COMPOSITIONS FOR THE MODULATION OF TASTE

FIELD OF THE INVENTION

[0001] This application claims the benefit of priority to the following provisional applications: United States Provisional Patent Application No. 63/515417, filed on July 25, 2023; United States Provisional Patent Application No. 63/583801, filed on September 19, 2023; United States Provisional Patent Application No. 63/618823, filed on January 8, 2024; and United States Provisional Patent Application No. 63/552981, filed on February 13, 2024. The disclosures of the above-referenced applications are hereby expressly incorporated by reference in their entireties.

FIELD OF THE INVENTION

[0002] Aspects of the present disclosure relate to compositions and methods of use comprising a flavonolignan, a steroid saponin, an iridoid glycoside, amentoflavone, a polyisoprenylated benzophenone, a phenylpropanoid, a pheylethanol derivate, a glycoside and/or analogs thereof (for example, glycosylation molecules of an aglycone, aglycones of a glycosylated molecule, or further glycosylated molecules of a glycosylated molecule) obtained from a plant extract such as a *Silybum marianum* (milk thistle) extract, an *Asparagus racemosus* extract, a *Smilax china* extract, a *Rehmannia glutinosa* root extract, a *Selaginella tamariscina* extract, a *Garcinia indicia* extract, a *Garcinia cambogia* extract, a *Trigonella foenum graecum L.* extract, a *Rhodiola rosea* root extract and/or other plant sources which are used for enhancing a subject's taste perception of sweetness, mouthfeel, astringency, bitterness, alcohol, carbonation, spice, salt, sourness, umami, tingling, numbing or cooling, harshness, pungency, burning, freshness, ripeness, juiciness, for increasing the amount of carbonation bubbles or decreasing the carbonation bubble size of a carbonated beverage, or for masking the off-tastes.

BACKGROUND OF THE INVENTION

[0003] Presently, there is an acknowledged need for flavor enhancement and taste modulation in food and beverages. Food and beverage manufacturers often have to balance the cost of certain components, such as sweeteners, dairy products, alcohol, carbonation, salt,

cooling agents or compounds, spices, or compounds that are astringent, bitter, or sour in their products with the taste profile and flavor profile provided to the consumer. Certain products that provide a more flavorful experience to the consumer may be reflected in a higher cost to the consumer. Food and beverage manufacturers may replace traditional sweeteners, including sucrose, fructose, and dextrose-based sweeteners with non or low-caloric sweetness modifiers, including rebaudioside A (Reb A), aspartame, saccharin, or glycosylated steviol glycosides, for example to partially or completely replace sugar in a consumable. Use of sweetener replacements however, may present undesirable or unexpected taste sensations, mouthfeel, onset, or other flavorings that distinguish the artificial sweetener in comparison to traditional caloric sweeteners. Additionally, astringent compounds, bitter compounds, harsh compounds, pungent compounds or sour compounds when consumed in excessive amounts can cause discomfort and health problems in consumers. Furthermore, masking off-tastes of consumables is a key driver of consumer acceptance and therefore of paramount importance for the food industry. Masking the off-taste of products helps to reduce the use of sugar/sweeteners and other taste and flavor ingredients, as well. As such, there is a need to provide low-cost taste modulators that can enhance the taste perception of a consumer, while also reducing the content of sweeteners, dairy products, alcohols, salts, carbonation, sour compounds, umami compounds, tingling compounds, numbing compounds, cooling agents of consumers, and spices in a food or beverage.

[0004] Taste modulators have previously been described. For example, US 2019/0090524 describes the use of sitosterol or an isomer thereof for enhancing alcohol sensation in alcoholic consumables or alcohol-free beverages as well as carbonation effect in carbonated beverages and US 2020/0109163 describes the use of sitosterol or a structural analog thereof to enhance the carbonation effect of carbonated beverages.

[0005] Sweetness enhancers have been previously described. For example, WO 2020/014610 describes the use of verbacoside or related compounds to enhance the sweetness of a sweetness modifier; US 2015/0305380 describes *R. suavissimus* extract for enhancing sugary mouthfeel; US 2015/0272184 describes the use of narigenin to enhance sweetness of a sweetness modifier; and WO 2020/118005 describes traumatic acid and isomers for use in compositions to enhance sweetness and mouthfeel of a carbohydrate sweetener.

SUMMARY OF THE INVENTION

[0006] Several embodiments described herein relate to methods for modulating a taste perception in a subject, such as sweetness and/or mouthfeel, or for masking the off-taste of a compound in a subject. In some aspects, the methods include: providing a subject a mixture comprising a first composition that comprises a sweetener admixed with a second composition comprising one or more flavonolignans, such as silibinin, silychristin, silydianin, dehydrosilybin, deoxysilycistin, deoxysilydianin, silandrin, silybinome, silyhermin or neosilyhermin, preferably, wherein the mixture is provided in a food or beverage or granule, powder or liquid and, optionally, wherein the mixture comprises one or more preservatives, such as a sulphite, sorbic acid, a sorbate compound, benzoic acid, benzoate, propionic acid, propionate, ascorbic acid, ascorbate, or citric acid or derivatives thereof, which improve, for example, the shelf-life or flavor profile of the mixture or food or beverage or granule.

[0007] In some embodiments, the methods described herein relate to modulating a taste perception in a subject, such as sweetness and/or mouthfeel, or for masking the off-taste of a compound in a subject, wherein the methods are practiced by providing a subject a mixture comprising a first composition that comprises a sweetener admixed with a second composition comprising one or more extracts derived from any species or variety of milk thistle, wherein the mixture is provided in a food or beverage or granule, powder or liquid formulation and, optionally, wherein the mixture includes one or more preservatives, such as a sulphite, sorbic acid, a sorbate compound, benzoic acid, benzoate, propionic acid, propionate, ascorbic acid, ascorbate, or citric acid or derivatives thereof, which improve, for example, the shelf-life or flavor profile of the mixture or food or beverage or granule.

[0008] Some embodiments relate to a method, wherein the one or more flavonolignans comprises one or more of: isosilychristin B, silychristin A, silychristin B, silydianin, silybin A, silybin B, isosilybin A, isosilybin B, or 2,3-Dehydrosilybin-der1 or a derivative thereof. In some methods, the sweetener comprises one or more of: a sugar, acesulfame potassium, advantame, alitame, aspartame, cyclamate, erythritol, isomalt, maltitol, lactitol, mannitol, neotame, saccharin, sucralose, sorbitol, xylitol, glycerol, thaumatin, glycyrrhizin, stevioside, luo han guo, stevia or a derivative thereof. In some embodiments, the second composition comprises: (a) an extract of *Silybum marianum* or sylimarin, such as an extract from *Silybum marianum (L) Gaertn* or *Silybum eburneum Coss. & Dur.*, preferably an

extract from *Silybum marianum (L.) Gaertn. var.marianum*, or *Silybum marianum (L.) Gaertn. var.albiflorum*; (b) an extract of *Iryanthera grandis* (Myristicaccae), *Iryanthera sagotiana*, or *Iryanthera lancifolia*; and/or (c) an extract from a plant including Sylimarin and/or one or more of its components.

[0009] In some embodiments, the one or more flavonolignans comprises a glucosylated flavonoligan or an aglycone of a flavonoligans.

[0010] In some embodiments, the mixture provides a sugar like or sugary mouthfeel sensation in the subject or a sensation of an increase in viscosity when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when the sweetener is provided to the subject in the absence of the second composition. In some embodiments, the mixture provides a taste perception in the subject of an increase in sweetness or sweetness intensity when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when the sweetener is provided to the subject in the absence of the second composition. In some embodiments, the mixture provides a taste perception in the subject of a faster onset of sweetness when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when the sweetener is provided to the subject in the absence of the second composition. In some embodiments, the mixture provides a taste perception in the subject that masks a sour taste, lingering sweetness, metallic taste, or a bitter taste when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when the sweetener is provided to the subject in the absence of the second composition.

[0011] In some of the methods described herein, the food or beverage or granule, powder, or liquid formulation is selected from a sugar substitute, carbonated fruit beverage, sport beverage, carbonated cola drink, wine cooler, cordial, flavored water, powders for drinks, hard candy, soft candy, taffy, chocolates, sugarless candies, chewing gum, bubble gum, condiments, spices and/or seasonings, dry cereal, oatmeal, granola bars, alcoholic beverages, energy beverages, juices, teas, coffees, salsa, gel beads, film strips for breath, gelatin candies,

pectin candies, starch candies, lozenges, cough drops, throat lozenges, throat sprays, toothpastes or mouth rinses.

[0012] In some of the embodiments described herein, the amount of the one or more flavonolignans or the amount of the second composition in the mixture is at least 0.5 ppm, such as 0.5, 1, 2, 3, 4, 5, 6, 7, 7.5 10, 20, 30, 40, 50, 60, 70, 80, 90, 100, 110, 120, 130, 140, 150, 160, 170, 180, 190, 200, 210, 220, 230, 240, 250, 260, 270, 280, 290, or 300 ppm or within a range defined by any two of the aforementioned amounts, preferably 7.5-150 ppm, 50-100 ppm, 50-200 ppm, or 50-300 ppm.

[0013] In some embodiments, the methods described herein further comprise selecting or identifying a subject to receive a composition, which modulates taste perception in a subject, such as sweetness, onset of sweetness, sugar like or sugary mouthfeel sensation, or which masks the off-taste of a compound, such as sourness, bitterness, lingering sweetness, or a metallic taste. In some embodiments, the methods described herein further comprise determining or analyzing the sweetness, sugar like or sugary mouthfeel sensation, the time of onset of sweetness, sweetness intensity, the masking of a sour, bitter, or metallic taste, or the masking of a lingering of sweetness or any combination thereof of the subject after consuming said mixture.

[0014] Some embodiments described herein relate to methods of making a composition, which modulates a taste perception of a subject, such as sweetness and/or mouthfeel, or which masks the off-taste of a compound, wherein the methods are practiced by: admixing a first component comprising a sweetener with a second component comprising one or more flavonolignans, such as silibinin, silychristin, silydianin, dehydrosilybin, deoxysilycistin, deoxysilydianin, silandrin, silybinome, silyhermin or neosilyhermin, so as to prepare said composition, preferably, wherein the composition is incorporated into a food or beverage or granule, powder or liquid formulation and, optionally, wherein the composition includes one or more preservatives, such as a sulphite, sorbic acid, a sorbate compound, benzoic acid, benzoate, propionic acid, propionate, ascorbic acid, ascorbate, or citric acid or derivatives thereof, which improve, for example, the shelf-life or flavor profile of the mixture or food or beverage or granule.

[0015] Some embodiments relate to methods of making a composition, which modulates a taste perception of a subject, such as sweetness and/or mouthfeel, or which masks

the off-taste of a compound, wherein said methods are practiced by: admixing a first component comprising a sweetener with a second component comprising one or more extracts derived from any species or variety of milk thistle, so as to prepare said composition, preferably, wherein the composition is incorporated into a food or beverage or granule, powder or liquid formulation and, optionally, wherein the composition includes one or more preservatives, such as a sulphite, sorbic acid, a sorbate compound, benzoic acid, benzoate, propionic acid, propionate, ascorbic acid, ascorbate, or citric acid or derivatives thereof, which improve, for example, the shelf-life or flavor profile of the mixture or food or beverage or granule.

[0016] In some embodiments of the method of making, the one or more flavonolignans comprise a glucosylated flavonoligan or an aglycones of a flavonoligan.

[0017] In some embodiments, the methods described herein relate to the use of a composition comprising one or more flavonolignans for modulating a taste perception in a subject, such as sweetness and/or mouthfeel, or for masking the off-taste of a compound in a subject.

[0018] In some embodiments, the methods described herein relate to any of the aforementioned embodiments, wherein the one or more flavonolignans comprises one or more of: isosilychristin B, silychristin A, silychristin B, silydianin, silybin A, silybin B, isosilybin A, isosilybin B, or 2,3-Dehydrosilybin-der1 or a derivative thereof. In some embodiments, the methods described herein relate to any of the aforementioned embodiments, wherein the sweetener comprises one or more of: a sugar, acesulfame potassium, advantame, alitame, aspartame, cyclamate, erythritol, isomalt, maltitol, lactitol, mannitol, neotame, saccharin, sucralose, sorbitol, xylitol, glycerol, thaumatin, glycyrrhizin, stevioside, luo han guo, stevia or a derivative thereof.

[0019] In some embodiments, the methods described herein relate to any of the aforementioned embodiments, wherein the second component comprises: (a) an extract of *Silybum marianum* or sylimarin, such as an extract from *Silybum marianum (L) Gaertn* or *Silybum eburneum Coss. & Dur.*, preferably an extract from *Silybum marianum (L.) Gaertn. var.marianum*, or *Silybum marianum (L.) Gaertn. var.albiflorum*; (b) an extract of *Iryanthera grandis* (Myristicaceae), *Iryanthera sagotiana*, or *Iryanthera lancifolia*; and/or (c) an extract from a plant including Sylimarin and/or one or more of its components.

[0020] In some embodiments of the method of use, the one or more flavonolignans comprise a glucosylated flavonoligan or an aglycones of a flavonoligan.

[0021] In some embodiments, the methods described herein relate to any of the aforementioned embodiments, wherein the composition provides a sugar like or sugary mouthfeel sensation in the subject or sensation of an increase in viscosity when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when the sweetener is provided to the subject in the absence of the second composition. In some embodiments, the methods described herein relate to any of the aforementioned embodiments, wherein the composition provides a taste perception in the subject of an increase in sweetness, a faster onset of sweetness, or a sugar like or a sugary mouthfeel sensation when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when the sweetener is provided to the subject in the absence of the second composition. In some embodiments, the methods described herein relate to any of the aforementioned embodiments, wherein the composition provides a taste perception in the subject that masks a lingering sweetness, a sourness, or a metallic or a bitter taste when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when the sweetener is provided to the subject in the absence of the second composition. In some embodiments, the methods described herein relate to any of the aforementioned embodiments, wherein the food or beverage or granule, powder, or liquid formulation is selected from a sugar substitute, carbonated fruit beverage, sport beverage, carbonated cola drink, wine cooler, cordial, flavored water, powders for drinks, hard candy, soft candy, taffy, chocolates, sugarless candies, chewing gum, bubble gum, condiments, spices and/or seasonings, dry cereal, oatmeal, granola bars, alcoholic beverages, energy beverages, juices, teas, coffees, salsa, gel beads, film strips for breath, gelatin candies, pectin candies, starch candies, lozenges, cough drops, throat lozenges, throat sprays, toothpastes or mouth rinses. In some embodiments, the methods described herein relate to any of the aforementioned embodiments, wherein the amount of the one or more flavonolignans or the amount of the second component in the mixture is at least 0.5 ppm, such as 0.5, 1, 2, 3, 4, 5, 6, 7, 7.5 10, 20, 30, 40, 50, 60, 70, 80, 90, 100, 110, 120, 130, 140, 150, 160, 170, 180, 190, 200, 210, 220, 230, 240, 250, 260, 270, 280, 290, or 300 ppm or within a

range defined by any two of the aforementioned amounts, preferably 7.5-150 ppm, 50-100 ppm, 50-200 ppm, or 50-300 ppm.

[0022] In some embodiments, the methods described herein relate to any of the aforementioned embodiments, wherein the subject is provided a mixture comprising a first composition comprising a sweetener admixed with a second composition comprising the one or more flavonolignans, such as silibinin, silychristin, silydianin, dehydrosilybin, deoxysilycistin, deoxysilydianin, silandrin, silybinome, silyhermin or neosilyhermin, preferably, wherein the mixture is provided in a food or beverage or granule, powder or liquid formulation and, optionally, wherein the mixture includes one or more preservatives, such as a sulphite, sorbic acid, a sorbate compound, benzoic acid, benzoate, propionic acid, propionate, ascorbic acid, ascorbate, or citric acid or derivatives thereof, which improve, for example, the shelf-life or flavor profile of the mixture or food or beverage or granule.

[0023] In some embodiments, the methods described herein relate to any of the aforementioned embodiments, wherein the subject is provided a mixture including a first composition comprising a sweetener admixed with a second composition comprising one or more extracts derived from any species or variety of milk thistle, preferably, wherein the mixture is provided in a food or beverage or granule, powder or liquid formulation and, optionally, wherein the mixture includes one or more preservatives, such as a sulphite, sorbic acid, a sorbate compound, benzoic acid, benzoate, propionic acid, propionate, ascorbic acid, ascorbate, or citric acid or derivatives thereof, which improve, for example, the shelf-life or flavor profile of the mixture or food or beverage or granule.

[0024] In some embodiments, the methods described herein relate to a use further comprising selecting or identifying a subject to receive a composition, which modulates taste perception in a subject, such as sweetness, onset of sweetness, sugar like or sugary mouthfeel sensation, or which masks the off-taste of a compound, such as bitterness, lingering sweetness, or a metallic taste.

[0025] In some embodiments, the methods described herein relate to a use further comprising determining or analyzing the sweetness, sugar like or sugary mouthfeel sensation, the time of onset of sweetness, sweetness intensity, the masking of a sour, bitter, or metallic taste, or the masking of a lingering of sweetness or any combination thereof of the subject after consuming said mixture.

[0026] In some embodiments, the methods described herein relate to a use, wherein the composition is dissolved in food grade ethanol. The use, wherein the food grade ethanol is at least 50%, such as 50, 60, 70, 80, 85, 90, 95, or 100%, or with a range defined by any two of the aforementioned amounts, preferably 80, 90, or 95%.

[0027] Several embodiments described herein relate to a method for modulating a subject's taste perception of alcohol, spice, cooling, carbonation, astringency, bitterness, or sourness or for masking off-tastes, the method including: providing a subject a mixture that includes at least two components (a) and (b): (a) a steroidal saponin or analog thereof (for example, a glycosylation molecule of an aglycone, an aglycone of a glycosylated molecule, or a further glycosylated molecule of a glycosylated molecule) or an extract of a plant that includes a steroidal saponin or an analog thereof, such as an *Asparagus racemosus* rhizome extract, a *Trigonella foenum graecum L.* extract or a *Smilax china* extract; and (b) a composition including an alcohol, a spice, a cooling compound, carbonation, an astringent compound, a bitter compound, a sour compound, or a compound with an off-taste; wherein component (a) is admixed with component (b); wherein the mixture is preferably provided in a food, beverage, granule, powder or liquid formulation; and optionally, wherein the mixture includes one or more preservatives or antioxidants, such as a sulphite, sorbic acid, a sorbate compound, benzoic acid, benzoate, propionic acid, propionate, ascorbic acid, ascorbate, citric acid, a tocopherol, a retinol, a polyphenol, a phenolic acid, a flavonoid, lipoic acid, N-acetylcysteine, butylated hydroxyanisole, butylated hydroxytoluene or derivatives thereof, preferably, wherein the one or more preservatives or antioxidants improve the shelf-life, flavor profile, or reduce spoilage of the mixture; and/or optionally, selecting a composition that includes an alcohol, a spice, a cooling compound, carbonation, an astringent compound, a bitter compound, a sour compound, or a compound with an off-taste for receiving an agent that modulates the taste perception of a subject of astringency, bitterness, or sourness or masks off-tastes and providing said selected composition component (a); and/or optionally, evaluating the modulation of a subject's taste perception of alcohol, spice, cooling, carbonation, astringency, bitterness, or sourness or evaluating the masking of off-tastes after providing the subject the mixture.

[0028] In some of the aforementioned methods, the steroidal saponin has one of the following sapogenin structures: spirostane, isospirostane, furostane, pregnane, or cholestane.

[0029] In some of the aforementioned methods, the steroidal saponin or extract of a plant that includes a steroidal saponin or an analog thereof includes saponins selected from one or more of the following: Shatavarin I, Shatavarin VIII, Protodioscin, Shatavarin IV, Shatarvain IX, Asparagoside A, Asparenydiol, Asparacosin A, Asparoside B, Sarsasapogenin, Schidigera saponin D5, Shatavarin VI, Immunoside, Shatavarin VII, Shatavarin X, Aspoligonin A, Prosapogenin A, Methyl gracillin, Methyl protodioscin, Neotigogenin-3-O-α-l-rhamnopyranosyl-(1 → 6)-β-d-glucopyranoside, Neotigogenin-3-O-β-d-glucopyranosyl-(1 → 4)-O-[α-l-rhamnopyranosyl-(1 → 6)]-β-d-glucopyranoside, Neotigogenin-3-O-β-d-glucopyranoside, Smilanippin A, Neotigogenin-3-O-β-d-glucopyranosyl-(1 → 4)-O-[α-l-arabinopyranosyl-(1 → 6)]-β-d-glucopyranoside, Sarsasapogenin-3-O-β-d-glucopyranosyl-(1 → 4)-[α-l-arabinopyranosyl- (1 → 6)]-β-d-glucopyranoside, (25S)-5β-Spirostane-3β-ol-3-O-α-l-rhamnopyranosyl-(1 → 2)-β-d-glucopyranosyl-(1 → 2)-β-d-glucopyranoside, Curillin G, Parillin, (25S)-Spirostan-6β-ol-3-O-β-d-glucopyranosyl-(1 → 4)-O-[α-l-arabinopyranosyl-(1 → 6)]-β-d-glucopyranoside, Trinervuloside C, Diosgenin-3-O-α-l-rhamnopyranoside, Dioscin, Diosgenin-3-O-[α-l-rhamnopyranosyl-(1 → 4)]-β-d-glucopyranoside, Diosgenin-3-O-[α-l-rhamnopyranosyl-(1 → 2)]-β-d-glucopyranoside, (25R)-Spirostan-5-en-3-O-α-l-rhamnopyranosyl-(1 → 2)-[α-l-rhamnopyranosyl-(1 → 4)-α-l-rhamnopyranosyl-(1 → 4)]-O-β-d-glucopyranoside, Gracillin, Parisyunnanoside C, Parisyunnanoside D, Parisyunnanoside E, Paris D, Paris H, (25R)-Spirost-5-en-3β,17α,27-triol-3-O-α-l-rhamnopyranosyl-(1 → 2)-[α-l-rhamnopyranosyl-(1 → 4)]-β-d-glucopyranoside, (25S)-Spirostan-5-en-3β,17α,27-triol-3-O-α-l-arabinopyranosyl-(1 → 6)-β-d-glucopyranoside, (25S)-Spirostan-5-en-3β,17α,27-triol-3-O-β-d-glucopyranosyl-(1 → 4)-[α-l-arabinopyranosyl-(1 → 6)]-β-d-glucopyranoside, (25S)-spirost-5-ene-3β,17α,27-triol-3-O-α-l-rhamnopyranosyl-(1 → 4)-β-d-glucopyranoside, (25S)-Spirost-5-en-3β,17α,27-triol-3-O-β-d-galactopyranoside, (25S)-Spirostan-5-en-3β,27-diol-3-O-α-l-arabinopyranosyl-(1 → 6)-β-d- glucopyranoside, Isonarthogenin3-O-α-l-rhamnopyranosyl-(1 → 2)-O-[α-l-rhamnopyranosyl-(1 → 4)]-β-d-glucopyranoside, Smilscobinoside A, Sieboldiin A, Sieboldiin B, Sieboldogenin, (25R)-5α-Spirostan-3β-ol-6-one-3-O-[α-l-arabinopyranosyl-(1 → 4)]-β-d-glucopyranoside, Smilaxin A, Smilaxin B, Parisvietnaside A, Smilaxin C, (25R)-5α-Spirostan-3β,6β-diol-3-O-β-d-glucopyranosyl-(1 → 4)-[α-l-arabinopyranosyl-(1 → 6)]-β-d-glucopyranoside, Smilscobinoside B, (25R)-5α-Spirostan-3β,17α,27-triol-3-O-β-d-glucopyranosyl-(1 → 4)-[α-l-arabinopyranosyl-(1 → 6)]-

β-d-glucopyranosie, (25R)-5βSpirostan-3β-ol-3-O-β-d-glucopyranosyl-(1 → 6)-[β-d-glucopyranosyl-(1 → 4)]-β-d-glucopyranosidc, (25R)-5β-Spirostan-3β-ol-3-O-β-d-glucopyranosyl-(1 → 6)-[β-d-glucopyranosyl-(1 → 2)]-[β-d-glucopyranosyl-(1 → 4)]-β-d-glucopyranoside, Disporoside A, (25R)-5β-Spirostan-3β-ol-3-O-β-d-glucopyranosyl-(1 → 6)-β-d-glucopyranoside, (25R)-5β-Spirostan-3β-ol-3-O-β-d-glucopyranosyl-(1 → 6)-[β-d-glucopyranosyl-(1 → 2)]-[α-l-rhamnopyranosyl-(l → 4)]-β-d-glucopyranoside, Smilagenin 3-O-β-d-glucopyranoside, Methylprotodioscin, 26-O-β-d-Glucopyranosyl-(25R)-furostan-5-en-3β,26-diol-22-methoxy-3-O-α-l-rhamnopyranosyl-(l → 2)-β-d-glucopyranoside, 26-O-β-d-Glucopyranosyl-22α-O-methyl-(25R)-furost-5-en-3β,26-diol-3-O-α-l-rhamnopyranosyl-(l → 4)-α-l-rhamnopyranosyl-(l → 4)-[α-l-rhamnopyranosyl-(l → 2)]-β-d-glucopyranoside, Protodiosgenin-3-O-α-l-rhamnopyranosyl-(1 → 4)-α-l-rhamnopyranosyl(1 → 4)-[α-l-rhamnopyranosyl(1 → 2)]-β-d-glucopyranoside, 26-O-β-d-Glucopyranosyl-22α-hydroxy-(25R)-furost-5-en-3β,26-diol-3-O-[4-O-acetyl-α-l-rhamnopyranosyl]-(l → 2)-[α-l-rhamnopyranosyl-(l → 4)]-β-d-glucopyranoside, 26-O-β-d-Glucopyranosyl-22α-hydroxy-(25R)-furost-5-en-3β,26-diol-3-O-[2-O-acetyl-α-l-rhamnopyranosyl]-(l → 2)-[α-l-rhamnopyranosyl-(l → 4)]-β-d-glucopyranoside, 26-O-β-d-Glucopyranosyl-22α-hydroxy-(25R)-furost-5-en-3β,26-diol-3-O-[3-O-acetyl-α-l-rhamnopyranosyl]-(l → 2)-[α-l-rhamnopyranosyl-(l → 4)]-β-d-glucopyranoside, 26-O-β-d-Glucopyranosyl-(25R)-furostan-5-en-3β,17α-diol-3-O-α-l-rhamnopyranosyl-(l → 2)-α-l-rhamnopyranoside, Protogracillin, Parisaponin I, Parisyunnanoside A, Pseudoprotodioscin, 26-O-β-d-Glucopyranosyl-(25R)-furostan-5,20(22)-dien-3β,26-diol-3-O-α-l-rhamnopyranosyl-(l → 2)-β-d-glucopyranoside, 15-Hydroxypseudoprotodioscin, 15-Methoxypseudoprotodioscin, 23-Oxopseudoprotodioscin, 26-O-β-d-Glucopyranosyl-(25S)-5-furosa-20(22)-en-3β,26-diol-3-O-α-l-rhamnopyranosyl-(l → 2)-O-[α-l-rhamnopyranosyl-(l → 6)]-β-d-glucopyranoside, Pseudoproto-pb, 26-O-β-d-Glucopyranosyl-(25R)-5α-furostan-3β,22,26-triol-6-one-3-O-α-l-arabinopyranosyl-(1 → 6)-β-d-glucopyranoside, 26-O-β-d-Glucopyranosyl-(25R)-5α-furostan-3β,22,26-triol-6-one-3-O-β-d-glucopyranosyl-(1 → 4)-[α-l-arabinopyranosyl-(1 → 6)]-β-d-glucopyranoside, 26-O-β-d-Glucopyranosyl-(25R)-5α-furostan-3β,26-diol-22-methoxyl-6-one-3-O-α-l-arabinopyranosyl-(1 → 6)-β-d-glucopyranoside, 26-O-β-d-Glucopyranosyl-(25R)-5α-furostan-3β,26-diol-22-methoxyl-6-one, 26-O-β-d-Glucopyranosyl-(25S)-5β-furostan-3β,26-diol-22α-methoxy-3-O-β-d-glucopyranosyl-(1 →

6)-[β-d-glucopyranosyl-(1 → 2)]-[β-d-glucopyranosyl-(1 → 4)]-β-d-glucopyranoside, (25S)-26-O-β-d-glucopyranosyl-3β,5β,22α-furostan-3,22,26-triol-3-O-α-l-rhamnopyranosyl-(1 → 2)-O-β-d-glucopyranosyl-(1 → 2)-O-β-d-glucopyranoside, Asparagoside E, Asparoside A, Asparoside B, 26-O-β-d-Glucopyranosyl-(25S)-5β-furostan-3β,22α-diol-3-O-α-l-arabinopyranosyl-(1 → 6)-[β-d-glucopyranosyl-(1 → 4)]-β-d-glucopyranoside, 26-O-β-d-Glucopyranosyl-(25S)-5α-furostan-3β,22α-diol-3-O-α-l-arabinopyranosyl-(1 → 6)-[β-d-glucopyranosyl-(1 → 4)]-β-d-glucopyranoside, 26-O-β-d-Glucopyranosyl-(25S)-5α-furostan-3β,6β,22α-tetraol-3-O-α-l-arabinopyranosyl-(1 → 6)-[β-d-glucopyranosyl-(1 → 4)]-β-d-glucopyranoside, Sarsaparilloside B, Sarsaparilloside C, Sarsaparilloside, Δ20(22)-Sarsaparilloside, Riparoside A, Smilaxchinoside A, (25R)-Smilaxchinoside A, Smilaxchinoside B, Smilaxchinoside C, Dioscoreside E, (25R)-5α-Furostan-3β,26-diol-20(22)-en-6-one-26-O-β-d-glucopyranoside, (23R,25R)-5α-Furostan-3β,23,26-triol-20(22)-en-6-one-26-O-β-d-glucopyranoside, 26-O-β-d-Glucopyranosyl-(25R)-5α-furostan-3β,26-diol-20(22)-en-6-one-3-O-α-l-arabinopyranosyl-(1 → 6)-β-d-glucopyranoside, (25S)-5β-Furostan-1β,2β,3β,5β,22α,26-hexaol-26-O-β-d-glucopyranoside, 26-O-β-d-Glucopyranosyl-(25S)-5β-furostan-1β,3β,22α,26-tetraol-1-O-β-d-glucopyranoside, Trinervuloside A, Riparoside B, Timosaponin J, Timosaponin K, Trinervuloside B, Pregna-5,16-diene-3β-ol-20-one-3-O-α-l-rhamnopyranosyl-(1 → 2)-O-[α-l-rhamnopyranosyl-(1 → 4)]-β-d-glucopyranoside, Pregna-5,16-diene-3β-ol-20-one-3-O-α-l-rhamnopyranosyl-(1 → 4)-α-l-rhamnopyranosyl-(1 → 4)-[α-l-rhamnopyranosyl-(1 → 2)]-β-d-glucopyranoside, Pregna-5,16-diene-3β-ol-20-one-3-O-α-l-rhamnopyranosyl-(1 → 2)-[α-l-rhamnopyranosyl-(1 → 4)]-α-l-rhamnopyranosyl-(1 → 2)-β-d-glucopyranoside, Pallidfloside D, Anguivioside XV, Yamogenin, Diosgenin, Smilagenin, Sarsasapogenin, Tigogenin, Neotigogenin, Gitogenin, Yuccagenin, Saponaretin or Smilaxchinoside D.

[0030] In some of the aforementioned methods, the steroidal saponin or analog thereof or extract of a plant that comprises a steroidal saponin or an analog thereof comprises a glucosylated steroidal saponins or an aglycone of a steroidal sanponin.

[0031] In some of the aforementioned methods, the composition is an alcoholic or non-alcoholic beverage, a carbonated beverage, a spice or spicy compound, such as a chili, wasabi, horseradish, mustard, ginger, black pepper, cinnamon, pumpkin spice, Szechuan pepper, allspice or any combination thereof, an astringent compound, such as phenolic

compounds, tannins, gallic acid, zinc oxide, zinc sulfate, tannic acid, potassium permanganate, silver nitrate, tincture of benzoin, potassium alum, caftaric acid, acacia, yarrow, sage, witch hazel, vinegar, tea, fruits, vegetables, dairy products, herbs, nuts or any combination thereof, a bitter compound, such as Absinthin, Aloin, Alpha acid, Amarogentin, Andrographolide, Brucine, Caffeine, Denatonium, Eugenin, Hesperidin, Humulone, Isohumulone, Kaempferol 3-O-rutinoside, 6-Methoxymellein, Naringin, Papaverine, Phenylthiocarbamide, Propylthiouracil, Quassin, Quinidine, Quinine, Salicin, Strychnine, Sucrose octaacetate, Sucrose octapropionate, Theobromine, Theophylline, vegetables, tea, chocolate, fruits or any combination thereof, a sour compound, such as acetic acid, citric acid, hydrochloric acid, lactic acid, malic acid, nitric acid, fumaric acid, sulfuric acid, tartaric acid, phosphoric acid, other acid or any combination thereof, a cooling compound, such as Menthol, Cyclohexanecarboxamide,N-Ethyl-5-Methyl-2-(1- Methylethyl) (WS-3), N-(Ethoxycarbonylmethyl)-3-p-menthanecarboxamide (WS-5), (1R,2S,5R)-N-(4-Methoxyphenyl)-5-methyl-2-(1- methylethyl)cyclohexanecarboxamide (WS-12), Butanamide, N,2,3-trimethyl-2-(1-methylethyl) (WS-23), or Menthyl Lactate or any combination thereof, a compound with an off-taste, such as plant-based milks or products of plant-based milks, dairy products, fruits, juices, proteins, plant protein, whole grain products or any combination thereof.

[0032] In some of the aforementioned methods, the dairy product, plant-based milk, or product of plant-based milk includes a milk, such as whole milk, nonfat milk, lactose-free milk, buttermilk, condensed milk, cashew milk, goat milk, rick milk, soy milk, oat milk, almond milk, coconut milk, a yogurt, cheese, frosting, pudding, chocolate, custard, ice cream, gelato, sherbet, sorbet, frozen yogurt or any combination thereof.

[0033] In some of the aforementioned methods, the plant extract including a steroidal saponin is obtained from a plant from any one or more of the following families or genera: Asparagaceae, Amaryllidaceae, Dioscoreaceae, Liliaceae, Costaceae, Melanthiaceae, Plantaginaceae, Fabaceae, Asteraceae, Asparagus, Tupistra, Anemarrhena, Sansevieria, Polygonatum, Nolina, Convallaria, Ophipogon, Hosta, Ornithogalum, Ruscus, Agapanthus, Dioscorea, Fritillaria, Lilium, Costus, Paris, Digitalis, Trigonella, Smilax, or Vernonia.

[0034] In some of the aforementioned methods, the plant extract including a steroidal saponin is obtained from a plant from any one or more of the following species:

Smilax riparia, *Smilax lanceaefolia*, *Smilax nipponica*, *Smilax nigrescens*, *Smilax officinalis*, *Smilax aspera subsp. Mauritanica*, *Smilax aristolochiifolia*, *Smilax ornate*, *Smilax glabra*, *Smilax china*, *Smilax menispermoides*, *Smilax lebrunii*, *Smilax stans*, *Smilax bockii*, *Smilax excelsa*, *Smilax microphylla*, *Smilax scobinicaulis*, *Smilax sieboldii*, *Smilax krausiana*, *Smilax medica*, *Asparagus acutifolius*, *Asparagus aethiopicus*, *Asparagus africanus*, *Asparagus asparagoides*, *Asparagus burchellii*, *Asparagus cochinchinensis*, *Asparagus declinatus*, *Asparagus capensis*, *Asparagus curillus*, *Asparagus densiflorus*, *Asparagus exuvialis*, *Asparagus falcatus*, *Asparagus fallax*, *Asparagus flagellaris*, *Asparagus horridus*, *Asparagus krebsianus*, *Asparagus laricinus*, *Asparagus lignosus*, *Asparagus macowanii*, *Asparagus mariae*, *Asparagus maritimus*, *Asparagus mucronatus*, *Asparagus multiflorus*, *Asparagus nesiotes*, *Asparagus officinalis*, *Asparagus ovatus*, *Asparagus pastorianus*, *Asparagus persicus*, *Asparagus racemosus*, *Asparagus retrofractus*, *Asparagus rubicundus*, *Asparagus scandens*, *Asparagus schoberioides*, *Asparagus scoparius*, *Asparagus setaceus*, *Asparagus striatus*, *Asparagus suaveolens*, *Asparagus tenuifolius*, *Asparagus umbellatus*, *Asparagus vaginellatus*, *Trigonella foenum graecum* or *Asparagus virgatus*.

[0035] In some of the aforementioned methods, the mixture provides a taste perception in the subject of a reduction in bitterness or bitterness perception, a masking of bitter tastes or bitterness, a reduction in sourness or sourness perception, a masking of sour tastes or sourness, a reduction in initial sourness perception or lingering sourness perception, a reduction in astringency or astringency perception, a masking of astringency, or a masking of off tastes when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0036] In some of the aforementioned methods, the mixture provides a taste perception in the subject of masked cooked tastes, masked metallic tastes, enhanced beer flavor, enhanced alcohol flavor, enhanced retro-nasal effect, increased bitterness perception, enhanced alcohol perception, enhanced spice intensity, increased sour perception, enhanced cooling intensity, faster onset of cooling sensation, increased duration of taste, or reduced stinging taste when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0037] In some of the aforementioned methods, the mixture increases the amount of carbonation bubbles or reduces the carbonation bubble size of a beverage when the mixture is provided to the subject, such as when the mixture is incorporated in a beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0038] In some of the aforementioned methods, the food or beverage or granule, powder, or liquid formulation is selected from water, a carbonated beverage, such as a carbonated fruit beverage, carbonated cola drink or carbonated water, alcoholic beverages, alcohol-free beverages, spices and/or seasonings, such as chili, wasabi, horseradish, mustard, ginger, black pepper, or cinnamon, energy beverages, flavored water, powders for drinks, dairy products, such as milk, yogurt, cheese, or ice cream, plant based milks, products of plant based milk, puddings, cakes, shakes, malts, brownies, pastries, cookies, cheesecakes, fudge, pies, cobblers, parfaits, mousse, biscuits, custards, frosting, fruits, vegetables, hard candy, soft candy, taffy, chocolates, sugarless candies, chewing gum, bubble gum, juices, teas, coffees, salsa, gel beads, film strips for breath, gelatin candies, pectin candies, starch candies, lozenges, cough drops, throat lozenges, throat sprays, toothpastes or mouth rinses.

[0039] In some of the aforementioned methods, the amount of component (a) in the mixture is at least 2 ppm, such as, 3, 4, 5, 7.5, 10, 20, 30, 40, 50, 60, 70, 80, 90, 100, 110, 120, 130, 140, 150, 160, 170, 180, 190, 200, 210, 220, 230, 240, 250, 260, 270, 280, 290, or 300 ppm or an amount within a range defined by any two of the aforementioned amounts, preferably 2-40 ppm, 6-75 ppm, 6-100 ppm, or 12-200 ppm.

[0040] In some embodiments, the aforementioned methods further include selecting or identifying a subject to receive a composition, which modulates a taste perception in a subject, such as alcohol, spice, cooling carbonation, bitterness, sourness, or astringency, or which masks off-tastes in a subject, such as bitter or sour tastes.

[0041] In some embodiments, the aforementioned methods further include determining or analyzing the alcohol perception, bitterness perception, bitterness intensity, the masking of bitterness, the sourness perception, sourness intensity, the masking of sourness, astringency perception, astringency intensity, the masking of astringency, or the masking of off-tastes or any combination thereof of the subject after consuming said mixture or

determining or analyzing the increase of carbonation bubbles, the reduction of carbonation bubble size of a carbonated beverage after providing composition component (a).

[0042] In some of the aforementioned methods, component (a) is dissolved in food grade ethanol.

[0043] In some of the aforementioned methods, the food grade ethanol is at least 1%, such as 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 15, 20, 25, 30, 35, 40, 45, 50, 60, 70, 80, 85, 90, 95, or 100%, or with a range defined by any two of the aforementioned amounts, preferably 80, 90, or 95%.

[0044] Additional embodiments described herein relate to methods of making a mixture which modulates a subject's taste perception of alcohol, spice, cooling, carbonation, astringency, bitterness, or sourness or which masks off-tastes, the method including the method including: admixing a component (a) with a component (b) to form said mixture: (a) a steroidal saponin or analog thereof (for example, a glycosylation molecule of an aglycone, an aglycone of a glycosylated molecule, or a further glycosylated molecule of a glycosylated molecule) or an extract of a plant that includes a steroidal saponin or an analog thereof, such as an *Asparagus racemosus* rhizome extract, a *Trigonella foenum graecum L.* extract or a *Smilax china* extract; and (b) a composition including an alcohol, a spice, a cooling compound, carbonation, an astringent compound, a bitter compound, a sour compound, or a compound with an off-taste; wherein component (a) is admixed with component (b); wherein the mixture is preferably provided in a food, beverage, granule, powder or liquid formulation; and optionally, wherein the composition includes one or more preservatives or antioxidants, such as a sulphite, sorbic acid, a sorbate compound, benzoic acid, benzoate, propionic acid, propionate, ascorbic acid, ascorbate, citric acid, a tocopherol, a retinol, a polyphenol, a phenolic acid, a flavonoid, lipoic acid, N-acetylcysteine, butylated hydroxyanisole, butylated hydroxytoluene or derivatives thereof, preferably, wherein the one or more preservatives or antioxidants improve the shelf-life, flavor profile, or reduce spoilage of the mixture.

[0045] In some embodiments of the aforementioned methods of making, the steroidal saponin has one of the following sapogenin structures: spirostane, isospirostane, furostane, pregnane, or cholestane.

[0046] In some embodiments of the aforementioned methods of making, the steroidal saponin or extract of a plant that includes a steroidal saponin or an analog thereof

includes saponins selected from one or more of the following: Shatavarin I, Shatavarin VIII, Protodioscin, Shatavarin IV, Shatarvain IX, Asparagoside A, Asparcnydiol, Asparacosin A, Asparoside B, Sarsasapogenin, Schidigera saponin D5, Shatavarin VI, Immunoside, Shatavarin VII, Shatavarin X, Aspoligonin A, Prosapogenin A, Methyl gracillin, Methyl protodioscin, Neotigogenin-3-O-α-l-rhamnopyranosyl-(1 → 6)-β-d-glucopyranoside, Neotigogenin-3-O-β-d-glucopyranosyl-(1 → 4)-O-[α-l-rhamnopyranosyl-(1 → 6)]-β-d-glucopyranoside, Neotigogenin-3-O-β-d-glucopyranoside, Smilanippin A, Neotigogenin-3-O-β-d-glucopyranosyl-(1 → 4)-O-[α-l-arabinopyranosyl-(1 → 6)]-β-d-glucopyranoside, Sarsasapogenin-3-O-β-d-glucopyranosyl-(1 → 4)-[α-l-arabinopyranosyl- (1 → 6)]-β-d-glucopyranoside, (25S)-5β-Spirostane-3β-ol-3-O-α-l-rhamnopyranosyl-(1 → 2)-β-d-glucopyranosyl-(1 → 2)-β-d-glucopyranoside, Curillin G, Parillin, (25S)-Spirostan-6β-ol-3-O-β-d-glucopyranosyl-(1 → 4)-O-[α-l-arabinopyranosyl-(1 → 6)]-β-d-glucopyranoside, Trinervuloside C, Diosgenin-3-O-α-l-rhamnopyranoside, Dioscin, Diosgenin-3-O-[α-l-rhamnopyranosyl-(l → 4)]-β-d-glucopyranoside, Diosgenin-3-O-[α-l-rhamnopyranosyl-(l → 2)]-β-d-glucopyranoside, (25R)-Spirostan-5-en-3-O-α-l-rhamnopyranosyl-(l → 2)-[α-l-rhamnopyranosyl-(l → 4)-α-l-rhamnopyranosyl-(l → 4)]-O-β-d-glucopyranoside, Gracillin, Parisyunnanoside C, Parisyunnanoside D, Parisyunnanoside E, Paris D, Paris H, (25R)-Spirost-5-en-3β,17α,27-triol-3-O-α-l-rhamnopyranosyl-(l → 2)-[α-l-rhamnopyranosyl-(l → 4)]-β-d-glucopyranoside, (25S)-Spirostan-5-en-3β,17α,27-triol-3-O-α-l-arabinopyranosyl-(1 → 6)-β-d-glucopyranoside, (25S)-Spirostan-5-en-3β,17α,27-triol-3-O-β-d-glucopyranosyl-(1 → 4)-[α-l-arabinopyranosyl-(1 → 6)]-β-d-glucopyranoside, (25S)-spirost-5-ene-3β,17α,27-triol-3-O-α-l-rhamnopyranosyl-(l → 4)-β-d-glucopyranoside, (25S)-Spirost-5-en-3β,17α,27-triol-3-O-β-d-galactopyranoside, (25S)-Spirostan-5-en-3β,27-diol-3-O-α-l-arabinopyranosyl-(1 → 6)-β-d- glucopyranoside, Isonarthogenin3-O-α-l-rhamnopyranosyl-(l → 2)-O-[α-l-rhamnopyranosyl-(l → 4)]-β-d-glucopyranoside, Smilscobinoside A, Sieboldiin A, Sieboldiin B, Sieboldogenin, (25R)-5α-Spirostan-3β-ol-6-one-3-O-[α-l-arabinopyranosyl-(l → 4)]-β-d-glucopyranoside, Smilaxin A, Smilaxin B, Parisvietnaside A, Smilaxin C, (25R)-5α-Spirostan-3β,6β-diol-3-O-β-d-glucopyranosyl-(1 → 4)-[α-l-arabinopyranosyl-(1 → 6)]-β-d-glucopyranoside, Smilscobinoside B, (25R)-5α-Spirostan-3β,17α,27-triol-3-O-β-d-glucopyranosyl-(1 → 4)-[α-l-arabinopyranosyl-(1 → 6)]-β-d-glucopyranosie, (25R)-5βSpirostan-3β-ol-3-O-β-d-glucopyranosyl-(1 → 6)-[β-d-glucopyranosyl-(1 → 4)]-β-d-

glucopyranoside, (25R)-5β-Spirostan-3β-ol-3-O-β-d-glucopyranosyl-(1 → 6)-[β-d-glucopyranosyl-(1 → 2)]-[β-d-glucopyranosyl-(1 → 4)]-β-d-glucopyranoside, Disporoside A, (25R)-5β-Spirostan-3β-ol-3-O-β-d-glucopyranosyl-(1 → 6)-β-d-glucopyranoside, (25R)-5β-Spirostan-3β-ol-3-O-β-d-glucopyranosyl-(1 → 6)-[β-d-glucopyranosyl-(1 → 2)]-[α-l-rhamnopyranosyl-(1 → 4)]-β-d-glucopyranoside, Smilagenin 3-O-β-d-glucopyranoside, Methylprotodioscin, 26-O-β-d-Glucopyranosyl-(25R)-furostan-5-en-3β,26-diol-22-methoxy-3-O-α-l-rhamnopyranosyl-(1 → 2)-β-d-glucopyranoside, 26-O-β-d-Glucopyranosyl-22α-O-methyl-(25R)-furost-5-en-3β,26-diol-3-O-α-l-rhamnopyranosyl-(1 → 4)-α-l-rhamnopyranosyl-(1 → 4)-[α-l-rhamnopyranosyl-(1 → 2)]-β-d-glucopyranoside, Protodiosgenin-3-O-α-l-rhamnopyranosyl-(1 → 4)-α-l-rhamnopyranosyl(1 → 4)-[α-l-rhamnopyranosyl(1 → 2)]-β-d-glucopyranoside, 26-O-β-d-Glucopyranosyl-22α-hydroxy-(25R)-furost-5-en-3β,26-diol-3-O-[4-O-acetyl-α-l-rhamnopyranosyl]-(1 → 2)-[α-l-rhamnopyranosyl-(1 → 4)]-β-d-glucopyranoside, 26-O-β-d-Glucopyranosyl-22α-hydroxy-(25R)-furost-5-en-3β,26-diol-3-O-[2-O-acetyl-α-l-rhamnopyranosyl]-(1 → 2)-[α-l-rhamnopyranosyl-(1 → 4)]-β-d-glucopyranoside, 26-O-β-d-Glucopyranosyl-22α-hydroxy-(25R)-furost-5-en-3β,26-diol-3-O-[3-O-acetyl-α-l-rhamnopyranosyl]-(1 → 2)-[α-l-rhamnopyranosyl-(1 → 4)]-β-d-glucopyranoside, 26-O-β-d-Glucopyranosyl-(25R)-furostan-5-en-3β,17α-diol-3-O-α-l-rhamnopyranosyl-(1 → 2)-α-l-rhamnopyranoside, Protogracillin, Parisaponin I, Parisyunnanoside A, Pseudoprotodioscin, 26-O-β-d-Glucopyranosyl-(25R)-furostan-5,20(22)-dien-3β,26-diol-3-O-α-l-rhamnopyranosyl-(1 → 2)-β-d-glucopyranoside, 15-Hydroxypseudoprotodioscin, 15-Methoxypseudoprotodioscin, 23-Oxopseudoprotodioscin, 26-O-β-d-Glucopyranosyl-(25S)-5-furosa-20(22)-en-3β,26-diol-3-O-α-l-rhamnopyranosyl-(1 → 2)-O-[α-l-rhamnopyranosyl-(1 → 6)]-β-d-glucopyranoside, Pseudoproto-pb, 26-O-β-d-Glucopyranosyl-(25R)-5α-furostan-3β,22,26-triol-6-one-3-O-α-l-arabinopyranosyl-(1 → 6)-β-d-glucopyranoside, 26-O-β-d-Glucopyranosyl-(25R)-5α-furostan-3β,22,26-triol-6-one-3-O-β-d-glucopyranosyl-(1 → 4)-[α-l-arabinopyranosyl-(1 → 6)]-β-d-glucopyranoside, 26-O-β-d-Glucopyranosyl-(25R)-5α-furostan-3β,26-diol-22-methoxyl-6-one-3-O-α-l-arabinopyranosyl-(1 → 6)-β-d-glucopyranoside, 26-O-β-d-Glucopyranosyl-(25R)-5α-furostan-3β,26-diol-22-methoxyl-6-one, 26-O-β-d-Glucopyranosyl-(25S)-5β-furostan-3β,26-diol-22α-methoxy-3-O-β-d-glucopyranosyl-(1 → 6)-[β-d-glucopyranosyl-(1 → 2)]-[β-d-glucopyranosyl-(1 → 4)]-β-d-glucopyranoside, (25S)-

26-O-β-d-glucopyranosyl-3β,5β,22α-furostan-3,22,26-triol-3-O-α-l-rhamnopyranosyl-(1 → 2)-O-β-d-glucopyranosyl-(1 → 2)-O-β-d-glucopyranoside, Asparagoside E, Asparoside A, Asparoside B, 26-O-β-d-Glucopyranosyl-(25S)-5β-furostan-3β,22α-diol-3-O-α-l-arabinopyranosyl-(1 → 6)-[β-d-glucopyranosyl-(1 → 4)]-β-d-glucopyranoside, 26-O-β-d-Glucopyranosyl-(25S)-5α-furostan-3β,22α-diol-3-O-α-l-arabinopyranosyl-(1 → 6)-[β-d-glucopyranosyl-(1 → 4)]-β-d-glucopyranoside, 26-O-β-d-Glucopyranosyl-(25S)-5α-furostan-3β,6β,22α-tetraol-3-O-α-l-arabinopyranosyl-(1 → 6)-[β-d-glucopyranosyl-(1 → 4)]-β-d-glucopyranoside, Sarsaparilloside B, Sarsaparilloside C, Sarsaparilloside, Δ20(22)-Sarsaparilloside, Riparoside A, Smilaxchinoside A, (25R)-Smilaxchinoside A, Smilaxchinoside B, Smilaxchinoside C, Dioscoreside E, (25R)-5α-Furostan-3β,26-diol-20(22)-en-6-one-26-O-β-d-glucopyranoside, (23R,25R)-5α-Furostan-3β,23,26-triol-20(22)-en-6-one-26-O-β-d-glucopyranoside, 26-O-β-d-Glucopyranosyl-(25R)-5α-furostan-3β,26-diol-20(22)-en-6-one-3-O-α-l-arabinopyranosyl-(1 → 6)-β-d-glucopyranoside, (25S)-5β-Furostan-1β,2β,3β,5β,22α,26-hexaol-26-O-β-d-glucopyranoside, 26-O-β-d-Glucopyranosyl-(25S)-5β-furostan-1β,3β,22α,26-tetraol-1-O-β-d-glucopyranoside, Trinervuloside A, Riparoside B, Timosaponin J, Timosaponin K, Trinervuloside B, Pregna-5,16-diene-3β-ol-20-one-3-O-α-l-rhamnopyranosyl-(1 → 2)-O-[α-l-rhamnopyranosyl-(1 → 4)]-β-d-glucopyranoside, Pregna-5,16-diene-3β-ol-20-one-3-O-α-l-rhamnopyranosyl-(1 → 4)-α-l-rhamnopyranosyl-(1 → 4)-[α-l-rhamnopyranosyl-(1 → 2)]-β-d-glucopyranoside, Pregna-5,16-diene-3β-ol-20-one-3-O-α-l-rhamnopyranosyl-(1 → 2)-[α-l-rhamnopyranosyl-(1 → 4)]-α-l-rhamnopyranosyl-(1 → 2)-β-d-glucopyranoside, Pallidfloside D, Anguivioside XV, Yamogenin, Diosgenin, Smilagenin, Sarsasapogenin, Tigogenin, Neotigogenin, Gitogenin, Yuccagenin, Saponaretin or Smilaxchinoside D. In some embodiments of the aforementioned methods of making, the steroidal saponin or analog thereof or extract of a plant that comprises a steroidal saponin or an analog thereof comprises a glucosylated steroidal saponins or an aglycone of a steroidal saponin.

[0047] In some embodiments of the aforementioned methods of making, the composition is an alcoholic or non-alcoholic beverage, a carbonated beverage, a spice or spicy compound, such as a chili, wasabi, horseradish, mustard, ginger, black pepper, cinnamon, pumpkin spice, Szechuan pepper, allspice or any combination thereof, an astringent compound, such as phenolic compounds, tannins, gallic acid, zinc oxide, zinc sulfate, tannic acid,

potassium permanganate, silver nitrate, tincture of benzoin, potassium alum, caftaric acid, acacia, yarrow, sage, witch hazel, vinegar, tea, fruits, vegetables, dairy products, herbs, nuts or any combination thereof, a bitter compound, such as Absinthin, Aloin, Alpha acid, Amarogentin, Andrographolide, Brucine, Caffeine, Denatonium, Eugenin, Hesperidin, Humulone, Isohumulone, Kaempferol 3-O-rutinoside, 6-Methoxymellein, Naringin, Papaverine, Phenylthiocarbamide, Propylthiouracil, Quassin, Quinidine, Quinine, Salicin, Strychnine, Sucrose octaacetate, Sucrose octapropionate, Theobromine, Theophylline, vegetables, tea, chocolate, fruits or any combination thereof, a sour compound, such as acetic acid, citric acid, hydrochloric acid, lactic acid, malic acid, nitric acid, fumaric acid, sulfuric acid, tartaric acid, phosphoric acid, other acid or any combination thereof, a cooling compound, such as Menthol, Cyclohexanecarboxamide,N-Ethyl-5-Methyl-2-(1- Methylethyl) (WS-3), N-(Ethoxycarbonylmethyl)-3-p-menthanecarboxamide (WS-5), (1R,2S,5R)-N-(4-Methoxyphenyl)-5-methyl-2-(1- methylethyl)cyclohexanecarboxamide (WS-12), Butanamide, N,2,3-trimethyl-2-(1-methylethyl) (WS-23), or Menthyl Lactate or any combination thereof, a compound with an off-taste, such as plant-based milks or products of plant-based milks, dairy products, fruits, juices, proteins, plant protein, whole grain products or any combination thereof.

[0048] In some embodiments of the aforementioned methods of making, the dairy product, plant-based milk, or product of plant-based milk includes a milk, such as whole milk, nonfat milk, lactose-free milk, buttermilk, condensed milk, cashew milk, goat milk, rick milk, soy milk, oat milk, almond milk, coconut milk, a yogurt, cheese, frosting, pudding, chocolate, custard, ice cream, gelato, sherbet, sorbet, frozen yogurt or any combination thereof.

[0049] In some embodiments of the aforementioned methods of making, the plant extract including a steroidal saponin is obtained from a plant from any one or more of the following families or genera: Asparagaceae, Amaryllidaceae, Dioscoreaceae, Liliaceae, Costaceae, Melanthiaceae, Plantaginaceae, Fabaceae, Asteraceae, Asparagus, Tupistra, Anemarrhena, Sansevieria, Polygonatum, Nolina, Convallaria, Ophipogon, Hosta, Ornithogalum, Ruscus, Agapanthus, Dioscorea, Fritillaria, Lilium, Costus, Paris, Digitalis, Trigonella, Smilax, or Vernonia.

[0050] In some embodiments of the aforementioned methods of making, the plant extract including a steroidal saponin is obtained from a plant from any one or more of the

following species: *Smilax riparia*, *Smilax lanceaefolia*, *Smilax nipponica*, *Smilax nigrescens*, *Smilax officinalis*, *Smilax aspera subsp. Mauritanica*, *Smilax aristolochiifolia*, *Smilax ornate*, *Smilax glabra*, *Smilax china*, *Smilax menispermoides*, *Smilax lebrunii*, *Smilax stans*, *Smilax bockii*, *Smilax excelsa*, *Smilax microphylla*, *Smilax scobinicaulis*, *Smilax sieboldii*, *Smilax krausiana*, *Smilax medica*, *Asparagus acutifolius*, *Asparagus aethiopicus*, *Asparagus africanus*, *Asparagus asparagoides*, *Asparagus burchellii*, *Asparagus cochinchinensis*, *Asparagus declinatus*, *Asparagus capensis*, *Asparagus curillus*, *Asparagus densiflorus*, *Asparagus exuvialis*, *Asparagus falcatus*, *Asparagus fallax*, *Asparagus flagellaris*, *Asparagus horridus*, *Asparagus krebsianus*, *Asparagus laricinus*, *Asparagus lignosus*, *Asparagus macowanii*, *Asparagus mariae*, *Asparagus maritimus*, *Asparagus mucronatus*, *Asparagus multiflorus*, *Asparagus nesiotes*, *Asparagus officinalis*, *Asparagus ovatus*, *Asparagus pastorianus*, *Asparagus persicus*, *Asparagus racemosus*, *Asparagus retrofractus*, *Asparagus rubicundus*, *Asparagus scandens*, *Asparagus schoberioides*, *Asparagus scoparius*, *Asparagus setaceus*, *Asparagus striatus*, *Asparagus suaveolens*, *Asparagus tenuifolius*, *Asparagus umbellatus*, *Asparagus vaginellatus*, *Trigonella foenum graecum* or *Asparagus virgatus*.

[0051] In some embodiments of the aforementioned methods of making, the mixture provides a taste perception in the subject of a reduction in bitterness or bitterness perception, a masking of bitter tastes or bitterness, a reduction in sourness or sourness perception, a masking of sour tastes or sourness, a reduction in initial sourness perception or lingering sourness perception, a reduction in astringency or astringency perception, a masking of astringency, or a masking of off tastes when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a). In some embodiments of the aforementioned methods of making, the mixture provides a taste perception in the subject of masked cooked tastes, masked metallic tastes, enhanced beer flavor, enhanced alcohol flavor, enhanced retro-nasal effect, increased bitterness perception, enhanced alcohol perception, enhanced spice intensity, increased sour perception, enhanced cooling intensity, faster onset of cooling sensation, increased duration of taste, or reduced stinging taste when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0052] In some embodiments of the aforementioned methods of making, the mixture increases the amount of carbonation bubbles or reduces the carbonation bubble size of a beverage when the mixture is provided to the subject, such as when the mixture is incorporated in a beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0053] In some embodiments of the aforementioned methods of making, the food or beverage or granule, powder, or liquid formulation is selected from water, a carbonated beverage, such as a carbonated fruit beverage, carbonated cola drink or carbonated water, alcoholic beverages, alcohol-free beverages, spices and/or seasonings, such as chili, wasabi, horseradish, mustard, ginger, black pepper, or cinnamon, energy beverages, flavored water, powders for drinks, dairy products, such as milk, yogurt, cheese, or ice cream, plant based milks, products of plant based milk, puddings, cakes, shakes, malts, brownies, pastries, cookies, cheesecakes, fudge, pies, cobblers, parfaits, mousse, biscuits, custards, frosting, fruits, vegetables, hard candy, soft candy, taffy, chocolates, sugarless candies, chewing gum, bubble gum, juices, teas, coffees, salsa, gel beads, film strips for breath, gelatin candies, pectin candies, starch candies, lozenges, cough drops, throat lozenges, throat sprays, toothpastes or mouth rinses.

[0054] In some embodiments of the aforementioned methods of making, the amount of component (a) in the mixture is at least 2 ppm, such as, 3, 4, 5, 7.5, 10, 20, 30, 40, 50, 60, 70, 80, 90, 100, 110, 120, 130, 140, 150, 160, 170, 180, 190, 200, 210, 220, 230, 240, 250, 260, 270, 280, 290, or 300 ppm or an amount within a range defined by any two of the aforementioned amounts, preferably 2-40 ppm, 6-75 ppm, 6-100 ppm, or 12-200 ppm.

[0055] In some embodiments of the aforementioned methods of making, component (a) is dissolved in food grade ethanol.

[0056] In some embodiments of the aforementioned methods of making, the food grade ethanol is at least 1%, such as 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 15, 20, 25, 30, 35, 40, 45, 50, 60, 70, 80, 85, 90, 95, or 100%, or with a range defined by any two of the aforementioned amounts, preferably 80, 90, or 95%.

[0057] Additional embodiments further include a composition obtained or obtainable by any one or more of the methods mentioned above.

[0058] More embodiments relate to a mixture used for modulating a subject's taste perception of alcohol, spice, cooling, carbonation, astringency, bitterness or sourness or for masking off-tastes, wherein the mixture includes at least two components (a) and (b): (a) a steroidal saponin or analog thereof (for example, a glycosylation molecule of an aglycone, an aglycone of a glycosylated molecule, or a further glycosylated molecule of a glycosylated molecule) or an extract of a plant that includes a steroidal saponin or an analog thereof, such as an *Asparagus racemosus* rhizome extract, a *Trigonella foenum graecum L.* extract or a *Smilax china* extract; and (b) a composition including an alcohol, a spice, a cooling compound, carbonation, an astringent compound, a bitter compound, a sour compound, or a compound with an off-taste; wherein component (a) is admixed with component (b); preferably, wherein the mixture is provided in a food, beverage, granule, powder or liquid formulation; and optionally, wherein the mixture includes one or more preservatives or antioxidants, such as a sulphite, sorbic acid, a sorbate compound, benzoic acid, benzoate, propionic acid, propionate, ascorbic acid, ascorbate, citric acid, a tocopherol, a retinol, a polyphenol, a phenolic acid, a flavonoid, lipoic acid, N-acetylcysteine, butylated hydroxyanisole, butylated hydroxytoluene or derivatives thereof, preferably, wherein the one or more preservatives or antioxidants improve the shelf-life, flavor profile, or reduce spoilage of the mixture.

[0059] In some embodiments of the aforementioned mixtures for use, the steroidal saponin has one of the following sapogenin structures: spirostane, isospirostane, furostane, pregnane, or cholestane.

[0060] In some embodiments of the aforementioned mixtures for use, the steroidal saponin or extract of a plant that includes a steroidal saponin or an analog thereof includes saponins selected from one or more of the following: Shatavarin I, Shatavarin VIII, Protodioscin, Shatavarin IV, Shatarvain IX, Asparagoside A, Asparenydiol, Asparacosin A, Asparoside B, Sarsasapogenin, Schidigera saponin D5, Shatavarin VI, Immunoside, Shatavarin VII, Shatavarin X, Aspoligonin A, Prosapogenin A, Methyl gracillin, Methyl protodioscin, Neotigogenin-3-O-α-l-rhamnopyranosyl-(1 → 6)-β-d-glucopyranoside, Neotigogenin-3-O-β-d-glucopyranosyl-(l → 4)-O-[α-l-rhamnopyranosyl-(l → 6)]-β-d-glucopyranoside, Neotigogenin-3-O-β-d-glucopyranoside, Smilanippin A, Neotigogenin-3-O-β-d-glucopyranosyl-(1 → 4)-O-[α-l-arabinopyranosyl-(1 → 6)]-β-d-glucopyranoside, Sarsasapogenin-3-O-β-d-glucopyranosyl-(1 → 4)-[α-l-arabinopyranosyl- (1 → 6)]-β-d-

glucopyranoside, (25S)-5β-Spirostane-3β-ol-3-O-α-l-rhamnopyranosyl-(1 → 2)-β-d-glucopyranosyl-(1 → 2)-β-d-glucopyranoside, Curillin G, Parillin, (25S)-Spirostan-6β-ol-3-O-β-d-glucopyranosyl-(1 → 4)-O-[α-l-arabinopyranosyl-(1 → 6)]-β-d-glucopyranoside, Trinervuloside C, Diosgenin-3-O-α-l-rhamnopyranoside, Dioscin, Diosgenin-3-O-[α-l-rhamnopyranosyl-(1 → 4)]-β-d-glucopyranoside, Diosgenin-3-O-[α-l-rhamnopyranosyl-(1 → 2)]-β-d-glucopyranoside, (25R)-Spirostan-5-en-3-O-α-l-rhamnopyranosyl-(1 → 2)-[α-l-rhamnopyranosyl-(1 → 4)-α-l-rhamnopyranosyl-(1 → 4)]-O-β-d-glucopyranoside, Gracillin, Parisyunnanoside C, Parisyunnanoside D, Parisyunnanoside E, Paris D, Paris H, (25R)-Spirost-5-en-3β,17α,27-triol-3-O-α-l-rhamnopyranosyl-(1 → 2)-[α-l-rhamnopyranosyl-(1 → 4)]-β-d-glucopyranoside, (25S)-Spirostan-5-en-3β,17α,27-triol-3-O-α-l-arabinopyranosyl-(1 → 6)-β-d-glucopyranoside, (25S)-Spirostan-5-en-3β,17α,27-triol-3-O-β-d-glucopyranosyl-(1 → 4)-[α-l-arabinopyranosyl-(1 → 6)]-β-d-glucopyranoside, (25S)-spirost-5-ene-3β,17α,27-triol-3-O-α-l-rhamnopyranosyl-(1 → 4)-β-d-glucopyranoside, (25S)-Spirost-5-en-3β,17α,27-triol-3-O-β-d-galactopyranoside, (25S)-Spirostan-5-en-3β,27-diol-3-O-α-l-arabinopyranosyl-(1 → 6)-β-d- glucopyranoside, Isonarthogenin3-O-α-l-rhamnopyranosyl-(1 → 2)-O-[α-l-rhamnopyranosyl-(1 → 4)]-β-d-glucopyranoside, Smilscobinoside A, Sieboldiin A, Sieboldiin B, Sieboldogenin, (25R)-5α-Spirostan-3β-ol-6-one-3-O-[α-l-arabinopyranosyl-(1 → 4)]-β-d-glucopyranoside, Smilaxin A, Smilaxin B, Parisvietnaside A, Smilaxin C, (25R)-5α-Spirostan-3β,6β-diol-3-O-β-d-glucopyranosyl-(1 → 4)-[α-l-arabinopyranosyl-(1 → 6)]-β-d-glucopyranoside, Smilscobinoside B, (25R)-5α-Spirostan-3β,17α,27-triol-3-O-β-d-glucopyranosyl-(1 → 4)-[α-l-arabinopyranosyl-(1 → 6)]-β-d-glucopyranosie, (25R)-5βSpirostan-3β-ol-3-O-β-d-glucopyranosyl-(1 → 6)-[β-d-glucopyranosyl-(1 → 4)]-β-d-glucopyranoside, (25R)-5β-Spirostan-3β-ol-3-O-β-d-glucopyranosyl-(1 → 6)-[β-d-glucopyranosyl-(1 → 2)]-[β-d-glucopyranosyl-(1 → 4)]-β-d-glucopyranoside, Disporoside A, (25R)-5β-Spirostan-3β-ol-3-O-β-d-glucopyranosyl-(1 → 6)-β-d-glucopyranoside, (25R)-5β-Spirostan-3β-ol-3-O-β-d-glucopyranosyl-(1 → 6)-[β-d-glucopyranosyl-(1 → 2)]-[α-l-rhamnopyranosyl-(1 → 4)]-β-d-glucopyranoside, Smilagenin 3-O-β-d-glucopyranoside, Methylprotodioscin, 26-O-β-d-Glucopyranosyl-(25R)-furostan-5-en-3β,26-diol-22-methoxy-3-O-α-l-rhamnopyranosyl-(1 → 2)-β-d-glucopyranoside, 26-O-β-d-Glucopyranosyl-22α-O-methyl-(25R)-furost-5-en-3β,26-diol-3-O-α-l-rhamnopyranosyl-(1 → 4)-α-l-rhamnopyranosyl-(1 → 4)-[α-l-rhamnopyranosyl-(1 → 2)]-β-d-glucopyranoside,

Protodiosgenin-3-O-α-l-rhamnopyranosyl-(1 → 4)-α-l-rhamnopyranosyl(1 → 4)-[α-l-rhamnopyranosyl(1 → 2)]-β-d-glucopyranoside, 26-O-β-d-Glucopyranosyl-22α-hydroxy-(25R)-furost-5-en-3β,26-diol-3-O-[4-O-acetyl-α-l-rhamnopyranosyl]-(1 → 2)-[α-l-rhamnopyranosyl-(1 → 4)]-β-d-glucopyranoside, 26-O-β-d-Glucopyranosyl-22α-hydroxy-(25R)-furost-5-en-3β,26-diol-3-O-[2-O-acetyl-α-l-rhamnopyranosyl]-(1 → 2)-[α-l-rhamnopyranosyl-(1 → 4)]-β-d-glucopyranoside, 26-O-β-d-Glucopyranosyl-22α-hydroxy-(25R)-furost-5-en-3β,26-diol-3-O-[3-O-acetyl-α-l-rhamnopyranosyl]-(1 → 2)-[α-l-rhamnopyranosyl-(1 → 4)]-β-d-glucopyranoside, 26-O-β-d-Glucopyranosyl-(25R)-furostan-5-en-3β,17α-diol-3-O-α-l-rhamnopyranosyl-(1 → 2)-α-l-rhamnopyranoside, Protogracillin, Parisaponin I, Parisyunnanoside A, Pseudoprotodioscin, 26-O-β-d-Glucopyranosyl-(25R)-furostan-5,20(22)-dien-3β,26-diol-3-O-α-l-rhamnopyranosyl-(1 → 2)-β-d-glucopyranoside, 15-Hydroxypseudoprotodioscin, 15-Methoxypseudoprotodioscin, 23-Oxopseudoprotodioscin, 26-O-β-d-Glucopyranosyl-(25S)-5-furosa-20(22)-en-3β,26-diol-3-O-α-l-rhamnopyranosyl-(1 → 2)-O-[α-l-rhamnopyranosyl-(1 → 6)]-β-d-glucopyranoside, Pseudoproto-pb, 26-O-β-d-Glucopyranosyl-(25R)-5α-furostan-3β,22,26-triol-6-one-3-O-α-l-arabinopyranosyl-(1 → 6)-β-d-glucopyranoside, 26-O-β-d-Glucopyranosyl-(25R)-5α-furostan-3β,22,26-triol-6-one-3-O-β-d-glucopyranosyl-(1 → 4)-[α-l-arabinopyranosyl-(1 → 6)]-β-d-glucopyranoside, 26-O-β-d-Glucopyranosyl-(25R)-5α-furostan-3β,26-diol-22-methoxyl-6-one-3-O-α-l-arabinopyranosyl-(1 → 6)-β-d-glucopyranoside, 26-O-β-d-Glucopyranosyl-(25R)-5α-furostan-3β,26-diol-22-methoxyl-6-one, 26-O-β-d-Glucopyranosyl-(25S)-5β-furostan-3β,26-diol-22α-methoxy-3-O-β-d-glucopyranosyl-(1 → 6)-[β-d-glucopyranosyl-(1 → 2)]-[β-d-glucopyranosyl-(1 → 4)]-β-d-glucopyranoside, (25S)-26-O-β-d-glucopyranosyl-3β,5β,22α-furostan-3,22,26-triol-3-O-α-l-rhamnopyranosyl-(1 → 2)-O-β-d-glucopyranosyl-(1 → 2)-O-β-d-glucopyranoside, Asparagoside E, Asparoside A, Asparoside B, 26-O-β-d-Glucopyranosyl-(25S)-5β-furostan-3β,22α-diol-3-O-α-l-arabinopyranosyl-(1 → 6)-[β-d-glucopyranosyl-(1 → 4)]-β-d-glucopyranoside, 26-O-β-d-Glucopyranosyl-(25S)-5α-furostan-3β,22α-diol-3-O-α-l-arabinopyranosyl-(1 → 6)-[β-d-glucopyranosyl-(1 → 4)]-β-d-glucopyranoside, 26-O-β-d-Glucopyranosyl-(25S)-5α-furostan-3β,6β,22α-tetraol-3-O-α-l-arabinopyranosyl-(1 → 6)-[β-d-glucopyranosyl-(1 → 4)]-β-d-glucopyranoside, Sarsaparilloside B, Sarsaparilloside C, Sarsaparilloside, Δ20(22)-Sarsaparilloside, Riparoside A, Smilaxchinoside A, (25R)-Smilaxchinoside A,

Smilaxchinoside B, Smilaxchinoside C, Dioscoreside E, (25R)-5α-Furostan-3β,26-diol-20(22)-cn-6-onc-26-O-β-d-glucopyranoside, (23R,25R)-5α-Furostan-3β,23,26-triol-20(22)-en-6-one-26-O-β-d-glucopyranoside, 26-O-β-d-Glucopyranosyl-(25R)-5α-furostan-3β,26-diol-20(22)-en-6-one-3-O-α-l-arabinopyranosyl-(1 → 6)-β-d-glucopyranoside, (25S)-5β-Furostan-1β,2β,3β,5β,22α,26-hexaol-26-O-β-d-glucopyranoside, 26-O-β-d-Glucopyranosyl-(25S)-5β-furostan-1β,3β,22α,26-tetraol-1-O-β-d-glucopyranoside, Trinervuloside A, Riparoside B, Timosaponin J, Timosaponin K, Trinervuloside B, Pregna-5,16-diene-3β-ol-20-one-3-O-α-l-rhamnopyranosyl-(1 → 2)-O-[α-l-rhamnopyranosyl-(1 → 4)]-β-d-glucopyranoside, Pregna-5,16-diene-3β-ol-20-one-3-O-α-l-rhamnopyranosyl-(1 → 4)-α-l-rhamnopyranosyl-(1 → 4)-[α-l-rhamnopyranosyl-(1 → 2)]-β-d-glucopyranoside, Pregna-5,16-diene-3β-ol-20-one-3-O-α-l-rhamnopyranosyl-(1 → 2)-[α-l-rhamnopyranosyl-(1 → 4)]-α-l-rhamnopyranosyl-(1 → 2)-β-d-glucopyranoside, Pallidfloside D, Anguivioside XV, Yamogenin, Diosgenin, Smilagenin, Sarsasapogenin, Tigogenin, Neotigogenin, Gitogenin, Yuccagenin, Saponaretin or Smilaxchinoside D.

[0061] In some embodiments of the aforementioned methods of making, the steroidal saponin or analog thereof or extract of a plant that comprises a steroidal saponin or an analog thereof comprises a glucosylated steroidal saponin or an aglycone of a steroidal saponin.

[0062] In some embodiments of the aforementioned mixtures for use, the composition is an alcoholic or non-alcoholic beverage, a carbonated beverage, a spice or spicy compound, such as a chili, wasabi, horseradish, mustard, ginger, black pepper, cinnamon, pumpkin spice, Szechuan pepper, allspice or any combination thereof, an astringent compound, such as phenolic compounds, tannins, gallic acid, zinc oxide, zinc sulfate, tannic acid, potassium permanganate, silver nitrate, tincture of benzoin, potassium alum, caftaric acid, acacia, yarrow, sage, witch hazel, vinegar, tea, fruits, vegetables, dairy products, herbs, nuts or any combination thereof, a bitter compound, such as Absinthin, Aloin, Alpha acid, Amarogentin, Andrographolide, Brucine, Caffeine, Denatonium, Eugenin, Hesperidin, Humulone, Isohumulone, Kaempferol 3-O-rutinoside, 6-Methoxymellein, Naringin, Papaverine, Phenylthiocarbamide, Propylthiouracil, Quassin, Quinidine, Quinine, Salicin, Strychnine, Sucrose octaacetate, Sucrose octapropionate, Theobromine, Theophylline, vegetables, tea, chocolate, fruits or any combination thereof, a sour compound, such as acetic

acid, citric acid, hydrochloric acid, lactic acid, malic acid, nitric acid, fumaric acid, sulfuric acid, tartaric acid, phosphoric acid, other acid or any combination thereof, a cooling compound, such as Menthol, Cyclohexanecarboxamide,N-Ethyl-5-Methyl-2-(1- Methylethyl) (WS-3), N-(Ethoxycarbonylmethyl)-3-p-menthanecarboxamide (WS-5), (1R,2S,5R)-N-(4-Methoxyphenyl)-5-methyl-2-(1- methylethyl)cyclohexanecarboxamide (WS-12), Butanamide, N,2,3-trimethyl-2-(1-methylethyl) (WS-23), or Menthyl Lactate or any combination thereof, a compound with an off-taste, such as plant-based milks or products of plant-based milks, dairy products, fruits, juices, proteins, plant protein, whole grain products or any combination thereof.

[0063] In some embodiments of the aforementioned mixtures for use, the dairy product, plant-based milk, or product of plant-based milk includes a milk, such as whole milk, nonfat milk, lactose-free milk, buttermilk, condensed milk, cashew milk, goat milk, rick milk, soy milk, oat milk, almond milk, coconut milk, a yogurt, cheese, frosting, pudding, chocolate, custard, ice cream, gelato, sherbet, sorbet, frozen yogurt or any combination thereof.

[0064] In some embodiments of the aforementioned mixtures for use, the plant extract including a steroidal saponin is obtained from a plant from any one or more of the following families or genera: Asparagaceae, Amaryllidaceae, Dioscoreaceae, Liliaceae, Costaceae, Melanthiaceae, Plantaginaceae, Fabaceae, Asteraceae, Asparagus, Tupistra, Anemarrhena, Sansevieria, Polygonatum, Nolina, Convallaria, Ophipogon, Hosta, Ornithogalum, Ruscus, Agapanthus, Dioscorea, Fritillaria, Lilium, Costus, Paris, Digitalis, Trigonella, Smilax or Vernonia.

[0065] In some embodiments of the aforementioned mixtures for use, the plant extract including a steroidal saponin is obtained from a plant from any one or more of the following species: *Smilax riparia*, *Smilax lanceaefolia*, *Smilax nipponica*, *Smilax nigrescens*, *Smilax officinalis*, *Smilax aspera subsp. Mauritanica*, *Smilax aristolochiifolia*, *Smilax ornate*, *Smilax glabra*, *Smilax china*, *Smilax menispermoides*, *Smilax lebrunii*, *Smilax stans*, *Smilax bockii*, *Smilax excelsa*, *Smilax microphylla*, *Smilax scobinicaulis*, *Smilax sieboldii*, *Smilax krausiana*, *Smilax medica*, *Asparagus acutifolius*, *Asparagus aethiopicus*, *Asparagus africanus*, *Asparagus asparagoides*, *Asparagus burchellii*, *Asparagus cochinchinensis*, *Asparagus declinatus*, *Asparagus capensis*, *Asparagus curillus*, *Asparagus densiflorus*, *Asparagus exuvialis*, *Asparagus falcatus*, *Asparagus fallax*, *Asparagus flagellaris*, *Asparagus*

horridus, *Asparagus krebsianus*, *Asparagus laricinus*, *Asparagus lignosus*, *Asparagus macowanii*, *Asparagus mariae*, *Asparagus maritimus*, *Asparagus mucronatus*, *Asparagus multiflorus*, *Asparagus nesiotes*, *Asparagus officinalis*, *Asparagus ovatus*, *Asparagus pastorianus*, *Asparagus persicus*, *Asparagus racemosus*, *Asparagus retrofractus*, *Asparagus rubicundus*, *Asparagus scandens*, *Asparagus schoberioides*, *Asparagus scoparius*, *Asparagus setaceus*, *Asparagus striatus*, *Asparagus suaveolens*, *Asparagus tenuifolius*, *Asparagus umbellatus*, *Asparagus vaginellatus*, *Trigonella foenum graecum* or *Asparagus virgatus*.

[0066] In some embodiments of the aforementioned mixtures for use, the mixture provides a taste perception in the subject of a reduction in bitterness or bitterness perception, a masking of bitter tastes or bitterness, a reduction in sourness or sourness perception, a masking of sour tastes or sourness, a reduction in initial sourness perception or lingering sourness perception, a reduction in astringency or astringency perception, a masking of astringency, or a masking of off tastes when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0067] In some embodiments of the aforementioned mixtures for use, the mixture provides a taste perception in the subject of masked cooked tastes, masked metallic tastes, enhanced beer flavor, enhanced alcohol flavor, enhanced retro-nasal effect, increased bitterness perception, enhanced alcohol perception, enhanced spice intensity, increased sour perception, enhanced cooling intensity, faster onset of cooling sensation, increased duration of taste, or reduced stinging taste when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0068] In some embodiments of the aforementioned mixtures for use the mixture, increases the amount of carbonation bubbles or reduces the carbonation bubble size of a beverage when the mixture is provided to the subject, such as when the mixture is incorporated in a beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0069] In some embodiments of the aforementioned mixtures for use, the food or beverage or granule, powder, or liquid formulation is selected from water, a carbonated

beverage, such as a carbonated fruit beverage, carbonated cola drink or carbonated water, alcoholic beverages, alcohol-free beverages, spices and/or seasonings, such as chili, wasabi, horseradish, mustard, ginger, black pepper, or cinnamon, energy beverages, flavored water, powders for drinks, dairy products, such as milk, yogurt, cheese, or ice cream, plant based milks, products of plant based milk, puddings, cakes, shakes, malts, brownies, pastries, cookies, cheesecakes, fudge, pies, cobblers, parfaits, mousse, biscuits, custards, frosting, fruits, vegetables, hard candy, soft candy, taffy, chocolates, sugarless candies, chewing gum, bubble gum, juices, teas, coffees, salsa, gel beads, film strips for breath, gelatin candies, pectin candies, starch candies, lozenges, cough drops, throat lozenges, throat sprays, toothpastes or mouth rinses.

[0070] In some embodiments of the aforementioned mixtures for use, the amount of component (a) in the mixture is at least 2 ppm, such as, 3, 4, 5, 7.5, 10, 20, 30, 40, 50, 60, 70, 80, 90, 100, 110, 120, 130, 140, 150, 160, 170, 180, 190, 200, 210, 220, 230, 240, 250, 260, 270, 280, 290, or 300 ppm or an amount within a range defined by any two of the aforementioned amounts, preferably 2-40 ppm, 6-75 ppm, 6-100 ppm, or 12-200 ppm.

[0071] In some embodiments, the methods described herein relate to a mixture for use, the method further including selecting or identifying a subject to receive a composition, which modulates a taste perception in a subject, such as alcohol, spice, cooling carbonation, bitterness, sourness, or astringency, or which masks off-tastes in a subject, such as bitter or sour tastes.

[0072] In some embodiments, the methods described herein relate to a mixture for use, the method further including determining or analyzing the alcohol perception, bitterness perception, bitterness intensity, the masking of bitterness, the sourness perception, sourness intensity, the masking of sourness, astringency perception, astringency intensity, the masking of astringency, or the masking of off-tastes or any combination thereof of the subject after consuming said mixture or determining or analyzing the increase of carbonation bubbles, the reduction of carbonation bubble size of a carbonated beverage after providing composition component (a).

[0073] In some embodiments of the aforementioned mixtures for use, component (a) is dissolved in food grade ethanol.

[0074] In some embodiments of the aforementioned mixtures for use, the food grade ethanol is at least 1%, such as 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 15, 20, 25, 30, 35, 40, 45, 50, 60, 70, 80, 85, 90, 95, or 100%, or with a range defined by any two of the aforementioned amounts, preferably 80, 90, or 95%.

[0075] Several embodiments described herein relate to a method for modulating a subject's taste perception of astringency, bitterness, or sourness or masking off-tastes, the method including: providing a subject a mixture that includes at least two components (a) and (b): (a) an iridoid glycoside or analog thereof (for example, a glycosylation molecule of an aglycone, an aglycone of a glycosylated molecule, or a further glycosylated molecule of a glycosylated molecule) or an extract of a plant that comprises an iridoid glycoside or an analog thereof, such as a *Rehmannia glutinosa* root extract; and (b) a composition including an astringent compound, a bitter compound, a sour compound, or a compound with an off-taste; wherein component (a) is admixed with component (b); wherein the mixture is preferably provided in a food, beverage, granule, powder or liquid formulation; and optionally, wherein the mixture includes one or more preservatives or antioxidants, such as a sulphite, sorbic acid, a sorbate compound, benzoic acid, benzoate, propionic acid, propionate, ascorbic acid, ascorbate, citric acid, a tocopherol, a retinol, a polyphenol, a phenolic acid, a flavonoid, lipoic acid, N-acetylcysteine, butylated hydroxyanisole, butylated hydroxytoluene or derivatives thereof, preferably, wherein the one or more preservatives or antioxidants improve the shelf-life, flavor profile, or reduce spoilage of the mixture; and/or optionally, selecting a composition that includes an astringent compound, a bitter compound, a sour compound, or a compound with an off-taste for receiving an agent that modulates the taste perception of a subject of astringency, bitterness, or sourness or masks off-tastes and providing said selected composition component (a); and/or optionally, evaluating the modulation of a subject's taste perception of astringency, bitterness, or sourness or evaluating the masking of off-tastes after providing the subject the mixture.

[0076] In some of the aforementioned methods, the iridoid glycoside or extract of a plant that comprises an iridoid glycoside includes iridoid glycosides selected from one or more of the following: Aucubin, Catalpol, Rehmannioside A, Rehmannioside B, Rehmannioside C, Rehmannioside D, Rehmannioside E, or Rehmannioside F.

[0077] In some of the aforementioned methods the iridoid glycoside or analog thereof or extract of a plant that comprises an iridoid glycoside or analog thereof comprises a glucosylated iridoid glycoside or an aglycones of an iridoid glycoside.

[0078] In some of the aforementioned methods, the composition is an alcoholic or non-alcoholic beverage, an astringent compound, such as phenolic compounds, tannins, tannic acid, citric acid, gallic acid, zinc oxide, zinc sulfate, tannic acid, potassium permanganate, silver nitrate, tincture of benzoin, potassium alum, caftaric acid, acacia, yarrow, sage, witch hazel, vinegar, tea, fruits, vegetables, dairy products, herbs, nuts or any combination thereof, a bitter compound, such as Absinthin, Aloin, Alpha acid, Amarogentin, Andrographolide, Brucine, Caffeine, Denatonium, Eugenin, Hesperidin, Humulone, Isohumulone, Kaempferol 3-O-rutinoside, 6-Methoxymellein, Naringin, Papaverine, Phenylthiocarbamide, Propylthiouracil, Quassin, Quinidine, Quinine, Salicin, Strychnine, Sucrose octaacetate, Sucrose octapropionate, Theobromine, Theophylline, vegetables, tea, chocolate, fruits or any combination thereof, a sour compound, such as acetic acid, citric acid, hydrochloric acid, lactic acid, malic acid, nitric acid, fumaric acid, sulfuric acid, tartaric acid, phosphoric acid, other acid or any combination thereof, a compound with an off-taste, such as plant-based milks or products of plant-based milks, dairy products, fruits, juices, proteins, plant protein, whole grain products or any combination thereof.

[0079] In some of the aforementioned methods, the dairy product, plant-based milk, or product of plant-based milk includes a milk, such as whole milk, nonfat milk, lactose-free milk, buttermilk, condensed milk, cashew milk, goat milk, rick milk, soy milk, oat milk, almond milk, coconut milk, a yogurt, cheese, frosting, pudding, chocolate, custard, ice cream, gelato, sherbet, sorbet, frozen yogurt or any combination thereof.

[0080] In some of the aforementioned methods, the plant extract including an iridoid glycoside is obtained from a plant from any one or more of the following families or genera: Cornaceae, Gentianaceae, Eucommiaceae, Scrophulariaceae, Rubiaceae, Lamiaceae, Pedaliaceae, Verbenaceae, Bignoniaceae, Gentiana, Rehmannia, or Antirrhinum.

[0081] In some of the aforementioned methods, the plant extract including an iridoid glycoside is obtained from a plant from any one or more of the following species: *Coronus officinalis, Eucommia ulmoides, Gardenia jasminoides, Stachys betonica, Harpagophytum procumbens, Rehmannia glutinosa, Rehmannia chingii, Rehmannia*

chrysantha, Rehmannia henryi, Rehmannia japonica, Rehmannia piasezkii, Rehmannia solanifolia, Verbena officinalis, or *Kigelia pinnata.*

[0082] In some of the aforementioned methods, the mixture provides a taste perception in the subject of a reduction in bitterness or bitterness perception, a masking of bitter tastes or bitterness, a reduction in sourness or sourness perception, a masking of sour tastes or sourness, a reduction in initial sourness perception or lingering sourness perception, a reduction in acidic taste or acidic taste perception, a reduction in lingering acidic taste perception, a reduction in astringency or astringency perception, a masking of astringency, a masking of acidic tastes, or a masking of off tastes when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0083] In some of the aforementioned methods, the mixture provides a taste perception in the subject of an enhancement of creaminess, creamy flavor, or creaminess perception, an enhancement of fattiness, fatty flavor, or fattiness perception, an enhancement in fruitiness, fruity flavor, or fruitiness perception, an enhancement of brightness, bright flavor, or bright perception, or an increase of sweetness or sweetness perception when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0084] In some of the aforementioned methods, the mixture modulates a subject's taste perception when the mixture is provided to the subject without negatively affecting the shelf life of a food or beverage or without increasing the pH of the food or beverage when the mixture is incorporated into the food or beverage. By incorporating an iridoid glycoside or a plant extract comprising an iridoid glycoside in an acidic food or beverage, preferably obtained from any one or more of the following families or genera: Cornaceae, Gentianaceae, Eucommiaceae, Scrophulariaceae, Rubiaceae, Lamiaceae, Pedaliaceae, Verbenaceae, Bignoniaceae, Gentiana, Rehmannia, or Antirrhinum, and most preferably from any one or more of the following species: *Coronus officinalis, Eucommia ulmoides, Gardenia jasminoides, Stachys betonica, Harpagophytum procumbens, Rehmannia glutinosa, Rehmannia chingii, Rehmannia chrysantha, Rehmannia henryi, Rehmannia japonica,*

Rehmannia piasezkii, Rehmannia solanifolia, Verbena officinalis, or *Kigelia pinnata,* the acidic food or beverage provides a subject with a non-acidic taste perception, a reduced acidic taste perception, or a masked acidic taste perception, yet the food or beverage maintains its acidic pH. By generating a non-acidic taste perception, a reduced acidic taste perception, or a masked acidic taste perception, in this manner and thereby maintaining the acidic pH of the food or beverage, a greater shelf-life or storage capacity for the food or beverage is provided. That is, by incorporating an iridoid glycoside or a plant extract comprising an iridoid glycoside in an acidic food or beverage as set forth herein, one can unexpectedly maintain the longer shelf-life and storage capacity enjoyed by acidic food or beverages but mask the acidic taste perception of a subject that consumes the food or beverage comprising the iridoid glycoside or a plant extract comprising an iridoid glycoside.

[0085] In some of the aforementioned methods, the food or beverage or granule, powder, or liquid formulation is selected from water, a carbonated beverage, such as a carbonated fruit beverage, carbonated cola drink or carbonated water, alcoholic beverages, alcohol-free beverages, spices and/or seasonings, such as chili, wasabi, horseradish, mustard, ginger, black pepper, or cinnamon, energy beverages, flavored water, powders for drinks, dairy products, such as milk, yogurt, cheese, or ice cream, plant based milks, products of plant based milk, puddings, cakes, shakes, malts, brownies, pastries, cookies, cheesecakes, fudge, pies, cobblers, parfaits, mousse, biscuits, custards, frosting, fruits, vegetables, hard candy, soft candy, taffy, chocolates, sugarless candies, chewing gum, bubble gum, juices, teas, coffees, salsa, gel beads, film strips for breath, gelatin candies, pectin candies, starch candies, lozenges, cough drops, throat lozenges, throat sprays, toothpastes or mouth rinses.

[0086] In some of the aforementioned methods, the amount of component (a) in the mixture is at least 2 ppm, such as, 3, 4, 5, 7.5, 10, 20, 30, 40, 50, 60, 70, 80, 90, 100, 110, 120, 130, 140, 150, 160, 170, 180, 190, 200, 210, 220, 230, 240, 250, 260, 270, 280, 290, or 300 ppm or an amount within a range defined by any two of the aforementioned amounts, preferably 2-40 ppm, 6-75 ppm, 6-100 ppm, or 50-300 ppm.

[0087] In some embodiments, the aforementioned methods further include selecting or identifying a subject to receive a composition, which modulates a taste perception in a subject, such as bitterness, acidity, sourness, or astringency, or which masks off-tastes in a subject, such as bitter, acidic, or sour tastes.

[0088] In some embodiments, the aforementioned methods further include determining or analyzing the bitterness perception, bitterness intensity, the masking of bitterness, the sourness perception, sourness intensity, the masking of sourness, the acidic perception, acidic intensity, the masking of acidity, sweetness perception, sweetness intensity, astringency perception, astringency intensity, the masking of astringency, the enhancement of creaminess, creamy flavor, or creaminess perception, an enhancement of fattiness, fatty flavor, or fattiness perception, an enhancement in fruitiness, fruity flavor, or fruitiness perception or the masking of off-tastes or any combination thereof of the subject after consuming said mixture.

[0089] In some of the aforementioned methods, component (a) is dissolved in food grade ethanol.

[0090] In some of the aforementioned methods, the food grade ethanol is at least 1%, such as 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 15, 20, 25, 30, 35, 40, 45, 50, 60, 70, 80, 85, 90, 95, or 100%, or with a range defined by any two of the aforementioned amounts, preferably 80, 90, or 95%.

[0091] Additional embodiments described herein relate to methods of making a mixture, which modulates a subject's taste perception of astringency, bitterness, acidity, or sourness or masking off-tastes, the method comprising: admixing a component (a) with a component (b) to form said mixture: (a) an iridoid glycoside or analog thereof (for example, a glycosylation molecule of an aglycone, an aglycone of a glycosylated molecule, or a further glycosylated molecule of a glycosylated molecule) or an extract of a plant that comprises an iridoid glycoside or an analog thereof, such as a *Rehmannia glutinosa* root extract; and (b) a composition including an astringent compound, a bitter compound, a sour compound, an acidic pH, or a compound with an off-taste; wherein component (a) is admixed with component (b); wherein the mixture is preferably provided in a food, beverage, granule, powder or liquid formulation; and optionally, wherein the composition comprises one or more preservatives or antioxidants, such as a sulphite, sorbic acid, a sorbate compound, benzoic acid, benzoate, propionic acid, propionate, ascorbic acid, ascorbate, citric acid, a tocopherol, a retinol, a polyphenol, a phenolic acid, a flavonoid, lipoic acid, N-acetylcysteine, butylated hydroxyanisole, butylated hydroxytoluene or derivatives thereof, preferably, wherein the one

or more preservatives or antioxidants improve the shelf-life, flavor profile, or reduce spoilage of the mixture.

[0092] In some embodiments of the aforementioned methods of making, the iridoid glycoside or extract of a plant that comprises an iridoid glycoside comprises iridoid glycosides selected from one or more of the following: Aucubin, Catalpol, Rehmannioside A, Rehmannioside B, Rehmannioside C, Rehmannioside D, Rehmannioside E, or Rehmannioside F. In some embodiments of the aforementioned methods of making, the iridoid glycoside or analog thereof or extract of a plant that comprises an iridoid glycoside or analog thereof comprises a glucosylated iridoid glycoside or an aglycones of an iridoid glycoside.

[0093] In some embodiments of the aforementioned methods of making, the composition is an alcoholic or non-alcoholic beverage, an astringent compound, such as phenolic compounds, tannins, citric acid, gallic acid, zinc oxide, zinc sulfate, tannic acid, potassium permanganate, silver nitrate, tincture of benzoin, potassium alum, caftaric acid, acacia, yarrow, sage, witch hazel, vinegar, tea, fruits, vegetables, dairy products, herbs, nuts or any combination thereof, a bitter compound, such as Absinthin, Aloin, Alpha acid, Amarogentin, Andrographolide, Brucine, Caffeine, Denatonium, Eugenin, Hesperidin, Humulone, Isohumulone, Kaempferol 3-O-rutinoside, 6-Methoxymellein, Naringin, Papaverine, Phenylthiocarbamide, Propylthiouracil, Quassin, Quinidine, Quinine, Salicin, Strychnine, Sucrose octaacetate, Sucrose octapropionate, Theobromine, Theophylline, vegetables, tea, chocolate, fruits or any combination thereof, a sour compound, such as acetic acid, citric acid, hydrochloric acid, lactic acid, malic acid, nitric acid, fumaric acid, sulfuric acid, tartaric acid, phosphoric acid, other acid or any combination thereof, a compound with an off-taste, such as plant-based milks or products of plant-based milks, dairy products, fruits, juices, proteins, plant protein, whole grain products or any combination thereof.

[0094] In some embodiments of the aforementioned methods of making, the dairy product, plant-based milk, or product of plant-based milk includes a milk, such as whole milk, nonfat milk, lactose-free milk, buttermilk, condensed milk, cashew milk, goat milk, rick milk, soy milk, oat milk, almond milk, coconut milk, a yogurt, cheese, frosting, pudding, chocolate, custard, ice cream, gelato, sherbet, sorbet, frozen yogurt or any combination thereof.

[0095] In some embodiments of the aforementioned methods of making, the plant extract comprising an iridoid glycoside is obtained from a plant from any one or more of the

following families or genera: Cornaceae, Gentianaceae, Eucommiaceae, Scrophulariaceae, Rubiaceae, Lamiaceae, Pedaliaceae, Verbenaceae, Bignoniaceae, Gentiana, Rehmannia, or Antirrhinum.

[0096] In some embodiments of the aforementioned methods of making, the plant extract comprising an iridoid glycoside is obtained from a plant from any one or more of the following species: *Coronus officinalis, Eucommia ulmoides, Gardenia jasminoides, Stachys betonica, Harpagophytum procumbens, Rehmannia glutinosa, Rehmannia chingii, Rehmannia chrysantha, Rehmannia henryi, Rehmannia japonica, Rehmannia piasezkii, Rehmannia solanifolia, Verbena officinalis,* or *Kigelia pinnata.*

[0097] In some embodiments of the aforementioned methods of making, the mixture provides a taste perception in the subject of a reduction in bitterness or bitterness perception, a masking of bitter tastes or bitterness, a reduction in sourness or sourness perception, a masking of sour tastes or sourness, a reduction in initial sourness perception or lingering sourness perception, a reduction in acidic taste or acidic taste perception, a reduction in lingering acidic taste perception, a reduction in astringency or astringency perception, a masking of astringency, a masking of acidic tastes, or a masking of off tastes when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0098] In some embodiments of the aforementioned methods of making, the mixture provides a taste perception in the subject of an enhancement of creaminess, creamy flavor, or creaminess perception, an enhancement of fattiness, fatty flavor, or fattiness perception, an enhancement in fruitiness, fruity flavor, or fruitiness perception, an enhancement of brightness, bright flavor, or bright perception, or an increase of sweetness or sweetness perception when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0099] In some of the aforementioned methods of making, the mixture modulates a subject's taste perception of acidity or sourness when the mixture is provided to the subject without negatively affecting the shelf life of a food or beverage or without increasing the pH of the food or beverage when the mixture is incorporated into the food or beverage.

[0100] In some embodiments of the aforementioned methods of making, the food or beverage or granule, powder, or liquid formulation is selected from water, a carbonated beverage, such as a carbonated fruit beverage, carbonated cola drink or carbonated water, alcoholic beverages, alcohol-free beverages, spices and/or seasonings, such as chili, wasabi, horseradish, mustard, ginger, black pepper, or cinnamon, energy beverages, flavored water, powders for drinks, dairy products, such as milk, yogurt, cheese, or ice cream, plant based milks, products of plant based milk, puddings, cakes, shakes, malts, brownies, pastries, cookies, cheesecakes, fudge, pies, cobblers, parfaits, mousse, biscuits, custards, frosting, fruits, vegetables, hard candy, soft candy, taffy, chocolates, sugarless candies, chewing gum, bubble gum, juices, teas, coffees, salsa, gel beads, film strips for breath, gelatin candies, pectin candies, starch candies, lozenges, cough drops, throat lozenges, throat sprays, toothpastes or mouth rinses.

[0101] In some embodiments of the aforementioned methods of making, the amount of component (a) in the mixture is at least 2 ppm, such as, 3, 4, 5, 7.5, 10, 20, 30, 40, 50, 60, 70, 80, 90, 100, 110, 120, 130, 140, 150, 160, 170, 180, 190, 200, 210, 220, 230, 240, 250, 260, 270, 280, 290, or 300 ppm or an amount within a range defined by any two of the aforementioned amounts, preferably 2-40 ppm, 6-75 ppm, 6-100 ppm, or 50-300 ppm.

[0102] In some embodiments of the aforementioned methods of making, component (a) is dissolved in food grade ethanol.

[0103] In some embodiments of the aforementioned methods of making, the food grade ethanol is at least 1%, such as 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 15, 20, 25, 30, 35, 40, 45, 50, 60, 70, 80, 85, 90, 95, or 100%, or with a range defined by any two of the aforementioned amounts, preferably 80, 90, or 95%.

[0104] Additional embodiments further include a composition obtained or obtainable by any one or more of the methods mentioned above.

[0105] More embodiments relate to a mixture suitable for modulating a subject's taste perception of astringency, bitterness, acidity, or sourness or masking off-tastes, wherein the mixture comprises at least two components (a) and (b): (a) an iridoid glycoside or analog thereof (for example, a glycosylation molecule of an aglycone, an aglycone of a glycosylated molecule, or a further glycosylated molecule of a glycosylated molecule) or an extract of a plant that comprises an iridoid glycoside or an analog thereof, such as a *Rehmannia glutinosa*

root extract; and (b) a composition comprising an astringent compound, a bitter compound, an acidic pH, a sour compound, or a compound with an off-taste; wherein component (a) is admixed with component (b); preferably, wherein the mixture is provided in a food, beverage, granule, powder or liquid formulation; and optionally, wherein the mixture comprises one or more preservatives or antioxidants, such as a sulphite, sorbic acid, a sorbate compound, benzoic acid, benzoate, propionic acid, propionate, ascorbic acid, ascorbate, citric acid, a tocopherol, a retinol, a polyphenol, a phenolic acid, a flavonoid, lipoic acid, N-acetylcysteine, butylated hydroxyanisole, butylated hydroxytoluene or derivatives thereof, preferably, wherein the one or more preservatives or antioxidants improve the shelf-life, flavor profile, or reduce spoilage of the mixture.

[0106] In some embodiments of the aforementioned mixtures, the iridoid glycoside or extract of a plant that includes an iridoid glycoside comprises iridoid glycosides selected from one or more of the following: Aucubin, Catalpol, Rehmannioside A, Rehmannioside B, Rehmannioside C, Rehmannioside D, Rehmannioside E, or Rehmannioside F.

[0107] In some embodiments of the aforementioned mixtures, the iridoid glycoside or analog thereof or extract of a plant that comprises an iridoid glycoside or analog thereof comprises a glucosylated iridoid glycoside or an aglycone of an iridoid glycoside.

[0108] In some embodiments of the aforementioned mixtures, the composition is an alcoholic or non-alcoholic beverage, an astringent compound, such as phenolic compounds, tannins, citric acid, gallic acid, zinc oxide, zinc sulfate, tannic acid, potassium permanganate, silver nitrate, tincture of benzoin, potassium alum, caftaric acid, acacia, yarrow, sage, witch hazel, vinegar, tea, fruits, vegetables, dairy products, herbs, nuts or any combination thereof, a bitter compound, such as Absinthin, Aloin, Alpha acid, Amarogentin, Andrographolide, Brucine, Caffeine, Denatonium, Eugenin, Hesperidin, Humulone, Isohumulone, Kaempferol 3-O-rutinoside, 6-Methoxymellein, Naringin, Papaverine, Phenylthiocarbamide, Propylthiouracil, Quassin, Quinidine, Quinine, Salicin, Strychnine, Sucrose octaacetate, Sucrose octapropionate, Theobromine, Theophylline, vegetables, tea, chocolate, fruits or any combination thereof, a sour compound, such as acetic acid, citric acid, hydrochloric acid, lactic acid, malic acid, nitric acid, fumaric acid, sulfuric acid, tartaric acid, phosphoric acid, other acid or any combination thereof, a compound with an off-taste, such as plant-based milks or

products of plant-based milks, dairy products, fruits, juices, proteins, plant protein, whole grain products or any combination thereof.

[0109] In some embodiments of the aforementioned mixtures, the dairy product, plant-based milk, or product of plant-based milk includes a milk, such as whole milk, nonfat milk, lactose-free milk, buttermilk, condensed milk, cashew milk, goat milk, rick milk, soy milk, oat milk, almond milk, coconut milk, a yogurt, cheese, frosting, pudding, chocolate, custard, ice cream, gelato, sherbet, sorbet, frozen yogurt or any combination thereof.

[0110] In some embodiments of the aforementioned mixtures, the plant extract comprising an iridoid glycoside is obtained from a plant from any one or more of the following families or genera: Cornaceae, Gentianaceae, Eucommiaceae, Scrophulariaceae, Rubiaceae, Lamiaceae, Pedaliaceae, Verbenaceae, Bignoniaceae, Gentiana, Rehmannia, or Antirrhinum.

[0111] In some embodiments of the aforementioned mixtures, the plant extract comprising an iridoid glycoside is obtained from a plant from any one or more of the following species: *Coronus officinalis, Eucommia ulmoides, Gardenia jasminoides, Stachys betonica, Harpagophytum procumbens, Rehmannia glutinosa, Rehmannia chingii, Rehmannia chrysantha, Rehmannia henryi, Rehmannia japonica, Rehmannia piasezkii, Rehmannia solanifolia, Verbena officinalis,* or *Kigelia pinnata.*

[0112] In some embodiments of the aforementioned mixtures, the mixture provides a taste perception in the subject of a reduction in bitterness or bitterness perception, a masking of bitter tastes or bitterness, a reduction in sourness or sourness perception, a masking of sour tastes or sourness, a reduction in initial sourness perception or lingering sourness perception, a reduction in acidic taste or acidic taste perception, a reduction in lingering acidic taste perception, a reduction in astringency or astringency perception, a masking of astringency, a masking of acidic tastes, or a masking of off tastes when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0113] In some embodiments of the aforementioned mixtures, the mixture provides a taste perception in the subject of an enhancement of creaminess, creamy flavor, or creaminess perception, an enhancement of fattiness, fatty flavor, or fattiness perception, an enhancement in fruitiness, fruity flavor, or fruitiness perception, an enhancement of brightness, bright flavor,

or bright perception, or an increase of sweetness or sweetness perception when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0114] In some of the aforementioned mixtures, the mixture modulates a subject's taste perception of acidity or sourness when the mixture is provided to the subject without negatively affecting the shelf life of a food or beverage or without increasing the pH of the food or beverage when the mixture is incorporated into the food or beverage.

[0115] In some embodiments of the aforementioned mixtures, the food or beverage or granule, powder, or liquid formulation is selected from water, a carbonated beverage, such as a carbonated fruit beverage, carbonated cola drink or carbonated water, alcoholic beverages, alcohol-free beverages, spices and/or seasonings, such as chili, wasabi, horseradish, mustard, ginger, black pepper, or cinnamon, energy beverages, flavored water, powders for drinks, dairy products, such as milk, yogurt, cheese, or ice cream, plant based milks, products of plant based milk, puddings, cakes, shakes, malts, brownies, pastries, cookies, cheesecakes, fudge, pies, cobblers, parfaits, mousse, biscuits, custards, frosting, fruits, vegetables, hard candy, soft candy, taffy, chocolates, sugarless candies, chewing gum, bubble gum, juices, teas, coffees, salsa, gel beads, film strips for breath, gelatin candies, pectin candies, starch candies, lozenges, cough drops, throat lozenges, throat sprays, toothpastes or mouth rinses.

[0116] In some embodiments of the aforementioned mixtures, the amount of component (a) in the mixture is at least 2 ppm, such as, 3, 4, 5, 7.5, 10, 20, 30, 40, 50, 60, 70, 80, 90, 100, 110, 120, 130, 140, 150, 160, 170, 180, 190, 200, 210, 220, 230, 240, 250, 260, 270, 280, 290, or 300 ppm or an amount within a range defined by any two of the aforementioned amounts, preferably 2-40 ppm, 6-75 ppm, 6-100 ppm, or 50-300 ppm.

[0117] In some embodiments of the aforementioned mixtures, component (a) is dissolved in food grade ethanol.

[0118] In some embodiments of the aforementioned mixtures, the food grade ethanol is at least 1%, such as 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 15, 20, 25, 30, 35, 40, 45, 50, 60, 70, 80, 85, 90, 95, or 100%, or with a range defined by any two of the aforementioned amounts, preferably 80, 90, or 95%.

[0119] Several embodiments described herein relate to a method for modulating a subject's taste perception of alcohol, carbonation, spice, or cooling, the method including: providing a subject a mixture that includes at least two components (a) and (b): (a) an amentoflavone or analog thereof (for example, a glycosylation molecule of an aglycone, an aglycone of a glycosylated molecule, or a further glycosylated molecule of a glycosylated molecule) or an extract of a plant that includes an amentoflavone or an analog thereof, such as a *Selaginella tamariscina* extract; and (b) a composition including an alcohol, carbonation, spice or a cooling compound or a non-alcoholic beverage; wherein component (a) is admixed with component (b); wherein the mixture is preferably provided in a food, beverage, granule, powder or liquid formulation; and optionally, wherein the mixture includes one or more preservatives or antioxidants, such as a sulphite, sorbic acid, a sorbate compound, benzoic acid, benzoate, propionic acid, propionate, ascorbic acid, ascorbate, citric acid, a tocopherol, a retinol, a polyphenol, a phenolic acid, a flavonoid, lipoic acid, N-acetylcysteine, butylated hydroxyanisole, butylated hydroxytoluene or derivatives thereof, preferably, wherein the one or more preservatives or antioxidants improve the shelf-life, flavor profile, or reduce spoilage of the mixture; and/or optionally, selecting a composition that includes an alcohol, carbonation, spice or cooling compound for receiving an agent that modulates the taste perception of a subject to an alcohol, carbonation, a spice, a cooling compound or a non-alcoholic beverage and providing said selected composition component (a); and/or optionally, evaluating the modulation of a subject's taste perception of alcohol, carbonation, spice, or cooling after providing the subject the mixture.

[0120] In some of the aforementioned methods, the amentoflavone or analog thereof or the extract of a plant includes an amentoflavone or an analog thereof includes flavonoids selected from one or more of the following: amentoflavone, 2',8"-biapigenin, delicaflavone, ginkgetin, heveaflavone, hinokiflavone, isocryptomerin, kayaflavone, ochnaflavone, podocarpusflavone A, robustaflavone, sumaflavone, or taiwaniaflavone.

[0121] In some of the aforementioned methods, the amentoflavone or analog thereof or the extract of a plant that comprises an amentoflavone or an analog thereof comprises a glucosylated amentoflavone or an aglycone of an amentoflavone.

[0122] In some of the aforementioned methods, the composition is an alcoholic or non-alcoholic beverage, a spicey product that includes a chili, wasabi, horseradish, mustard,

ginger, black pepper, cinnamon, pumpkin spice, Szechuan pepper, or allspice, a carbonated beverage e.g., to reduce the bubble size of the beverage or impart a champagne-like effect, or a cooling compound, such as Menthol, Cyclohexanecarboxamide,N-Ethyl-5-Methyl-2-(1-Methylethyl) (WS-3), N-(Ethoxycarbonylmethyl)-3-p-menthanecarboxamide (WS-5), (1R,2S,5R)-N-(4-Methoxyphenyl)-5-methyl-2-(1- methylethyl)cyclohexanecarboxamide (WS-12), Butanamide, N,2,3-trimethyl-2-(1-methylethyl) (WS-23), or Menthyl Lactate or any combination thereof.

[0123] In some of the aforementioned methods, the plant extract including amentoflavone is obtained from a plant from any one or more of the following families: Phyllanthaceae, Euphorbiaceae, Liliaceae, Guttiferae, Primulaceae, Oxalidaceae, Cupressaceae, Malpighiaceae, Leguminosae, Calophyllaceae, Ochnaceae, Burseraceae, Flacourtiaceae, Cephalotaxaceae, Connaraceae, Taxodiaceae, Cycadaceae, Podocarpaceae, Moraceae, Labiatae, Clusiaceae, Ginkgoaceae, Hypericaceae, Lanariaceae, Caprifoliaceae, Anacardiaceae, Berberidaceae, Velloziaceae, Ranunculaceae, Thymelaeaceae, Taxaceae, or Psilotaceae, such as *Amanoa almerindae*, *Alchornea glandulosa*, *Alchornea triplinervia*, *Aletris spicata*, *Allanblackia monticola*, *Androsace umbellate*, *Antidesma bunius*, *Antidesma laciniatum*, *Biophytum sensitivum*, *Biota semipervirens*, *Byrsonima crassa*, *Byrsonima intermedia*, *Caesalpinia pyramidalis*, *Callitris rhomboidea*, *Calocedrus microlepic var. formosana formosana*, *Calophyllum brasiliense*, *Calophyllum ferrugineum*, *Calophyllum flavoramulum*, *Calophyllum incrassatum*, *Calophyllum inophylloide*, *Calophyllum inophyllum*, *Calophyllum membranaceum*, *Calophyllum pinetorum*, *Calophyllum rivulare*, *Calophyllum symingtonianum*, *Calophyllum venulosum*, *Campylospermum calanthum*, *Campylospermum mannii*, *Canarium album*, *Canarium pimela*, *Canarium schweinfurthii*, *Casearia clarkei*, *Celaenodendron mexicanum*, *Cephalotaxus fortunei*, *Cephalotaxus koreana*, *Cephalotaxus oliveri*, *Chamaecyparis obtusa*, *Chrozophora tinctoria*, *Cnestis ferruginea*, *Cunninghamia lanceolata*, *Cupressocyparis leylandii*, *Cupressus chengiana*, *Cupressus sempervirens*, *Cycas beddomei*, *Cycas circinalis*, *Cycas panzhihuaensis*, *Cycas pectinate*, *Cycas revoluta*, *Dacrydium araucarioides*, *Decussocarpus rospigliosii*, *Discocleidion rufescens*, *Dorstenia barteri*, *Drypetes gerrardii*, *Drypetes hainanensis*, *Elateriospermum tapos*, *Galeobdolon chinense*, *Garcinia bakeriana*, *Garcinia brasiliensis*, *Garcinia brevipedicellata*, *Garcinia cowa*, *Garcinia intermedia*, *Garcinia livingstonei*, *Garcinia*

merguensis, *Garcinia subelliptica*, *Garcinia xanthochymus*, *Gingko biloba*, *Hypericum connatum*, *Hypericum perforatum*, *Hyeronima alchorneoides*, *Juniperus occidentalis*, *Juniperus rigida*, *Lanaria lanata*, *Lonicera chrysantha*, *Lonicera macranthoides*, *Lonicera similes*, *Luxemburgia nobilis*, *Lysimachia christinae*, *Mangifera indica*, *Manihot esculenta*, *Microbiota decussata*, *Nandina domestica*, *Nanuza plicata*, *Ochna schweinfurthiana*, *Ouratea parviflora*, *Ouratea semiserrata*, *Ouratea sulcate*, *Pistacia chinensis*, *Podocarpus imbricadus*, *Ranunculus ternatus*, *Retrophyllum rospigliosii*, *Rhus pyroides*, *Rhus succedanea*, *Sabina pingii var. wilsonii*, *Sabina sinoalpina*, *Sabina vulgaris*, *Speranskia Tuberculata*, *Struthiola argentea*, *Taxus baccata*, *Thuja orientalis*, *Tmesipteris tannensis*, *Torreya nucifera*, *Torreya yunnanensis*, *Viburnum chinshanense*, or *Zabelia tyaihyonii*.

[0124] In some of the aforementioned methods, plant extract including amentoflavone is obtained from a plant from any one or more of the following species: *Selaginella bryopteris*, *Selaginella chrysocaulos*, *Selaginella delicatula*, *Selaginella denticulate*, *Selaginella doederleinii*, *Selaginella involvens*, *Selaginella labordei*, *Selaginella moellendorffii*, *Selaginella nipponica*, *Selaginella nothohybrida*, *Selaginella pachystachys*, *Selaginella pulvinate*, *Selaginella remotifolia*, *Selaginella rupestris*, *Selaginella sanquinolenta*, *Selaginella selaginoides*, *Selaginella sinensis*, *Selaginella stauntoniana*, *Selaginella tamariscina*, *Selaginella uncinate*, or *Selaginella willdenowii*.

[0125] In some of the aforementioned methods, the mixture provides an increased alcohol perception, increased alcoholic bitterness, increased cooling intensity, enhanced spiciness duration, a tingling spice sensation, or an increased spiciness sensation in the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0126] In some of the aforementioned methods, the mixture provides a taste perception in the subject of an increase in alcohol perception or alcohol intensity when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0127] In some of the aforementioned methods, the mixture provides a taste perception in the subject of an increase in alcoholic bitterness when the mixture is provided to

the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0128] In some of the aforementioned methods, the mixture provides a taste perception in the subject of an increase in retro nasal effect or tongue tingling effect when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0129] In some of the aforementioned methods, the mixture provides a taste perception in the subject of an increase in spiciness or spice intensity when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0130] In some of the aforementioned methods, the mixture provides a taste perception in the subject of an increased spiciness duration when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0131] In some of the aforementioned methods, the mixture provides a taste perception in the subject of an increase in burning sensation or spice tingling sensation when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0132] In some of the aforementioned methods, the mixture provides a taste perception in the subject of an increase in cooling perception or cooling intensity when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0133] In some of the aforementioned methods, the mixture provides a taste perception in the subject of a faster onset of coolness when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the

subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0134] In some of the aforementioned methods, the mixture provides a taste perception in the subject of an increased duration of coolness when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0135] In some of the aforementioned methods, the mixture provides a taste perception in the subject of an increase in carbonation perception or reduced bubble size or champagne-like effect when the mixture is provided to the subject, such as when the mixture is incorporated in a beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0136] In some of the aforementioned methods, the mixture provides a taste perception in the subject of an increase in fizzy sensation or frothy sensation when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0137] In some of the aforementioned methods, the mixture provides a taste perception in the subject of a decrease in harshness when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0138] In some of the aforementioned methods, the mixture reduces the carbonation bubble size of a beverage when the mixture is incorporated into a beverage, as compared to the carbonation bubble size of the beverage in the absence of component (a).

[0139] In some of the aforementioned methods, the mixture increases the amount of carbonation bubbles of a beverage when the mixture is incorporated into a beverage as compared to amount of carbonation bubbles of the beverage in the absence of component (a).

[0140] In some of the aforementioned methods, the food or beverage or granule, powder, or liquid formulation is selected from a carbonated beverage, such as a carbonated fruit beverage, carbonated cola drink or carbonated water, alcoholic beverages, alcohol-free

beverages, spices and/or seasonings, such as chili, wasabi, horseradish, mustard, ginger, black pepper, or cinnamon, energy beverages, flavored water, powders for drinks, hard candy, soft candy, taffy, chocolates, sugarless candies, chewing gum, bubble gum, juices, teas, coffees, salsa, gel beads, film strips for breath, gelatin candies, pectin candies, starch candies, lozenges, cough drops, throat lozenges, throat sprays, toothpastes or mouth rinses.

[0141] In some of the aforementioned methods, the amount of component (a) in the mixture is at least 2 ppm, such as, 3, 4, 5, 7.5, 10, 20, 30, 40, 50, 60, 70, 80, 90, 100, 110, 120, 130, 140, 150, 160, 170, 180, 190, 200, 210, 220, 230, 240, 250, 260, 270, 280, 290, or 300 ppm or an amount within a range defined by any two of the aforementioned amounts, preferably 2-40 ppm, 6-75 ppm, 6-100 ppm, or 12-200 ppm.

[0142] In some embodiments, the aforementioned methods further include selecting or identifying a subject to receive a composition, which modulates taste perception in a subject, such as alcohol perception, alcohol intensity, alcoholic bitterness, alcoholic bitterness intensity, tongue tingling effect, cooling perception, cooling intensity, the time of onset of cooling, cooling duration, carbonation perception, fizzy sensation, frothy sensation, harshness, spiciness, spiciness duration, burning sensation, spice tingling sensation, or spiciness intensity, which decreases the carbonation bubble size or increases the carbonation bubble amount in a carbonated beverage, or which increases the retro nasal effect in subject.

[0143] In some embodiments, the aforementioned methods further include determining or analyzing the alcohol perception, alcohol intensity, alcoholic bitterness, alcoholic bitterness intensity, tongue tingling effect, cooling perception, cooling intensity, the time of onset of cooling, cooling duration, carbonation perception, fizzy sensation, frothy sensation, harshness, spiciness, spiciness duration, burning sensation, spice tingling sensation, spiciness intensity, the reduction of carbonation bubble size or increase of carbonation bubble amount in a carbonated beverage, or the increase of the retro nasal effect or any combination thereof of the subject after consuming said mixture.

[0144] In some of the aforementioned methods, component (a) is dissolved in food grade ethanol.

[0145] In some of the aforementioned methods, the food grade ethanol is at least 1%, such as 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 15, 20, 25, 30, 35, 40, 45, 50, 60, 70, 80, 85, 90, 95, or

100%, or with a range defined by any two of the aforementioned amounts, preferably 80, 90, or 95%.

[0146] Additional embodiments described herein relate to methods of making a mixture, which modulates a subject's taste perception of alcohol, carbonation, spice or cooling, the method including: admixing a component (a) with a component (b) to form said mixture: (a) an amentoflavone or analog thereof (for example, a glycosylation molecule of an aglycone, an aglycone of a glycosylated molecule, or a further glycosylated molecule of a glycosylated molecule) or an extract of a plant that includes an amentoflavone or an analog thereof, such as a *Selaginella tamariscina* extract; and (b) a composition including an alcohol, carbonation, spice or a cooling compound or a non-alcoholic beverage; wherein the composition is preferably provided in a food, beverage, granule, powder or liquid formulation; and optionally, wherein the composition includes one or more preservatives or antioxidants, such as a sulphite, sorbic acid, a sorbate compound, benzoic acid, benzoate, propionic acid, propionate, ascorbic acid, ascorbate, citric acid, a tocopherol, a retinol, a polyphenol, a phenolic acid, a flavonoid, lipoic acid, N-acetylcysteine, butylated hydroxyanisole, butylated hydroxytoluene or derivatives thereof, preferably, wherein the one or more preservatives or antioxidants improve the shelf-life, flavor profile, or reduce spoilage of the mixture.

[0147] In some embodiments of the aforementioned methods of making, the amentoflavone or analog thereof or the extract of a plant that includes an amentoflavone or an analog thereof includes flavonoids selected from one or more of the following: amentoflavone, 2',8"-biapigenin, delicaflavone, ginkgetin, heveaflavone, hinokiflavone, isocryptomerin, kayaflavone, ochnaflavone, podocarpusflavone A, robustaflavone, sumaflavone, or taiwaniaflavone.

[0148] In some embodiments of the aforementioned methods of making, the amentoflavone or analog thereof or the extract of a plant that comprises an amentoflavone or an analog thereof comprises a glucosylated amentoflavone or an aglycone of an amentoflavone.

[0149] In some embodiments of the aforementioned methods of making, the composition is an alcoholic or non-alcoholic beverage, a spicey product that includes a chili, wasabi, horseradish, mustard, ginger, black pepper, cinnamon, pumpkin spice, Szechuan pepper, or allspice, a carbonated beverage e.g., to reduce the bubble size of the beverage or

impart a champagne-like effect, or a cooling compound, such as Menthol, Cyclohexanecarboxamide,N-Ethyl-5-Methyl-2-(1- Methylethyl) (WS-3), N-(Ethoxycarbonylmethyl)-3-p-menthanecarboxamide (WS-5), (1R,2S,5R)-N-(4-Methoxyphenyl)-5-methyl-2-(1- methylethyl)cyclohexanecarboxamide (WS-12), Butanamide, N,2,3-trimethyl-2-(1-methylethyl) (WS-23), or Menthyl Lactate or any combination thereof.

[0150] In some embodiments of the aforementioned methods of making, the plant extract including amentoflavone is obtained from a plant from any one or more of the following families: Phyllanthaceae, Euphorbiaceae, Liliaceae, Guttiferae, Primulaceae, Oxalidaceae, Cupressaceae, Malpighiaceae, Leguminosae, Calophyllaceae, Ochnaceae, Burseraceae, Flacourtiaceae, Cephalotaxaceae, Connaraceae, Taxodiaceae, Cycadaceae, Podocarpaceae, Moraceae, Labiatae, Clusiaceae, Ginkgoaceae, Hypericaceae, Lanariaceae, Caprifoliaceae, Anacardiaceae, Berberidaceae, Velloziaceae, Ranunculaceae, Thymelaeaceae, Taxaceae, or Psilotaceae, such as *Amanoa almerindae*, *Alchornea glandulosa*, *Alchornea triplinervia*, *Aletris spicata*, *Allanblackia monticola*, *Androsace umbellate*, *Antidesma bunius*, *Antidesma laciniatum*, *Biophytum sensitivum*, *Biota semipervirens*, *Byrsonima crassa*, *Byrsonima intermedia*, *Caesalpinia pyramidalis*, *Callitris rhomboidea*, *Calocedrus microlepic var. formosana formosana*, *Calophyllum brasiliense*, *Calophyllum ferrugineum*, *Calophyllum flavoramulum*, *Calophyllum incrassatum*, *Calophyllum inophylloide*, *Calophyllum inophyllum*, *Calophyllum membranaceum*, *Calophyllum pinetorum*, *Calophyllum rivulare*, *Calophyllum symingtonianum*, *Calophyllum venulosum*, *Campylospermum calanthum*, *Campylospermum mannii*, *Canarium album*, *Canarium pimela*, *Canarium schweinfurthii*, *Casearia clarkei*, *Celaenodendron mexicanum*, *Cephalotaxus fortunei*, *Cephalotaxus koreana*, *Cephalotaxus oliveri*, *Chamaecyparis obtusa*, *Chrozophora tinctoria*, *Cnestis ferruginea*, *Cunninghamia lanceolata*, *Cupressocyparis leylandii*, *Cupressus chengiana*, *Cupressus sempervirens*, *Cycas beddomei*, *Cycas circinalis*, *Cycas panzhihuaensis*, *Cycas pectinate*, *Cycas revoluta*, *Dacrydium araucarioides*, *Decussocarpus rospigliosii*, *Discocleidion rufescens*, *Dorstenia barteri*, *Drypetes gerrardii*, *Drypetes hainanensis*, *Elateriospermum tapos*, *Galeobdolon chinense*, *Garcinia bakeriana*, *Garcinia brasiliensis*, *Garcinia brevipedicellata*, *Garcinia cowa*, *Garcinia intermedia*, *Garcinia livingstonei*, *Garcinia merguensis*, *Garcinia subelliptica*, *Garcinia xanthochymus*, *Gingko biloba*, *Hypericum*

connatum, *Hypericum perforatum*, *Hyeronima alchorneoides*, *Juniperus occidentalis*, *Juniperus rigida*, *Lanaria lanata*, *Lonicera chrysantha*, *Lonicera macranthoides*, *Lonicera similes*, *Luxemburgia nobilis*, *Lysimachia christinae*, *Mangifera indica*, *Manihot esculenta*, *Microbiota decussata*, *Nandina domestica*, *Nanuza plicata*, *Ochna schweinfurthiana*, *Ouratea parviflora*, *Ouratea semiserrata*, *Ouratea sulcate*, *Pistacia chinensis*, *Podocarpus imbricadus*, *Ranunculus ternatus*, *Retrophyllum rospigliosii*, *Rhus pyroides*, *Rhus succedanea*, *Sabina pingii var. wilsonii*, *Sabina sinoalpina*, *Sabina vulgaris*, *Speranskia Tuberculata*, *Struthiola argentea*, *Taxus baccata*, *Thuja orientalis*, *Tmesipteris tannensis*, *Torreya nucifera*, *Torreya yunnanensis*, *Viburnum chinshanense*, or *Zabelia tyaihyonii*.

[0151] In some embodiments of the aforementioned methods of making, the plant extract including amentoflavone is obtained from a plant from any one or more of the following species: *Selaginella bryopteris*, *Selaginella chrysocaulos*, *Selaginella delicatula*, *Selaginella denticulate*, *Selaginella doederleinii*, *Selaginella involvens*, *Selaginella labordei*, *Selaginella moellendorffii*, *Selaginella nipponica*, *Selaginella nothohybrida*, *Selaginella pachystachys*, *Selaginella pulvinate*, *Selaginella remotifolia*, *Selaginella rupestris*, *Selaginella sanquinolenta*, *Selaginella selaginoides*, *Selaginella sinensis*, *Selaginella stauntoniana*, *Selaginella tamariscina*, *Selaginella uncinate*, or *Selaginella willdenowii*.

[0152] In some embodiments of the aforementioned methods of making, the mixture provides an increased alcohol perception, increased alcoholic bitterness, increased cooling intensity, enhanced spiciness duration, a tingling spice sensation, or an increased spiciness sensation in the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0153] In some embodiments of the aforementioned methods of making, the mixture provides a taste perception in the subject of an increase in alcohol perception or alcohol intensity when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0154] In some embodiments of the aforementioned methods of making, the mixture provides a taste perception in the subject of an increase in alcoholic bitterness when the mixture is provided to the subject, such as when the mixture is incorporated in a food or

beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0155] In some embodiments of the aforementioned methods of making, the mixture provides a taste perception in the subject of an increase in retro nasal effect or tongue tingling effect when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0156] In some embodiments of the aforementioned methods of making, the mixture provides a taste perception in the subject of an increase in spiciness or spice intensity when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0157] In some embodiments of the aforementioned methods of making, the mixture provides a taste perception in the subject of an increased spiciness duration when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0158] In some embodiments of the aforementioned methods of making, the mixture provides a taste perception in the subject of an increase in burning sensation or spice tingling sensation when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0159] In some embodiments of the aforementioned methods of making, the mixture provides a taste perception in the subject of an increase in cooling perception or cooling intensity when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0160] In some embodiments of the aforementioned methods of making, the mixture provides a taste perception in the subject of a faster onset of coolness when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that

is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0161] In some embodiments of the aforementioned methods of making, the mixture provides a taste perception in the subject of an increased duration of coolness when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0162] In some embodiments of the aforementioned methods of making, the mixture provides a taste perception in the subject of an increase in carbonation perception or reduced bubble size or champagne-like effect when the mixture is provided to the subject, such as when the mixture is incorporated in a beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0163] In some embodiments of the aforementioned methods of making, the mixture provides a taste perception in the subject of an increase in fizzy sensation or frothy sensation when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0164] In some embodiments of the aforementioned methods of making, the mixture provides a taste perception in the subject of a decrease in harshness when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0165] In some embodiments of the aforementioned methods of making, the mixture reduces the carbonation bubble size of a beverage when the mixture is incorporated into a beverage, as compared to the carbonation bubble size of the beverage in the absence of component (a).

[0166] In some embodiments of the aforementioned methods of making, the mixture increases the amount of carbonation bubbles of a beverage when the mixture is incorporated into a beverage as compared to amount of carbonation bubbles of the beverage in the absence of component (a).

[0167] In some embodiments of the aforementioned methods of making, the food or beverage or granule, powder, or liquid formulation is selected from a carbonated beverage, such as a carbonated fruit beverage, carbonated cola drink or carbonated water, alcoholic beverages, alcohol-free beverages, spices and/or seasonings, such as chili, wasabi, horseradish, mustard, ginger, black pepper, or cinnamon, energy beverages, flavored water, powders for drinks, hard candy, soft candy, taffy, chocolates, sugarless candies, chewing gum, bubble gum, juices, teas, coffees, salsa, gel beads, film strips for breath, gelatin candies, pectin candies, starch candies, lozenges, cough drops, throat lozenges, throat sprays, toothpastes or mouth rinses.

[0168] In some embodiments of the aforementioned methods of making, the amount of component (a) in the mixture is at least 2 ppm, such as, 3, 4, 5, 7.5, 10, 20, 30, 40, 50, 60, 70, 80, 90, 100, 110, 120, 130, 140, 150, 160, 170, 180, 190, 200, 210, 220, 230, 240, 250, 260, 270, 280, 290, or 300 ppm or an amount within a range defined by any two of the aforementioned amounts, preferably 2-40 ppm, 6-75 ppm, 6-100 ppm, or 12-200 ppm.

[0169] In some embodiments, the aforementioned methods of making further include dissolving component (a) in food grade ethanol.

[0170] In some embodiments of the aforementioned methods of making, the food grade ethanol is at least 1%, such as 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 15, 20, 25, 30, 35, 40, 45, 50, 60, 70, 80, 85, 90, 95, or 100%, or with a range defined by any two of the aforementioned amounts, preferably 80, 90, or 95%.

[0171] Additional embodiments further a composition obtained or obtainable by any of the methods of making the mixtures set forth herein.

[0172] More embodiments relate to a mixture used for modulating a subject's taste perception of alcohol, carbonation, spice, or cooling, wherein the mixture includes at least two components (a) and (b): (a) an amentoflavone or analog thereof (for example, a glycosylation molecule of an aglycone, an aglycone of a glycosylated molecule, or a further glycosylated molecule of a glycosylated molecule) or an extract of a plant that includes an amentoflavone or an analog thereof, such as a *Selaginella tamariscina* extract; (b) a composition including an alcohol, carbonation, spice or a cooling compound or a non-alcoholic beverage; wherein component (a) is admixed with component (b); preferably, wherein the mixture is provided in a food, beverage, granule, powder or liquid formulation; and optionally, wherein the mixture

includes one or more preservatives or antioxidants, such as a sulphite, sorbic acid, a sorbate compound, benzoic acid, benzoate, propionic acid, propionate, ascorbic acid, ascorbate, citric acid, a tocopherol, a retinol, a polyphenol, a phenolic acid, a flavonoid, lipoic acid, N-acetylcysteine, butylated hydroxyanisole, butylated hydroxytoluene or derivatives thereof, preferably, wherein the one or more preservatives or antioxidants improve the shelf-life, flavor profile, or reduce spoilage of the mixture.

[0173] In some embodiments of the aforementioned mixtures for use, the amentoflavone or analog thereof or the extract of a plant that includes an amentoflavone or an analog thereof includes flavonoids selected from one or more of the following: amentoflavone, 2',8"-biapigenin, delicaflavone, ginkgetin, heveaflavone, hinokiflavone, isocryptomerin, kayaflavone, ochnaflavone, podocarpusflavone A, robustaflavone, sumaflavone, or taiwaniaflavone.

[0174] In some embodiments of the aforementioned mixtures for use the amentoflavone or analog thereof or the extract of a plant that comprises an amentoflavone or an analog thereof comprises a glucosylated amentoflavone or an aglycone of an amentoflavone.

[0175] In some embodiments of the aforementioned mixtures for use, the composition is an alcoholic or non-alcoholic beverage, a spicey product that includes a chili, wasabi, horseradish, mustard, ginger, black pepper, cinnamon, pumpkin spice, Szechuan pepper, or allspice, a carbonated beverage e.g., to reduce the bubble size of the beverage or impart a champagne-like effect, or a cooling compound, such as Menthol, Cyclohexanecarboxamide,N-Ethyl-5-Methyl-2-(1- Methylethyl) (WS-3), N-(Ethoxycarbonylmethyl)-3-p-menthanecarboxamide (WS-5), (1R,2S,5R)-N-(4-Methoxyphenyl)-5-methyl-2-(1- methylethyl)cyclohexanecarboxamide (WS-12), Butanamide, N,2,3-trimethyl-2-(1-methylethyl) (WS-23), or Menthyl Lactate or any combination thereof.

[0176] In some embodiments of the aforementioned mixtures for use, the plant extract including amentoflavone is obtained from a plant from any one or more of the following families: Phyllanthaceae, Euphorbiaceae, Liliaceae, Guttiferae, Primulaceae, Oxalidaceae, Cupressaceae, Malpighiaceae, Leguminosae, Calophyllaceae, Ochnaceae, Burseraceae, Flacourtiaceae, Cephalotaxaceae, Connaraceae, Taxodiaceae, Cycadaceae, Podocarpaceae,

Moraceae, Labiatae, Clusiaceae, Ginkgoaceae, Hypericaceae, Lanariaceae, Caprifoliaceae, Anacardiaccae, Berberidaccae, Velloziaccae, Ranunculaccae, Thymelacaceae, Taxaccae, or Psilotaceae, such as *Amanoa almerindae*, *Alchornea glandulosa*, *Alchornea triplinervia*, *Aletris spicata*, *Allanblackia monticola*, *Androsace umbellate*, *Antidesma bunius*, *Antidesma laciniatum*, *Biophytum sensitivum*, *Biota semipervirens*, *Byrsonima crassa*, *Byrsonima intermedia*, *Caesalpinia pyramidalis*, *Callitris rhomboidea*, *Calocedrus microlepic var. formosana formosana*, *Calophyllum brasiliense*, *Calophyllum ferrugineum*, *Calophyllum flavoramulum*, *Calophyllum incrassatum*, *Calophyllum inophylloide*, *Calophyllum inophyllum*, *Calophyllum membranaceum*, *Calophyllum pinetorum*, *Calophyllum rivulare*, *Calophyllum symingtonianum*, *Calophyllum venulosum*, *Campylospermum calanthum*, *Campylospermum mannii*, *Canarium album*, *Canarium pimela*, *Canarium schweinfurthii*, *Casearia clarkei*, *Celaenodendron mexicanum*, *Cephalotaxus fortunei*, *Cephalotaxus koreana*, *Cephalotaxus oliveri*, *Chamaecyparis obtusa*, *Chrozophora tinctoria*, *Cnestis ferruginea*, *Cunninghamia lanceolata*, *Cupressocyparis leylandii*, *Cupressus chengiana*, *Cupressus sempervirens*, *Cycas beddomei*, *Cycas circinalis*, *Cycas panzhihuaensis*, *Cycas pectinate*, *Cycas revoluta*, *Dacrydium araucarioides*, *Decussocarpus rospigliosii*, *Discocleidion rufescens*, *Dorstenia barteri*, *Drypetes gerrardii*, *Drypetes hainanensis*, *Elateriospermum tapos*, *Galeobdolon chinense*, *Garcinia bakeriana*, *Garcinia brasiliensis*, *Garcinia brevipedicellata*, *Garcinia cowa*, *Garcinia intermedia*, *Garcinia livingstonei*, *Garcinia merguensis*, *Garcinia subelliptica*, *Garcinia xanthochymus*, *Gingko biloba*, *Hypericum connatum*, *Hypericum perforatum*, *Hyeronima alchorneoides*, *Juniperus occidentalis*, *Juniperus rigida*, *Lanaria lanata*, *Lonicera chrysantha*, *Lonicera macranthoides*, *Lonicera similes*, *Luxemburgia nobilis*, *Lysimachia christinae*, *Mangifera indica*, *Manihot esculenta*, *Microbiota decussata*, *Nandina domestica*, *Nanuza plicata*, *Ochna schweinfurthiana*, *Ouratea parviflora*, *Ouratea semiserrata*, *Ouratea sulcate*, *Pistacia chinensis*, *Podocarpus imbricadus*, *Ranunculus ternatus*, *Retrophyllum rospigliosii*, *Rhus pyroides*, *Rhus succedanea*, *Sabina pingii var. wilsonii*, *Sabina sinoalpina*, *Sabina vulgaris*, *Speranskia Tuberculata*, *Struthiola argentea*, *Taxus baccata*, *Thuja orientalis*, *Tmesipteris tannensis*, *Torreya nucifera*, *Torreya yunnanensis*, *Viburnum chinshanense*, or *Zabelia tyaihyonii*.

[0177] In some embodiments of the aforementioned mixtures for use, the plant extract including amentoflavone is obtained from a plant from any one or more of the following

species: *Selaginella bryopteris*, *Selaginella chrysocaulos*, *Selaginella delicatula*, *Selaginella denticulate*, *Selaginella doederleinii*, *Selaginella involvens*, *Selaginella labordei*, *Selaginella moellendorffii*, *Selaginella nipponica*, *Selaginella nothohybrida*, *Selaginella pachystachys*, *Selaginella pulvinate*, *Selaginella remotifolia*, *Selaginella rupestris*, *Selaginella sanquinolenta*, *Selaginella selaginoides*, *Selaginella sinensis*, *Selaginella stauntoniana*, *Selaginella tamariscina*, *Selaginella uncinate*, or *Selaginella willdenowii*.

[0178] In some embodiments of the aforementioned mixtures for use, the mixture provides an increased alcohol perception, increased alcoholic bitterness, increased cooling intensity, enhanced spiciness duration, a tingling spice sensation, or an increased spiciness sensation in the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0179] In some embodiments of the aforementioned mixtures for use, the mixture provides a taste perception in the subject of an increase in alcohol perception or alcohol intensity when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0180] In some embodiments of the aforementioned mixtures for use, the mixture provides a taste perception in the subject of an increase in alcoholic bitterness when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0181] In some embodiments of the aforementioned mixtures for use, the mixture provides a taste perception in the subject of an increase in retro nasal effect or tongue tingling effect when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0182] In some embodiments of the aforementioned mixtures for use, the mixture provides a taste perception in the subject of an increase in spiciness or spice intensity when the mixture is provided to the subject, such as when the mixture is incorporated in a food or

beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0183] In some embodiments of the aforementioned mixtures for use, the mixture provides a taste perception in the subject of an increased spiciness duration when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0184] In some embodiments of the aforementioned mixtures for use, the mixture provides a taste perception in the subject of an increase in burning sensation or spice tingling sensation when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0185] In some embodiments of the aforementioned mixtures for use, the mixture provides a taste perception in the subject of an increase in cooling perception or cooling intensity when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0186] In some embodiments of the aforementioned mixtures for use, the mixture provides a taste perception in the subject of a faster onset of coolness when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0187] In some embodiments of the aforementioned mixtures for use, the mixture provides a taste perception in the subject of an increased duration of coolness when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0188] In some embodiments of the aforementioned mixtures for use, the mixture provides a taste perception in the subject of an increase in carbonation perception or reduced bubble size or champagne-like effect when the mixture is provided to the subject, such as when

the mixture is incorporated in a beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0189] In some embodiments of the aforementioned mixtures for use, the mixture provides a taste perception in the subject of an increase in fizzy sensation or frothy sensation when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0190] In some embodiments of the aforementioned mixtures for use, the mixture provides a taste perception in the subject of a decrease in harshness when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0191] In some embodiments of the aforementioned mixtures for use, the mixture reduces the carbonation bubble size of a beverage when the mixture is incorporated into a beverage, as compared to the carbonation bubble size of the beverage in the absence of component (a).

[0192] In some embodiments of the aforementioned mixtures for use, the mixture increases the amount of carbonation bubbles of a beverage when the mixture is incorporated into a beverage as compared to amount of carbonation bubbles of the beverage in the absence of component (a).

[0193] In some embodiments of the aforementioned mixtures for use, the food or beverage or granule, powder, or liquid formulation is selected from a carbonated beverage, such as a carbonated fruit beverage, carbonated cola drink or carbonated water, alcoholic beverages, alcohol-free beverages, spices and/or seasonings, such as chili, wasabi, horseradish, mustard, ginger, black pepper, or cinnamon, energy beverages, flavored water, powders for drinks, hard candy, soft candy, taffy, chocolates, sugarless candies, chewing gum, bubble gum, juices, teas, coffees, salsa, gel beads, film strips for breath, gelatin candies, pectin candies, starch candies, lozenges, cough drops, throat lozenges, throat sprays, toothpastes or mouth rinses.

[0194] In some embodiments of the aforementioned mixtures for use, the amount of component (a) in the mixture is at least 2 ppm, such as, 3, 4, 5, 7.5, 10, 20, 30, 40, 50, 60,

70, 80, 90, 100, 110, 120, 130, 140, 150, 160, 170, 180, 190, 200, 210, 220, 230, 240, 250, 260, 270, 280, 290, or 300 ppm or an amount within a range defined by any two of the aforementioned amounts, preferably 2-40 ppm, 6-75 ppm, 6-100 ppm, or 12-200 ppm.

[0195] In some embodiments, the methods described herein relate to a mixture for use, the method further including selecting or identifying a subject to receive a composition, which modulates taste perception in a subject, such as alcohol perception, alcohol intensity, alcoholic bitterness, alcoholic bitterness intensity, tongue tingling effect, cooling perception, cooling intensity, the time of onset of cooling, cooling duration, carbonation perception, fizzy sensation, frothy sensation, harshness, spiciness,, spiciness duration, burning sensation, spice tingling sensation, or spiciness intensity, which decreases the carbonation bubble size or increases carbonation bubble amount in a carbonated beverage, or which increases the retro nasal effect in subject.

[0196] In some embodiments, the methods described herein relate to a mixture for use, the method further including determining or analyzing the alcohol perception, alcohol intensity, alcoholic bitterness, alcoholic bitterness intensity, tongue tingling effect, cooling perception, cooling intensity, the time of onset of cooling, cooling duration, carbonation perception, fizzy sensation, frothy sensation, harshness, spiciness, spiciness duration, burning sensation, spice tingling sensation, spiciness intensity, the reduction of carbonation bubble size or increase of carbonation bubble amount in a carbonated beverage, or the increase of the retro nasal effect or any combination thereof of the subject after consuming said mixture.

[0197] In some embodiments of the aforementioned mixtures for use, component (a) is dissolved in food grade ethanol.

[0198] In some embodiments of the aforementioned mixtures for use, the food grade ethanol is at least 1%, such as 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 15, 20, 25, 30, 35, 40, 45, 50, 60, 70, 80, 85, 90, 95, or 100%, or with a range defined by any two of the aforementioned amounts, preferably 80, 90, or 95%.

[0199] Several embodiments described herein also relate to methods for modulating a subject's taste perception of alcohol, carbonation, spice, salt, sourness, umami, tingling, numbing, or cooling, or for masking an off-taste of a compound in a subject, the method including: providing a subject a mixture that includes at least two components (a) and (b): (a) a polyisoprenylated benzophenone or analog thereof (for example, a glycosylation

molecule of an aglycone, an aglycone of a glycosylated molecule, or a further glycosylated molecule of a glycosylated molecule) or an extract of a plant that includes a polyisoprenylated benzophenone or an analog thereof, such as a *Garcinia indica* extract or a *Garcinia cambogia* extract; and (b) a composition including an alcohol, carbonation, spice, salt, tingling compound, numbing compound, sour compound, umami compound or a cooling compound or a non-alcoholic beverage; wherein component (a) is admixed with component (b); wherein the mixture is preferably provided in a food, beverage, granule, powder or liquid formulation; and optionally, wherein the mixture includes one or more preservatives or antioxidants, such as a sulphite, sorbic acid, a sorbate compound, benzoic acid, benzoate, propionic acid, propionate, ascorbic acid, ascorbate, citric acid, a tocopherol, a retinol, a polyphenol, a phenolic acid, a flavonoid, lipoic acid, N-acetylcysteine, butylated hydroxyanisole, butylated hydroxytoluene or derivatives thereof, preferably, wherein the one or more preservatives or antioxidants improve the shelf-life, flavor profile, or reduce spoilage of the mixture; and/or optionally, selecting a composition that includes an alcohol, carbonation, spice, salt, tingling compound, numbing compound, sour compound, umami compound or a cooling compound or a non-alcoholic beverage for receiving an agent that modulates the taste perception of a subject to an alcohol, carbonation, a spice, a salt, tingling, numbing or cooling and providing said selected composition component (a); and/or optionally, evaluating the modulation of a subject's taste perception of alcohol, carbonation, spice, salt, sourness, umami, tingling, numbing or cooling after providing the subject the mixture.

[0200] In some embodiments of the aforementioned methods, the polyisoprenylated benzophenone or an analog thereof is selected from one or more of the following: Aristophenone A, Aristophenone B, Bronianone C, Camboginol C, Cambogin C, Chamuangone, Clusianone, 7-epi-aristophenone, 7-epi-clusianone, Eugeniaphenone, Gambogenone, Garcicowin A, Garcicowin B, Garcicowin C, Garcicowin D, Garcimangosone D, Garcimultiflorone A, Garcimultiflorone B, Garcimultiflorone C, Garcimultiflorone D, Garcimultiflorone E, Garcimultiflorone F, (+) Garcinialiptone A, (−) Garcinialiptone B, (−) Cycloxanthochymol, Garcinialiptone C, Garcinialiptone D, Garcinielliptone FA, Garcinielliptone FB, Garcinol, Garcinol 13-O-methylether, Garciosaphenone A, Guttiferone A, Guttiferone B, Guttiferone C, Guttiferone D, Guttiferone E, Guttiferone F, Guttiferone G, Guttiferone H, Guttiferone I, Guttiferone J, Guttiferone K, Guttiferone L, Guttiferone M,

Guttiferone N, Guttiferone O, Guttiferone P, Guttiferone Q, Guttiferone R, Guttiferone S, Isogarcimultiflorone F, Isogarcinol, Isogarcinol 13-O-methylether, Isoxanthochymol, Kolanone, Macurin, Myrtiaphenone A, Myrtiaphenone B, Oblongifolins A, Oblongifolins B, Oblongifolins C, Oblongifolins D, Oblongifolins E, Oblongifolins F, Oblongifolins G, Paucinone A, Paucinone B, Paucinone C, Paucinone D, Pedunculol, Pseudoguttiaphenone A, Semsinones A, Semsinones B, Semsinones C, Xanthochymol, Vismiaphenone C, 13, 14 di-dehydroxyisogarcinol, 13-hydroxygarcimultiflorone B, 18-hydroxygarcimultiflorone D, Cariphenone A, Cariphenone B, Chamone I, Chamone II, Clusianone, Clusiaphenone A, Clusiaphenone B, Coccinone A, Coccinone B, Coccinone C, Coccinone D, Coccinone E, Coccinone F, Coccinone G, Coccinone H, Cudranone, Cudraphenone A, Cudraphenone B, Cudraphenone C, Cudraphenone D, 14-deoxygarcinol, 15, 16 dihydro-16-hydroperoxy plukenetione F, 7-epi-garcinol, 7-epi-isogarcinol, 7-epi nemorosone, 28, 29 epoxy plukenetione A, Garcinielliptone I, Guttiferone K, Hilarianone, 33-hydroperoxy-isoplukenetione, Hyperibone B, Hyperibone K, Hyperibone L, Insigninone, Isovismiaphenone B, Isoxanthochymol, Lanceolatone, Machuone, Methyl hydroxyl nemorosone, Microsphaerins A, Microsphaerins B, Microsphaerins C, Microsphaerins D, Methyl Grandone, Nemorosonal, Nemorosone, Nemorosone II, Ochrocarpinone A, Ochrocarpinone B, Ochrocarpinone C, Pestalone, Plukenetione A, Plukenetione B, Plukenetione C, Plukenetione D acetate, Plukenetione E acetate, Plukenetione F, Plukenetione G, Propolone A, Propolone B, Propolone C, Propolone D, Sampsonione A, Sampsonione B, Sampsonione C, Sampsonione D, Sampsonione E, Sampsonione F, Sampsonione G, Sampsonione H, Sampsonione N, Sampsonione O, Sampsonione P, Sampsonione Q, Scrobiculatone A, Scrobiculatone B, Spiritone, Tovophenone A, Tovophenone B, Tovophenone C, Vismiaguianone A, Vismiaguianone B, Vismiaguianone C, Vismiaguianone D, Vismiaguianone E, Vismiaphenone A, Vismiaphenone B, Vismiaphenone C, Vismiaphenone D, Vismiaphenone E, Vismiaphenone F, Vismiaphenone G, Wedellianone A, Wedellianone B, Xerophenone A, Xerophenone B, 18-ethyloxy-17-hydroxy-17,18-dihydroscrobiculatone A, or 18-ethyloxy-17-hydroxy-17,18-dihydroscrobiculatone B.

[0201] In some embodiments of the aforementioned methods, the polyisoprenylated benzophenone or analog thereof or the extract of a plant that comprises a

polyisoprenylated benzophenone or an analog thereof comprises a glucosylated polyisoprenylated benzophenone or an aglycone of a polyisoprenylated benzophenone.

[0202] In some embodiments of the aforementioned methods, the composition is an alcoholic or non-alcoholic beverage, a spicey product that includes a chili, wasabi, horseradish, mustard, ginger, black pepper, cinnamon, pumpkin spice, Szechuan pepper, or allspice, a salt, a carbonated beverage e.g., to reduce the bubble size of the beverage or impart a champagne-like effect, a sour compound, such as acetic acid, citric acid, malic acid, fumaric acid, tartaric acid, phosphoric acid or other acid, an umami compound, such as monosodium glutamate, disodium inosinate, disodium guanylate, seafoods, meats, vegetables, tea, seaweed, mushrooms, eggs, dairy products, or fermented products, a tingling or numbing compound, such as jambu oleoresin or spilanthol, or a cooling compound, such as Menthol, Cyclohexanecarboxamide,N-Ethyl-5-Methyl-2-(1- Methylethyl) (WS-3), N-(Ethoxycarbonylmethyl)-3-p-menthanecarboxamide (WS-5), (1R,2S,5R)-N-(4-Methoxyphenyl)-5-methyl-2-(1- methylethyl)cyclohexanecarboxamide (WS-12), Butanamide, N,2,3-trimethyl-2-(1-methylethyl) (WS-23), or Menthyl Lactate or any combination thereof.

[0203] In some embodiments of the aforementioned methods, the plant extract including a polyisoprenylated benzophenone or an analog thereof is obtained from a plant from any one or more of the following families or genera: Clusiasceae, Guttiferae, Clusia, Garcinia, Vismia, Allanblackia, Moronobea, Symphonia, Hypericum, Tovomita, Tovomiptosis, or Ochrocarpus.

[0204] In some embodiments of the aforementioned methods, the plant extract including a polyisoprenylated benzophenone or an analog thereof is obtained from a plant from any one or more of the following species: *Garcinia aristata*, *Garcinia xanthochymus*, *Garcinia multiflora*, *Garcinia hambroniana*, *Garcinia cambogia*, *Garcinia oblongifolia*, *Garcinia pedunculata*, *Garcinia mangostana*, *Garcinia cowa*, *Garcinia assigu*, *Garcinia humulis*, *Garcinia brasiliensis*, *Garcinia eugeniaefolia*, *Garcinia subelliptica*, *Garcinia purpurea*, *Garcinia indica*, *Garcinia speciosa*, *Garcinia yunnanensis*, *Garcinia livingstonei*, *Garcinia macrophylla*, *Garcinia intermedia*, *Garcinia virgata*, *Garcinia ovalifolia*, *Cuban propolis*, *Garcinia cochinchinensis*, *Garcinia solomonensis*, *Garcinia multiflora*, *Garcinia pyrifera*,

Garcinia kola, *Garcinia myrtifolia*, *Garcinia pseudoguttifera*, *Garcinia paucinervis*, or *Garcinia semseii*.

[0205] In some embodiments of the aforementioned methods, the mixture provides an increased salt perception, increased salt impact, enhanced saltiness, increased metallic taste, increased alcohol perception, increased authentic alcohol taste, increased retro-nasal effect, increased tingling effect, increased alcoholic bitterness, increased herbal off-note taste, increased cooling intensity, increased cooling perception, enhanced spiciness duration, faster onset of spicy sensation, increase spicy intensity, improved chili flavor, increase in salt and sour flavor notes, an increased spiciness sensation in the subject, faster onset of tingling or numbing sensation, increased tingling or numbing perception, increased tingling or numbing intensity, enhanced tingling or numbing sensation, enhanced tingling or numbing impact, decreased harshness, decreased stinging sensation, enhanced umami perception, increased umami impact, enhanced umami duration, increased umami intensity, increased mouth-watering effect, increased smooth mouthfeel effect, enhanced sourness perception, increased sourness intensity, decreased astringency sensation, or a masking of off-tastes, such as jambu off-tastes, herbal off-tastes or bitter off-tastes, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0206] In some embodiments of the aforementioned methods, the mixture provides a taste perception in the subject of an increase in alcohol perception or alcohol intensity when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0207] In some embodiments of the aforementioned methods, the mixture provides a taste perception in the subject of an increase in alcoholic bitterness or an increase in authentic alcohol taste when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0208] In some embodiments of the aforementioned methods, the mixture provides a taste perception in the subject of an increase in retro nasal effect or tingling effect when the mixture is provided to the subject, such as when the mixture is incorporated in a food or

beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0209] In some embodiments of the aforementioned methods, the mixture provides a taste perception in the subject of an increase in spiciness or spice intensity when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0210] In some embodiments of the aforementioned methods, the mixture provides a taste perception in the subject of an increased spiciness duration or a faster spiciness onset when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0211] In some embodiments of the aforementioned methods, the mixture provides a taste perception in the subject of an increase in salt and sour flavors or improved chili flavor when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0212] In some embodiments of the aforementioned methods, the mixture provides a taste perception in the subject of an increase in cooling perception or cooling intensity when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0213] In some embodiments of the aforementioned methods, the mixture provides a taste perception in the subject of a faster onset of coolness or an increased duration of coolness when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0214] In some embodiments of the aforementioned methods, the mixture provides a taste perception in the subject of an increase in carbonation perception or reduced bubble size or champagne-like effect when the mixture is provided to the subject, such as when the mixture

is incorporated in a beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0215] In some embodiments of the aforementioned methods, the mixture provides a taste perception in the subject of a decrease in harshness or decrease in stinging sensation when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0216] In some embodiments of the aforementioned methods, the mixture reduces the carbonation bubble size of a beverage when the mixture is incorporated into a beverage, as compared to the carbonation bubble size of the beverage in the absence of component (a).

[0217] In some embodiments of the aforementioned methods, the mixture increases the amount of carbonation bubbles of a beverage when the mixture is incorporated into a beverage as compared to amount of carbonation bubbles of the beverage in the absence of component (a).

[0218] In some embodiments of the aforementioned methods, the mixture provides a taste perception in the subject of an increase in numbing or tingling perception or numbing or tingling intensity when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0219] In some embodiments of the aforementioned methods, the mixture provides a taste perception in the subject of a faster onset of numbing or tingling or an increased duration of numbing or tingling when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0220] In some embodiments of the aforementioned methods, the mixture provides a taste perception in the subject of an increase in saltiness perception or salt intensity when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0221] In some embodiments of the aforementioned methods, the mixture provides a taste perception in the subject of an enhanced initial salt impact or enhanced saltiness taste

when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0222] In some embodiments of the aforementioned methods, the mixture provides a taste perception in the subject that masks a bitter off-taste, herbal off-taste or jambu off-taste when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0223] In some embodiments of the aforementioned methods, the mixture provides a taste perception in the subject of an enhanced umami perception or increased umami intensity when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0224] In some embodiments of the aforementioned methods, the mixture provides a taste perception in the subject of an increased umami impact or increased duration of umami sensation when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0225] In some embodiments of the aforementioned methods, the mixture provides a taste perception in the subject of an increased mouth-watering effect when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0226] In some embodiments of the aforementioned methods, wherein the mixture provides a perception in the subject of an increased smooth mouthfeel effect when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0227] In some embodiments of the aforementioned methods, the mixture provides a taste perception in the subject of an enhanced sourness perception of increased sourness intensity when the mixture is provided to the subject, such as when the mixture is incorporated

in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0228] In some embodiments of the aforementioned methods, wherein the mixture provides a taste perception in the subject of a reduction of astringency when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0229] In some embodiments of the aforementioned methods, the food or beverage or granule, powder, or liquid formulation is selected from a carbonated beverage, such as a carbonated fruit beverage, carbonated cola drink or carbonated water, alcoholic beverages, alcohol-free beverages, spices and/or seasonings, such as chili, wasabi, horseradish, mustard, ginger, black pepper, or cinnamon, meat, vegetables, mushrooms, cheese, seafood, dry cereal, oatmeal, granola bars, salt, energy beverages, flavored water, powders for drinks, hard candy, soft candy, taffy, chocolates, sugarless candies, chewing gum, bubble gum, juices, teas, coffees, salsa, gel beads, film strips for breath, gelatin candies, pectin candies, starch candies, lozenges, cough drops, throat lozenges, throat sprays, toothpastes or mouth rinses.

[0230] In some embodiments of the aforementioned methods, the amount of component (a) in the mixture is at least 0.1 ppm, such as at least 0.2, 0.3, 0.4, 0.5, 0.75, 1, 1.5, 2.5, 3, 4, 5, 7.5, 10, 20, 30, 40, 50, 60, 70, 80, 90, 100, 110, 120, 130, 140, 150, 160, 170, 180, 190, 200, 210, 220, 230, 240, 250, 260, 270, 280, 290, or 300 ppm or an amount within a range defined by any two of the aforementioned amounts, preferably 1-5 ppm, 2.5-5 ppm, 5-300ppm, 20-300ppm, 25-300 ppm, 50-300 ppm, 100-300 ppm, 150-300 ppm, 200-300 ppm, or 1-300 ppm.

[0231] In some embodiments, the aforementioned methods further include selecting or identifying a subject to receive a composition, which modulates taste perception in a subject, such as salt perception, salt impact, saltiness, metallic taste, alcohol perception, authentic alcohol taste, tingling effect, alcoholic bitterness, cooling intensity, cooling perception, spiciness duration, the time of onset of spicy sensation, spicy intensity, chili flavor, salt or sour flavor, spiciness, the time of onset of tingling or numbing sensation, tingling or numbing perception, tingling or numbing intensity, tingling or numbing sensation, tingling or numbing impact, harshness, stinging sensation, umami perception, umami impact, umami

duration, umami intensity, mouth-watering effect, sourness perception, sourness intensity, astringency sensation, which masks off-tastes, such as jambu off-tastes, herbal off-tastes or bitter off-tastes, which modulates the mouthfeel effect in a subject, which decreases the carbonation bubble size or increases the carbonation bubble amount in a carbonated beverage, or which increases the retro nasal effect in a subject.

[0232] In some embodiments, the aforementioned methods further include determining or analyzing the salt perception, salt impact, saltiness, metallic taste, alcohol perception, authentic alcohol taste, tingling effect, alcoholic bitterness, cooling intensity, cooling perception, spiciness duration, the time of onset of spicy sensation, spicy intensity, chili flavor, salt or sour flavor, spiciness, the time of onset of tingling or numbing sensation, tingling or numbing perception, tingling or numbing intensity, tingling or numbing sensation, tingling or numbing impact, harshness, stinging sensation, umami perception, umami impact, umami duration, umami intensity, mouth-watering effect, sourness perception, sourness intensity, astringency sensation, the masking of off-tastes, such as jambu off-tastes, herbal off-tastes or bitter off-tastes, the mouthfeel, the reduction of carbonation bubble size or increase of carbonation bubble amount in a carbonated beverage, or the increase of the retro nasal effect or any combination thereof of the subject after consuming said mixture.

[0233] In some embodiments of the aforementioned methods component (a) is dissolved in food grade ethanol.

[0234] In some embodiments of the aforementioned methods the food grade ethanol is at least 1%, such as 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 15, 20, 25, 30, 35, 40, 45, 50, 60, 70, 80, 85, 90, 95, or 100%, or with a range defined by any two of the aforementioned amounts, preferably 80, 90, or 95%.

[0235] Additional embodiments described herein relate to methods of making a mixture, which modulates a subject's taste perception of alcohol, carbonation, spice, salt, sourness, umami, tingling, numbing, or cooling, or which masks an off-taste of a compound in a subject, the method including: admixing a component (a) with a component (b) to form said mixture: (a) a polyisoprenylated benzophenone or analog thereof (for example, a glycosylation molecule of an aglycone, an aglycone of a glycosylated molecule, or a further glycosylated molecule of a glycosylated molecule) or an extract of a plant that includes a polyisoprenylated benzophenone or an analog thereof, such as a *Garcinia indica* extract or a *Garcinia cambogia*

extract; and (b) a composition including an alcohol, carbonation, spice, salt, tingling compound, numbing compound, sour compound, umami compound or a cooling compound or a non-alcoholic beverage; wherein the composition is preferably provided in a food, beverage, granule, powder or liquid formulation; and optionally, wherein the composition includes one or more preservatives or antioxidants, such as a sulphite, sorbic acid, a sorbate compound, benzoic acid, benzoate, propionic acid, propionate, ascorbic acid, ascorbate, citric acid, a tocopherol, a retinol, a polyphenol, a phenolic acid, a flavonoid, lipoic acid, N-acetylcysteine, butylated hydroxyanisole, butylated hydroxytoluene or derivatives thereof, preferably, wherein the one or more preservatives or antioxidants improve the shelf-life, flavor profile, or reduce spoilage of the mixture.

[0236] In some embodiments of the aforementioned methods of making, the polyisoprenylated benzophenone or an analog thereof is selected from one or more of the following: Aristophenone A, Aristophenone B, Bronianone C, Camboginol C, Cambogin C, Chamuangone, Clusianone, 7-epi-aristophenone, 7-epi-clusianone, Eugeniaphenone, Gambogenone, Garcicowin A, Garcicowin B, Garcicowin C, Garcicowin D, Garcimangosone D, Garcimultiflorone A, Garcimultiflorone B, Garcimultiflorone C, Garcimultiflorone D, Garcimultiflorone E, Garcimultiflorone F, (+) Garcinialiptone A, (–) Garcinialiptone B, (–) Cycloxanthochymol, Garcinialiptone C, Garcinialiptone D, Garcinielliptone FA, Garcinielliptone FB, Garcinol, Garcinol 13-O-methylether, Garciosaphenone A, Guttiferone A, Guttiferone B, Guttiferone C, Guttiferone D, Guttiferone E, Guttiferone F, Guttiferone G, Guttiferone H, Guttiferone I, Guttiferone J, Guttiferone K, Guttiferone L, Guttiferone M, Guttiferone N, Guttiferone O, Guttiferone P, Guttiferone Q, Guttiferone R, Guttiferone S, Isogarcimultiflorone F, Isogarcinol, Isogarcinol 13-O-methylether, Isoxanthochymol, Kolanone, Macurin, Myrtiaphenone A, Myrtiaphenone B, Oblongifolins A, Oblongifolins B, Oblongifolins C, Oblongifolins D, Oblongifolins E, Oblongifolins F, Oblongifolins G, Paucinone A, Paucinone B, Paucinone C, Paucinone D, Pedunculol, Pseudoguttiaphenone A, Semsinones A, Semsinones B, Semsinones C, Xanthochymol, Vismiaphenone C, 13, 14 di-dehydroxyisogarcinol, 13-hydroxygarcimultiflorone B, 18-hydroxygarcimultiflorone D, Cariphenone A, Cariphenone B, Chamone I, Chamone II, Clusianone, Clusiaphenone A, Clusiaphenone B, Coccinone A, Coccinone B, Coccinone C, Coccinone D, Coccinone E, Coccinone F, Coccinone G, Coccinone H, Cudranone, Cudraphenone A, Cudraphenone B,

Cudraphenone C, Cudraphenone D, 14-deoxygarcinol, 15, 16 dihydro-16-hydroperoxy plukenetione F, 7-epi-garcinol, 7-epi-isogarcinol, 7-epi nemorosone, 28, 29 epoxy plukenetione A, Garcinielliptone I, Guttiferone K, Hilarianone, 33-hydroperoxy-isoplukenetione, Hyperibone B, Hyperibone K, Hyperibone L, Insigninone, Isovismiaphenone B, Isoxanthochymol, Lanceolatone, Machuone, Methyl hydroxyl nemorosone, Microsphaerins A, Microsphaerins B, Microsphaerins C, Microsphaerins D, Methyl Grandone, Nemorosonal, Nemorosone, Nemorosone II, Ochrocarpinone A, Ochrocarpinone B, Ochrocarpinone C, Pestalone, Plukenetione A, Plukenetione B, Plukenetione C, Plukenetione D acetate, Plukenetione E acetate, Plukenetione F, Plukenetione G, Propolone A, Propolone B, Propolone C, Propolone D, Sampsonione A, Sampsonione B, Sampsonione C, Sampsonione D, Sampsonione E, Sampsonione F, Sampsonione G, Sampsonione H, Sampsonione N, Sampsonione O, Sampsonione P, Sampsonione Q, Scrobiculatone A, Scrobiculatone B, Spiritone, Tovophenone A, Tovophenone B, Tovophenone C, Vismiaguianone A, Vismiaguianone B, Vismiaguianone C, Vismiaguianone D, Vismiaguianone E, Vismiaphenone A, Vismiaphenone B, Vismiaphenone C, Vismiaphenone D, Vismiaphenone E, Vismiaphenone F, Vismiaphenone G, Wedellianone A, Wedellianone B, Xerophenone A, Xerophenone B, 18-ethyloxy-17-hydroxy-17,18-dihydroscrobiculatone A, or 18-ethyloxy-17-hydroxy-17,18-dihydroscrobiculatone B.

[0237] In some embodiments of the aforementioned methods of making, the polyisoprenylated benzophenone or analog thereof or the extract of a plant that comprises an polyisoprenylated benzophenone or an analog thereof comprises a glucosylated polyisoprenylated benzophenone or an aglycone of a polyisoprenylated benzophenone.

[0238] In some embodiments of the aforementioned methods of making, the composition is an alcoholic or non-alcoholic beverage, a spicey product that includes a chili, wasabi, horseradish, mustard, ginger, black pepper, cinnamon, pumpkin spice, Szechuan pepper, or allspice, a salt, a carbonated beverage e.g., to reduce the bubble size of the beverage or impart a champagne-like effect, acetic acid, citric acid, malic acid, fumaric acid, tartaric acid, phosphoric acid or other acid, an umami compound, such as monosodium glutamate, disodium inosinate, disodium guanylate, seafoods, meats, vegetables, tea, seaweed, mushrooms, eggs, dairy products, or fermented products, a tingling or numbing compound, such as jambu oleoresin or spilanthol, or a cooling compound, such as Menthol,

Cyclohexanecarboxamide,N-Ethyl-5-Methyl-2-(1- Methylethyl) (WS-3), N-(Ethoxycarbonylmethyl)-3-p-menthanecarboxamide (WS-5), (1R,2S,5R)-N-(4-Methoxyphenyl)-5-methyl-2-(1- methylethyl)cyclohexanecarboxamide (WS-12), Butanamide, N,2,3-trimethyl-2-(1-methylethyl) (WS-23), or Menthyl Lactate or any combination thereof.

[0239] In some embodiments of the aforementioned methods of making, the plant extract including a polyisoprenylated benzophenone or an analog is obtained from a plant from any one or more of the following families or genera: Clusiasceae, Guttiferae, Clusia, Garcinia, Vismia, Allanblackia, Moronobea, Symphonia, Hypericum, Tovomita, Tovomiptosis, or Ochrocarpus.

[0240] In some embodiments of the aforementioned methods of making, the plant extract including amentoflavone is obtained from a plant from any one or more of the following species: *Garcinia aristata*, *Garcinia xanthochymus*, *Garcinia multiflora*, *Garcinia hambroniana*, *Garcinia cambogia*, *Garcinia oblongifolia*, *Garcinia pedunculata*, *Garcinia mangostana*, *Garcinia cowa*, *Garcinia assigu*, *Garcinia humulis*, *Garcinia brasiliensis*, *Garcinia eugeniaefolia*, *Garcinia subelliptica*, *Garcinia purpurea*, *Garcinia indica*, *Garcinia speciosa*, *Garcinia yunnanensis*, *Garcinia livingstonei*, *Garcinia macrophylla*, *Garcinia intermedia*, *Garcinia virgata*, *Garcinia ovalifolia*, *Cuban propolis*, *Garcinia cochinchinensis*, *Garcinia solomonensis*, *Garcinia multiflora*, *Garcinia pyrifera*, *Garcinia kola*, *Garcinia myrtifolia*, *Garcinia pseudoguttifera*, *Garcinia paucinervis*, or *Garcinia semseii*.

[0241] In some embodiments of the aforementioned methods of making, the mixture provides an increased salt perception, increased salt impact, enhanced saltiness, increased metallic taste, increased alcohol perception, increased authentic alcohol taste, increased retro-nasal effect, increased tingling effect, increased alcoholic bitterness, increased herbal off-note taste, increased cooling intensity, increased cooling perception, enhanced spiciness duration, faster onset of spicy sensation, increase spicy intensity, improved chili flavor, increase in salt and sour flavor notes, an increased spiciness sensation in the subject, faster onset of tingling or numbing sensation, increased tingling or numbing perception, increased tingling or numbing intensity, enhanced tingling or numbing sensation, enhanced tingling or numbing impact, decreased harshness, decreased stinging sensation, enhanced umami perception, increased umami impact, enhanced umami duration, increased umami

intensity, increased mouth-watering effect, increased smooth mouthfeel effect, enhanced sourness perception, increased sourness intensity, decreased astringency sensation, or a masking of off-tastes, such as jambu off-tastes, herbal off-tastes or bitter off-tastes, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0242] In some embodiments of the aforementioned methods of making, the mixture provides a taste perception in the subject of an increase in alcohol perception or alcohol intensity when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0243] In some embodiments of the aforementioned methods of making, the mixture provides a taste perception in the subject of an increase in alcoholic bitterness or authentic alcohol taste when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0244] In some embodiments of the aforementioned methods of making, the mixture provides a taste perception in the subject of an increase in retro nasal effect or tingling effect when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0245] In some embodiments of the aforementioned methods of making, the mixture provides a taste perception in the subject of an increase in spiciness or spice intensity when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0246] In some embodiments of the aforementioned methods of making, the mixture provides a taste perception in the subject of an increased spiciness duration or faster spiciness onset when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0247] In some embodiments of the aforementioned methods of making, the mixture provides a taste perception in the subject of an increase in salt and sour flavors or improved chili flavor when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0248] In some embodiments of the aforementioned methods of making, the mixture provides a taste perception in the subject of an increase in cooling perception or cooling intensity when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0249] In some embodiments of the aforementioned methods of making, the mixture provides a taste perception in the subject of a faster onset of coolness or an increased duration of coolness when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0250] In some embodiments of the aforementioned methods of making, the mixture provides a taste perception in the subject of an increase in carbonation perception or reduced bubble size or champagne-like effect when the mixture is provided to the subject, such as when the mixture is incorporated in a beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0251] In some embodiments of the aforementioned methods of making, the mixture provides a taste perception in the subject of a decrease in harshness or decrease in stinging sensation when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0252] In some embodiments of the aforementioned methods of making, the mixture reduces the carbonation bubble size of a beverage when the mixture is incorporated into a beverage, as compared to the carbonation bubble size of the beverage in the absence of component (a).

[0253] In some embodiments of the aforementioned methods of making, the mixture increases the amount of carbonation bubbles of a beverage when the mixture is incorporated into a beverage as compared to amount of carbonation bubbles of the beverage in the absence of component (a).

[0254] In some embodiments of the aforementioned methods of making, the mixture provides a taste perception in the subject of an increase in numbing or tingling perception or numbing or tingling intensity when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0255] In some embodiments of the aforementioned methods of making, the mixture provides a taste perception in the subject of a faster onset of numbing or tingling or an increased duration of numbing or tingling when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0256] In some embodiments of the aforementioned methods of making, the mixture provides a taste perception in the subject of an increase in saltiness perception or salt intensity when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0257] In some embodiments of the aforementioned methods of making, the mixture provides a taste perception in the subject of an enhanced initial salt impact or enhanced saltiness taste when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0258] In some embodiments of the aforementioned methods of making, the mixture provides a taste perception in the subject that masks a bitter off-taste, herbal off-taste or jambu off-taste when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b)is provided to the subject in the absence of component (a).

[0259] In some embodiments of the aforementioned methods of making, the mixture provides a taste perception in the subject of an enhanced umami perception or increased umami intensity when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0260] In some embodiments of the aforementioned methods of making, the mixture provides a taste perception in the subject of an increased umami impact or increased duration of umami sensation when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0261] In some embodiments of the aforementioned methods of making, the mixture provides a taste perception in the subject of an increased mouth-watering effect when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0262] In some embodiments of the aforementioned methods of making, wherein the mixture provides a perception in the subject of an increased smooth mouthfeel effect when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0263] In some embodiments of the aforementioned methods of making, the mixture provides a taste perception in the subject of an enhanced sourness perception of increased sourness intensity when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0264] In some embodiments of the aforementioned methods of making, wherein the mixture provides a taste perception in the subject of a reduction of astringency when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0265] In some embodiments of the aforementioned methods of making, the food or beverage or granule, powder, or liquid formulation is selected from a carbonated beverage, such as a carbonated fruit beverage, carbonated cola drink or carbonated water, alcoholic beverages, alcohol-free beverages, spices and/or seasonings, such as chili, wasabi, horseradish, mustard, ginger, black pepper, or cinnamon, meat, vegetables, mushrooms, cheese, seafood, dry cereal, oatmeal, granola bars, salt, energy beverages, flavored water, powders for drinks, hard candy, soft candy, taffy, chocolates, sugarless candies, chewing gum, bubble gum, juices, teas, coffees, salsa, gel beads, film strips for breath, gelatin candies, pectin candies, starch candies, lozenges, cough drops, throat lozenges, throat sprays, toothpastes or mouth rinses.

[0266] In some embodiments of the aforementioned methods of making, the amount of component (a) in the mixture is at least 2 ppm, such as, 3, 4, 5, 7.5, 10, 20, 30, 40, 50, 60, 70, 80, 90, 100, 110, 120, 130, 140, 150, 160, 170, 180, 190, 200, 210, 220, 230, 240, 250, 260, 270, 280, 290, or 300 ppm or an amount within a range defined by any two of the aforementioned amounts, preferably 1-5 ppm, 2.5-5 ppm, 5-300ppm, 20-300ppm, 25-300 ppm, 50-300 ppm, 100-300 ppm, 150-300 ppm, 200-300 ppm, or 1-300 ppm.

[0267] In some embodiments, the aforementioned methods of making further include dissolving component (a) in food grade ethanol.

[0268] In some embodiments of the aforementioned methods of making, the food grade ethanol is at least 1%, such as 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 15, 20, 25, 30, 35, 40, 45, 50, 60, 70, 80, 85, 90, 95, or 100%, or with a range defined by any two of the aforementioned amounts, preferably 80, 90, or 95%.

[0269] Additional embodiments further a composition obtained or obtainable by any of the methods of making the mixtures set forth herein.

[0270] More embodiments relate to a mixture used for modulating a subject's taste perception of alcohol, carbonation, spice, salt, sourness, umami, tingling, numbing, or cooling, or for masking an off-taste of a compound in a subject, wherein the mixture includes at least two components (a) and (b): (a) a polyisoprenylated benzophenone or analog thereof (for example, a glycosylation molecule of an aglycone, an aglycone of a glycosylated molecule, or a further glycosylated molecule of a glycosylated molecule) or an extract of a plant that includes a polyisoprenylated benzophenone or an analog thereof, such as a *Garcinia indica* extract or a *Garcinia cambogia* extract; and (b) a composition including an alcohol,

carbonation, spice, salt, tingling compound, numbing compound, sour compound, umami compound or a cooling compound or a non-alcoholic beverage; wherein component (a) is admixed with component (b); preferably, wherein the mixture is provided in a food, beverage, granule, powder or liquid formulation; and optionally, wherein the mixture includes one or more preservatives or antioxidants, such as a sulphite, sorbic acid, a sorbate compound, benzoic acid, benzoate, propionic acid, propionate, ascorbic acid, ascorbate, citric acid, a tocopherol, a retinol, a polyphenol, a phenolic acid, a flavonoid, lipoic acid, N-acetylcysteine, butylated hydroxyanisole, butylated hydroxytoluene or derivatives thereof, preferably, wherein the one or more preservatives or antioxidants improve the shelf-life, flavor profile, or reduce spoilage of the mixture.

[0271] In some embodiments of the aforementioned mixtures for use, the polyisoprenylated benzophenone or an analog thereof is selected from one or more of the following: Aristophenone A, Aristophenone B, Bronianone C, Camboginol C, Cambogin C, Chamuangone, Clusianone, 7-epi-aristophenone, 7-epi-clusianone, Eugeniaphenone, Gambogenone, Garcicowin A, Garcicowin B, Garcicowin C, Garcicowin D, Garcimangosone D, Garcimultiflorone A, Garcimultiflorone B, Garcimultiflorone C, Garcimultiflorone D, Garcimultiflorone E, Garcimultiflorone F, (+) Garcinialiptone A, (–) Garcinialiptone B, (–) Cycloxanthochymol, Garcinialiptone C, Garcinialiptone D, Garcinielliptone FA, Garcinielliptone FB, Garcinol, Garcinol 13-O-methylether, Garciosaphenone A, Guttiferone A, Guttiferone B, Guttiferone C, Guttiferone D, Guttiferone E, Guttiferone F, Guttiferone G, Guttiferone H, Guttiferone I, Guttiferone J, Guttiferone K, Guttiferone L, Guttiferone M, Guttiferone N, Guttiferone O, Guttiferone P, Guttiferone Q, Guttiferone R, Guttiferone S, Isogarcimultiflorone F, Isogarcinol, Isogarcinol 13-O-methylether, Isoxanthochymol, Kolanone, Macurin, Myrtiaphenone A, Myrtiaphenone B, Oblongifolins A, Oblongifolins B, Oblongifolins C, Oblongifolins D, Oblongifolins E, Oblongifolins F, Oblongifolins G, Paucinone A, Paucinone B, Paucinone C, Paucinone D, Pedunculol, Pseudoguttiaphenone A, Semsinones A, Semsinones B, Semsinones C, Xanthochymol, Vismiaphenone C, 13, 14 di-dehydroxyisogarcinol, 13-hydroxygarcimultiflorone B, 18-hydroxygarcimultiflorone D, Cariphenone A, Cariphenone B, Chamone I, Chamone II, Clusianone, Clusiaphenone A, Clusiaphenone B, Coccinone A, Coccinone B, Coccinone C, Coccinone D, Coccinone E, Coccinone F, Coccinone G, Coccinone H, Cudranone, Cudraphenone A, Cudraphenone B,

Cudraphenone C, Cudraphenone D, 14-deoxygarcinol, 15, 16 dihydro-16-hydroperoxy plukenetione F, 7-epi-garcinol, 7-epi-isogarcinol, 7-epi nemorosone, 28, 29 epoxy plukenetione A, Garcinielliptone I, Guttiferone K, Hilarianone, 33-hydroperoxy-isoplukenetione, Hyperibone B, Hyperibone K, Hyperibone L, Insigninone, Isovismiaphenone B, Isoxanthochymol, Lanceolatone, Machuone, Methyl hydroxyl nemorosone, Microsphaerins A, Microsphaerins B, Microsphaerins C, Microsphaerins D, Methyl Grandone, Nemorosonal, Nemorosone, Nemorosone II, Ochrocarpinone A, Ochrocarpinone B, Ochrocarpinone C, Pestalone, Plukenetione A, Plukenetione B, Plukenetione C, Plukenetione D acetate, Plukenetione E acetate, Plukenetione F, Plukenetione G, Propolone A, Propolone B, Propolone C, Propolone D, Sampsonione A, Sampsonione B, Sampsonione C, Sampsonione D, Sampsonione E, Sampsonione F, Sampsonione G, Sampsonione H, Sampsonione N, Sampsonione O, Sampsonione P, Sampsonione Q, Scrobiculatone A, Scrobiculatone B, Spiritone, Tovophenone A, Tovophenone B, Tovophenone C, Vismiaguianone A, Vismiaguianone B, Vismiaguianone C, Vismiaguianone D, Vismiaguianone E, Vismiaphenone A, Vismiaphenone B, Vismiaphenone C, Vismiaphenone D, Vismiaphenone E, Vismiaphenone F, Vismiaphenone G, Wedellianone A, Wedellianone B, Xerophenone A, Xerophenone B, 18-ethyloxy-17-hydroxy-17,18-dihydroscrobiculatone A, or 18-ethyloxy-17-hydroxy-17,18-dihydroscrobiculatone B.

[0272] In some embodiments of the aforementioned mixtures for use, the polyisoprenylated benzophenone or analog thereof or the extract of a plant that comprises an polyisoprenylated benzophenone or an analog thereof comprises a glucosylated polyisoprenylated benzophenone or an aglycone of a polyisoprenylated benzophenone.

[0273] In some embodiments of the aforementioned mixtures for use, the composition is an alcoholic or non-alcoholic beverage, a spicey product that includes a chili, wasabi, horseradish, mustard, ginger, black pepper, cinnamon, pumpkin spice, Szechuan pepper, or allspice, a salt, a carbonated beverage e.g., to reduce the bubble size of the beverage or impart a champagne-like effect, a sour compound, such as acetic acid, citric acid, malic acid, fumaric acid, tartaric acid, phosphoric acid or other acid, an umami compound, such as monosodium glutamate, disodium inosinate, disodium guanylate, seafoods, meats, vegetables, tea, seaweed, mushrooms, eggs, dairy products, or fermented products, a tingling or numbing compound, such as jambu oleoresin or spilanthol, or a cooling compound, such as

Menthol, Cyclohexanecarboxamide,N-Ethyl-5-Methyl-2-(1- Methylethyl) (WS-3), N-(Ethoxycarbonylmethyl)-3-p-menthanecarboxamide (WS-5), (1R,2S,5R)-N-(4-Methoxyphenyl)-5-methyl-2-(1- methylethyl)cyclohexanecarboxamide (WS-12), Butanamide, N,2,3-trimethyl-2-(1-methylethyl) (WS-23), or Menthyl Lactate or any combination thereof.

[0274] In some embodiments of the aforementioned mixtures for use, the plant extract including a polyisoprenylated benzophenone or an analog is obtained from a plant from any one or more of the following families or genera: Clusiasceae, Guttiferae, Clusia, Garcinia, Vismia, Allanblackia, Moronobea, Symphonia, Hypericum, Tovomita, Tovomiptosis, or Ochrocarpus.

[0275] In some embodiments of the aforementioned mixtures for use, the plant extract including amentoflavone is obtained from a plant from any one or more of the following species: *Garcinia aristata*, *Garcinia xanthochymus*, *Garcinia multiflora*, *Garcinia hambroniana*, *Garcinia cambogia*, *Garcinia oblongifolia*, *Garcinia pedunculata*, *Garcinia mangostana*, *Garcinia cowa*, *Garcinia assigu*, *Garcinia humulis*, *Garcinia brasiliensis*, *Garcinia eugeniaefolia*, *Garcinia subelliptica*, *Garcinia purpurea*, *Garcinia indica*, *Garcinia speciosa*, *Garcinia yunnanensis*, *Garcinia livingstonei*, *Garcinia macrophylla*, *Garcinia intermedia*, *Garcinia virgata*, *Garcinia ovalifolia*, *Cuban propolis*, *Garcinia cochinchinensis*, *Garcinia solomonensis*, *Garcinia multiflora*, *Garcinia pyrifera*, *Garcinia kola*, *Garcinia myrtifolia*, *Garcinia pseudoguttifera*, *Garcinia paucinervis*, or *Garcinia semseii*.

[0276] In some embodiments of the aforementioned mixtures for use, the mixture provides an increased salt perception, increased salt impact, enhanced saltiness, increased metallic taste, increased alcohol perception, increased authentic alcohol taste, increased retro-nasal effect, increased tingling effect, increased alcoholic bitterness, increased herbal off-note taste, increased cooling intensity, increased cooling perception, enhanced spiciness duration, faster onset of spicy sensation, increase spicy intensity, improved chili flavor, increase in salt and sour flavor notes, an increased spiciness sensation in the subject, faster onset of tingling or numbing sensation, increased tingling or numbing perception, increased tingling or numbing intensity, enhanced tingling or numbing sensation, enhanced tingling or numbing impact, decreased harshness, decreased stinging sensation, enhanced umami perception, increased umami impact, enhanced umami duration, increased umami intensity, increased mouth-

watering effect, increased smooth mouthfeel effect, enhanced sourness perception, increased sourness intensity, decreased astringency sensation, or a masking of off-tastes, such as jambu off-tastes, herbal off-tastes or bitter off-tastes, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0277] In some embodiments of the aforementioned mixtures for use, the mixture provides a taste perception in the subject of an increase in alcohol perception or alcohol intensity when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0278] In some embodiments of the aforementioned mixtures for use, the mixture provides a taste perception in the subject of an increase in alcoholic bitterness or authentic alcohol taste when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0279] In some embodiments of the aforementioned mixtures for use, the mixture provides a taste perception in the subject of an increase in retro nasal effect or tingling effect when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0280] In some embodiments of the aforementioned mixtures for use, the mixture provides a taste perception in the subject of an increase in spiciness or spice intensity when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0281] In some embodiments of the aforementioned mixtures for use, the mixture provides a taste perception in the subject of an increased spiciness duration or faster spiciness onset when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0282] In some embodiments of the aforementioned mixtures for use, the mixture provides a taste perception in the subject of an increase in salt and sour flavors or improved chili flavor when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0283] In some embodiments of the aforementioned mixtures for use, the mixture provides a taste perception in the subject of an increase in cooling perception or cooling intensity when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0284] In some embodiments of the aforementioned mixtures for use, the mixture provides a taste perception in the subject of a faster onset of coolness or an increased duration of coolness when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0285] In some embodiments of the aforementioned mixtures for use, the mixture provides a taste perception in the subject of an increase in carbonation perception or reduced bubble size or champagne-like effect when the mixture is provided to the subject, such as when the mixture is incorporated in a beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0286] In some embodiments of the aforementioned mixtures for use, the mixture provides a taste perception in the subject of a decrease in harshness or decrease in stinging sensation when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0287] In some embodiments of the aforementioned mixtures for use, the mixture reduces the carbonation bubble size of a food or beverage when the mixture is incorporated into a beverage, as compared to the carbonation bubble size of the beverage in the absence of component (a).

[0288] In some embodiments of the aforementioned mixtures for use, the mixture increases the amount of carbonation bubbles of a beverage when the mixture is incorporated

into a beverage as compared to amount of carbonation bubbles of the beverage in the absence of component (a).

[0289] In some embodiments of the aforementioned mixtures for use, the mixture provides a taste perception in the subject of an increase in numbing or tingling perception or numbing or tingling intensity when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0290] In some embodiments of the aforementioned mixtures for use, the mixture provides a taste perception in the subject of a faster onset of numbing or tingling or an increased duration of numbing or tingling when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0291] In some embodiments of the aforementioned mixtures for use, the mixture provides a taste perception in the subject of an increase in saltiness perception or salt intensity when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0292] In some embodiments of the aforementioned mixtures for use, the mixture provides a taste perception in the subject of an enhanced initial salt impact or enhanced saltiness taste when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0293] In some embodiments of the aforementioned mixtures for use, the mixture provides a taste perception in the subject that masks a bitter off-taste, herbal off-taste or jambu off-taste when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b)is provided to the subject in the absence of component (a).

[0294] In some embodiments of the aforementioned mixtures for use, the mixture provides a taste perception in the subject of an enhanced umami perception or increased umami intensity when the mixture is provided to the subject, such as when the mixture is incorporated

in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0295] In some embodiments of the aforementioned mixtures for use, the mixture provides a taste perception in the subject of an increased umami impact or increased duration of umami sensation when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0296] In some embodiments of the aforementioned mixtures for use, the mixture provides a taste perception in the subject of an increased mouth-watering effect when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0297] In some embodiments of the aforementioned mixtures for use, wherein the mixture provides a perception in the subject of an increased smooth mouthfeel effect when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0298] In some embodiments of the aforementioned mixtures for use, the mixture provides a taste perception in the subject of an enhanced sourness perception of increased sourness intensity when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0299] In some embodiments of the aforementioned mixtures for use, wherein the mixture provides a taste perception in the subject of a reduction of astringency when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0300] In some embodiments of the aforementioned mixtures for use, the food or beverage or granule, powder, or liquid formulation is selected from a carbonated beverage, such as a carbonated fruit beverage, carbonated cola drink or carbonated water, alcoholic beverages, alcohol-free beverages, spices and/or seasonings, such as chili, wasabi, horseradish,

mustard, ginger, black pepper, or cinnamon, meat, vegetables, mushrooms, cheese, seafood, dry cereal, oatmeal, granola bars, salt, energy beverages, flavored water, powders for drinks, hard candy, soft candy, taffy, chocolates, sugarless candies, chewing gum, bubble gum, juices, teas, coffees, salsa, gel beads, film strips for breath, gelatin candies, pectin candies, starch candies, lozenges, cough drops, throat lozenges, throat sprays, toothpastes or mouth rinses.

[0301] In some embodiments of the aforementioned mixtures for use, the amount of component (a) in the mixture is at least 2 ppm, such as, 3, 4, 5, 7.5, 10, 20, 30, 40, 50, 60, 70, 80, 90, 100, 110, 120, 130, 140, 150, 160, 170, 180, 190, 200, 210, 220, 230, 240, 250, 260, 270, 280, 290, or 300 ppm or an amount within a range defined by any two of the aforementioned amounts, preferably 1-5 ppm, 2.5-5 ppm, 5-300ppm, 20-300ppm, 25-300 ppm, 50-300 ppm, 100-300 ppm, 150-300 ppm, 200-300 ppm, or 1-300 ppm.

[0302] In some embodiments, the methods described herein relate to a mixture for use, the method further including selecting or identifying a subject to receive a composition, which modulates taste perception in a subject, such as salt perception, salt impact, saltiness, metallic taste, alcohol perception, authentic alcohol taste, tingling effect, alcoholic bitterness, cooling intensity, cooling perception, spiciness duration, the time of onset of spicy sensation, spicy intensity, chili flavor, salt or sour flavor, spiciness, the time of onset of tingling or numbing sensation, tingling or numbing perception, tingling or numbing intensity, tingling or numbing sensation, tingling or numbing impact, harshness, stinging sensation, umami perception, umami impact, umami duration, umami intensity, mouth-watering effect, sourness perception, sourness intensity, astringency sensation, which masks off-tastes, such as jambu off-tastes, herbal off-tastes or bitter off-tastes, which modulates the mouthfeel effect in a subject, which decreases the carbonation bubble size or increases the carbonation bubble amount in a carbonated beverage, or which increases the retro nasal effect in a subject.

[0303] In some embodiments, the methods described herein relate to a mixture for use, the method further including determining or analyzing the salt perception, salt impact, saltiness, metallic taste, alcohol perception, authentic alcohol taste, tingling effect, alcoholic bitterness, cooling intensity, cooling perception, spiciness duration, the time of onset of spicy sensation, spicy intensity, chili flavor, salt or sour flavor, spiciness, the time of onset of tingling or numbing sensation, tingling or numbing perception, tingling or numbing intensity, tingling or numbing sensation, tingling or numbing impact, harshness, stinging sensation, umami

perception, umami impact, umami duration, umami intensity, mouth-watering effect, sourness perception, sourness intensity, astringency sensation, the masking of off-tastes, such as jambu off-tastes, herbal off-tastes or bitter off-tastes, the mouthfeel, the reduction of carbonation bubble size or increase of carbonation bubble amount in a carbonated beverage, or the increase of the retro nasal effect or any combination thereof of the subject after consuming said mixture.

[0304] In some embodiments of the aforementioned mixtures for use, component (a) is dissolved in food grade ethanol.

[0305] In some embodiments of the aforementioned mixtures for use, the food grade ethanol is at least 1%, such as 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 15, 20, 25, 30, 35, 40, 45, 50, 60, 70, 80, 85, 90, 95, or 100%, or with a range defined by any two of the aforementioned amounts, preferably 80, 90, or 95%.

[0306] Several embodiments described herein relate to a method for modulating a subject's taste perception of fruity flavors, white flavors, brown flavors, pungency, burning, harshness, bitterness, aging, oak, honey, alcohol, syrup, tea, or saffron, the method including: providing a subject a mixture that includes at least two components (a) and (b): (a) a phenylpropanoid, a phenylethanol derivative, a glycoside or an analog thereof (for example, a glycosylation molecule of an aglycone, an aglycone of a glycosylated molecule, or a further glycosylated molecule of a glycosylated molecule) or an extract of a plant that includes a phenylpropanoid, a phenylethanol derivative, a glycoside or an analog thereof, such as a *Rhodiola rosea* root extract; and (b) a composition including a fruit, vanilla, cocoa, chocolate, coffee, a pungent compound, a burning compound, a harsh compound, a bitter compound, saffron, oak extract, honey, tea, syrup, or an alcohol, wherein component (a) is admixed with component (b); wherein the mixture is preferably provided in a food, beverage, granule, powder or liquid formulation; and optionally, wherein the mixture includes one or more preservatives or antioxidants, such as a sulphite, sorbic acid, a sorbate compound, benzoic acid, benzoate, propionic acid, propionate, ascorbic acid, ascorbate, citric acid, a tocopherol, a retinol, a polyphenol, a phenolic acid, a flavonoid, lipoic acid, N-acetylcysteine, butylated hydroxyanisole, butylated hydroxytoluene or derivatives thereof, preferably, wherein the one or more preservatives or antioxidants improve the shelf-life, flavor profile, or reduce spoilage of the mixture; and/or optionally, selecting a composition that includes an compound with a fruit, vanilla, chocolate, coffee, a pungent compound, a burning compound, a harsh compound,

a bitter compound, saffron, oak extract, honey, tea, syrup, or an alcohol for receiving an agent that modulates the taste perception of a subject of fruity flavors, white flavors, brown flavors, pungency, burning, harshness, bitterness, aging, oak tastes, or saffron tastes and providing said selected composition component (a); and/or optionally, evaluating the modulation of a subject's taste perception of fruity flavors, white flavors, brown flavors, pungency, burning, harshness, bitterness, aging, oak tastes, or saffron tastes after providing the subject the mixture.

[0307] In some of the aforementioned methods, the phenylpropanoid, the phenylethanol derivative, the glycoside or an analog thereof or the extract of a plant that includes a phenylpropanoid, a phenylethanol derivative, a glycoside or an analog thereof includes molecules selected from one or more of the following: salidroside (rhodioloside), rosin, rosavin, rosarin, rosiridrin, rhodioniside, and p-tyrosol.

[0308] In some of the aforementioned methods, the phenylpropanoid, the phenylethanol derivative, the glycoside or an analog thereof or the extract of a plant that comprises a phenylpropanoid, a phenylethanol derivative, a glycoside or an analog thereof comprises a glucosylated phenylpropanoid, a glucosylated phenylethanol derivative, a glucosylated glycoside, an aglycone of a phenylpropanoid, an aglycone of a phenylethanol derivative, or an aglycone of a glycoside.

[0309] In some of the aforementioned methods, the composition is a fruit, such as citrus fruits, tropical fruits, or berries, juices, puree, jam, jelly, sports drinks, fruit flavored beverages, wine, dairy product, plant-based milk, product of plant-based milk, coffee, such as black coffee, milk-based coffee drinks, iced coffee drinks, instant coffee, coffee beans, or any combination thereof, alcoholic or non-alcoholic beverage, such as vodka, brandy, whiskey, or any combination thereof, a pungent compound, such as capsaicin, capsicum, piperine, allyl isothiocyanate, allicin, gingerol, sinigrin, eugenol, sinalbin, safrole, menthol, isothiocyanates, thymol, curcumin, resiniferatoxin, oleocanthal or any combination thereof, a harsh compound, such as quinine, caffeine, nicotine, tannins, catechins, limonene, pinene, amygdalin, saponins, oxalic acid, formic acid, allyl isothiocyanate, dimethyl sulfide, casein peptides, bromelain, capsaicin or any combination thereof, a burning compound, such as capsaicin, dihydrocapsaicin, nordihydrocapsaicin, allyl isothiocyanate, piperine, gingerol, allicin, allyl sulfide, diallyl disulfide, resiniferatoxin, acrolein, cinnamaldehyde, menthol, eugenol, ethanol, acetic acid, oleocanthal, citric acid or any combination thereof, a bitter compound, such as

absinthin, aloin, alpha acid, amarogentin, andrographolide, brucine, caffeine, denatonium, eugenin, hesperidin, humulone, isohumulone, Kaempferol 3-O-rutinoside, 6-Methoxymellein, naringin, papaverine, phenylthiocarbamide, propylthiouracil, quassin, quinidine, quinine, salicin, strychnine, sucrose octaacetate, sucrose octapropionate, theobromine, theophylline, vegetables, tea, chocolate, fruits or any combination thereof, honey, vanilla, chocolate, tea, saffron, safranal or syrup, such as maple syrup.

[0310] In some of the aforementioned methods, the dairy product, plant-based milk, or product of plant-based milk includes a milk, such as whole milk, nonfat milk, lactose-free milk, buttermilk, condensed milk, cashew milk, goat milk, rick milk, soy milk, oat milk, almond milk, coconut milk, chocolate milk, a yogurt, cheese, frosting, pudding, chocolate, custard, ice cream, gelato, sherbet, sorbet, frozen yogurt or any combination thereof.

[0311] In some of the aforementioned methods, the plant extract that includes a phenylpropanoid, a phenylethanol derivative, a glycoside or an analog thereof is obtained from a plant from any one or more of the following species: *Rhodiola rosea*, *Rhodiola alterna*, *Rhodiola brevipetiolata*, *Rhodiola crenulate*, *Rhodiola kirilowi*, *Rhodiola quadrifida*, *Rhodiola sachalinensis*, *Rhodiola sacra.*, or *Rhodiola iremelica.*.

[0312] In some of the aforementioned methods, the mixture provides a taste perception in the subject of an enhancement of ripeness or ripeness perception, an enhancement of juiciness or juiciness perception, an enhancement of freshness or freshness perception, an enhancement of fruity flavors or notes, an enhancement of flavor depth, an enhancement in mouthfeel or mouthfeel perception when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0313] In some of the aforementioned methods, the mixture provides a taste perception in the subject of an enhancement of cocoa flavors or notes, an enhancement of dark cocoa flavors or notes, an enhancement of vanilla bean flavors or notes, an enhancement of sweetness or sweetness perception, an enhancement of roasted coffee flavors or notes, an enhancement of dark roasted flavors or notes, or an enhancement of creaminess or creaminess perception when the mixture is provided to the subject, such as when the mixture is

incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0314] In some of the aforementioned methods, the mixture provides a taste perception in the subject of an enhancement of cinnamic notes, an enhancement of brown notes, or an enhancement of honey notes when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0315] In some of the aforementioned methods, the mixture provides a taste perception in the subject of a reduction in pungency or pungency perception, a reduction in initial pungency perception, a reduction in burning sensation or burning perception, a reduction in initial burning perception, a delayed onset of burning sensation or burning perception, a reduction in burning sensation duration, a masking of alcohol perception, an enhancement of aged fruit notes, enhancement of brandy flavors or notes, a reduction in tingling sensation or tingling perception, a reduction in initial tingling perception, a delayed onset of tingling sensation or tingling perception, a reduction in harshness or harshness perception, a reduction in bitterness or bitterness perception, a delayed onset of spice burn or spice burn perception, or a reduction in spice intensity when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0316] In some of the aforementioned methods, the mixture provides a taste perception in the subject of an enhancement of aging effect, an enhancement of wood tastes or notes, an enhancement of brown flavors or notes, an enhancement of sweet flavors or notes, an enhancement of caramel flavors or notes, an enhancement of floral flavors or notes, an enhancement of woodiness, an enhancement of hay flavors or notes, an enhancement of saffron taste or an enhancement of astringency or astringency perception when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0317] In some of the aforementioned methods, the food or beverage or granule, powder, or liquid formulation is selected from a sugar substitute, water, a carbonated beverage,

such as a carbonated fruit beverage, carbonated cola drink or carbonated water, sport beverage, alcoholic beverages, alcohol-free beverages, spices and/or seasonings, such as chili, wasabi, horseradish, mustard, ginger, black pepper, or cinnamon, meat, vegetables, mushrooms, cheese, seafood, salt, energy beverages, flavored water, powders for drinks, dairy products, such as milk, yogurt, cheese, or ice cream, plant based milks, products of plant based milk, puddings, cakes, shakes, malts, brownies, pastries, cookies, cheesecakes, fudge, pies, cobblers, parfaits, mousse, biscuits, custards, frosting, fruits, vegetables, condiments, dry cereal, oatmeal, granola bars, hard candy, soft candy, taffy, chocolates, sugarless candies, chewing gum, bubble gum, juices, teas, coffees, salsa, gel beads, film strips for breath, gelatin candies, pectin candies, starch candies, lozenges, cough drops, throat lozenges, throat sprays, toothpastes or mouth rinses.

[0318] In some of the aforementioned methods, the amount of component (a) in the mixture is at least 2 ppm, such as, 3, 4, 5, 7.5, 10, 20, 30, 40, 50, 60, 70, 80, 90, 100, 110, 120, 130, 140, 150, 160, 170, 180, 190, 200, 210, 220, 230, 240, 250, 260, 270, 280, 290, or 300 ppm or an amount within a range defined by any two of the aforementioned amounts, preferably 15-25 ppm, 12.5-40 ppm, 25-50 ppm, 25-60 ppm, 25-75 ppm, 50-90 ppm, 50-150 ppm, 100-150 ppm, 100-200 ppm, 150-200 ppm, 200-250 ppm, or 12-200 ppm.

[0319] In some embodiments, the aforementioned methods further include selecting or identifying a subject to receive a composition, which modulates a taste perception in a subject, such as fruity flavors, white flavors, brown flavors, pungency, burning, harshness, bitterness, aging, oak tastes, or saffron tastes.

[0320] In some embodiments, the aforementioned methods further include determining or analyzing the ripeness perception, juiciness perception, freshness perception, flavor depth perception, mouthfeel perception, creaminess perception, pungency perception, initial pungency onset, burning perception, initial burning onset, tingling perception, initial tingling onset, harshness perception, bitterness perception, aging effect perception, initial spice burn onset, spice intensity perception, alcohol perception, astringency perception, or perception of fruity, vanilla bean, cocoa, dark cocoa, roasted coffee, dark roasted coffee, cinnamic, brown, honey, aged fruit, wood, sweet, hay, saffron, caramel, or floral flavor or notes or any combination thereof of the subject after consuming said mixture.

[0321] In some of the aforementioned methods, component (a) is dissolved in food grade ethanol.

[0322] In some of the aforementioned methods, the food grade ethanol is at least 1%, such as 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 15, 20, 25, 30, 35, 40, 45, 50, 60, 70, 80, 85, 90, 95, or 100%, or with a range defined by any two of the aforementioned amounts, preferably 80, 90, or 95%.

[0323] Additional embodiments described herein relate to a method of making a mixture which modulates a subject's taste perception of fruity flavors, white flavors, brown flavors, pungency, burning, harshness, bitterness, aging, oak, honey, alcohol, syrup, tea, or saffron, the method including: admixing a component (a) with a component (b) to form said mixture: (a) a phenylpropanoid, a phenylethanol derivative, a glycoside or an analog thereof (for example, a glycosylation molecule of an aglycone, an aglycone of a glycosylated molecule, or a further glycosylated molecule of a glycosylated molecule) or an extract of a plant that includes a phenylpropanoid, a phenylethanol derivative, a glycoside or an analog thereof, such as a *Rhodiola rosea* root extract; and (b) a composition including a fruit, vanilla, cocoa, chocolate, coffee, a pungent compound, a burning compound, a harsh compound, a bitter compound, saffron, oak extract, honey, tea, syrup, or an alcohol; wherein the composition is preferably provided in a food, beverage, granule, powder or liquid formulation; and optionally, wherein the composition includes one or more preservatives or antioxidants, such as a sulphite, sorbic acid, a sorbate compound, benzoic acid, benzoate, propionic acid, propionate, ascorbic acid, ascorbate, citric acid, a tocopherol, a retinol, a polyphenol, a phenolic acid, a flavonoid, lipoic acid, N-acetylcysteine, butylated hydroxyanisole, butylated hydroxytoluene or derivatives thereof, preferably, wherein the one or more preservatives or antioxidants improve the shelf-life, flavor profile, or reduce spoilage of the mixture.

[0324] In some embodiments of the aforementioned methods of making, the phenylpropanoid, the phenylethanol derivative, the glycoside or an analog thereof or the extract of a plant that includes a phenylpropanoid, a phenylethanol derivative, a glycoside or an analog thereof includes molecules selected from one or more of the following: salidroside (rhodioloside), rosin, rosavin, rosarin, rosiridrin, rhodioniside, or p-tyrosol.

[0325] In some embodiments of the aforementioned methods of making, the phenylpropanoid, the phenylethanol derivative, the glycoside or an analog thereof or the

extract of a plant that comprises a phenylpropanoid, a phenylethanol derivative, a glycoside or an analog thereof comprises a glucosylated phenylpropanoid, a glucosylated phenylethanol derivative, a glucosylated glycoside, an aglycone of a phenylpropanoid, an aglycone of a phenylethanol derivative, or an aglycone of a glycoside.

[0326] In some embodiments of the aforementioned methods of making, the composition is a fruit, such as citrus fruits, tropical fruits, or berries, juices, puree, jam, jelly, sports drinks, fruit flavored beverages, wine, dairy product, plant-based milk, product of plant-based milk, coffee, such as black coffee, milk-based coffee drinks, iced coffee drinks, instant coffee, coffee beans, or any combination thereof, alcoholic or non-alcoholic beverage, such as vodka, brandy, whiskey, or any combination thereof, a pungent compound, such as capsaicin, capsicum, piperine, allyl isothiocyanate, allicin, gingerol, sinigrin, eugenol, sinalbin, safrole, menthol, isothiocyanates, thymol, curcumin, resiniferatoxin, oleocanthal or any combination thereof, a harsh compound, such as quinine, caffeine, nicotine, tannins, catechins, limonene, pinene, amygdalin, saponins, oxalic acid, formic acid, allyl isothiocyanate, dimethyl sulfide, casein peptides, bromelain, capsaicin or any combination thereof, a burning compound, such as capsaicin, dihydrocapsaicin, nordihydrocapsaicin, allyl isothiocyanate, piperine, gingerol, allicin, allyl sulfide, diallyl disulfide, resiniferatoxin, acrolein, cinnamaldehyde, menthol, eugenol, ethanol, acetic acid, oleocanthal, citric acid or any combination thereof, a bitter compound, such as absinthin, aloin, alpha acid, amarogentin, andrographolide, brucine, caffeine, denatonium, eugenin, hesperidin, humulone, isohumulone, Kaempferol 3-O-rutinoside, 6-Methoxymellein, naringin, papaverine, phenylthiocarbamide, propylthiouracil, quassin, quinidine, quinine, salicin, strychnine, sucrose octaacetate, sucrose octapropionate, theobromine, theophylline, vegetables, tea, chocolate, fruits or any combination thereof, honey, vanilla, chocolate, tea, saffron, safranal or syrup, such as maple syrup.

[0327] In some embodiments of the aforementioned methods of making, the dairy product, plant-based milk, or product of plant-based milk includes a milk, such as whole milk, nonfat milk, lactose-free milk, buttermilk, condensed milk, cashew milk, goat milk, rick milk, soy milk, oat milk, almond milk, coconut milk, chocolate milk, a yogurt, cheese, frosting, pudding, chocolate, custard, ice cream, gelato, sherbet, sorbet, frozen yogurt or any combination thereof.

[0328] In some embodiments of the aforementioned methods of making, the plant extract that includes a phenylpropanoid, a phenylethanol derivative, a glycoside or an analog thereof is obtained from a plant from any one or more of the following species: *Rhodiola rosea*, *Rhodiola alterna*, *Rhodiola brevipetiolata*, *Rhodiola crenulate*, *Rhodiola kirilowi*, *Rhodiola quadrifida*, *Rhodiola sachalinensis*, *Rhodiola sacra.*, or *Rhodiola iremelica.*.

[0329] In some embodiments of the aforementioned methods of making, the mixture provides a taste perception in the subject of an enhancement of ripeness or ripeness perception, an enhancement of juiciness or juiciness perception, an enhancement of freshness or freshness perception, an enhancement of fruity flavors or notes, an enhancement of flavor depth, an enhancement in mouthfeel or mouthfeel perception when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0330] In some embodiments of the aforementioned methods of making, the mixture provides a taste perception in the subject of an enhancement of cocoa flavors or notes, an enhancement of dark cocoa flavors or notes, an enhancement of vanilla bean flavors or notes, an enhancement of sweetness or sweetness perception, an enhancement of roasted coffee flavors or notes, an enhancement of dark roasted flavors or notes, or an enhancement of creaminess or creaminess perception when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0331] In some embodiments of the aforementioned methods of making, the mixture provides a taste perception in the subject of an enhancement of cinnamic notes, an enhancement of brown notes, or an enhancement of honey notes when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0332] In some embodiments of the aforementioned methods of making, the mixture provides a taste perception in the subject of a reduction in pungency or pungency perception, a reduction in initial pungency perception, a reduction in burning sensation or

burning perception, a reduction in initial burning perception, a delayed onset of burning sensation or burning perception, a reduction in burning sensation duration, a masking of alcohol perception, an enhancement of aged fruit notes, enhancement of brandy flavors or notes, a reduction in tingling sensation or tingling perception, a reduction in initial tingling perception, a delayed onset of tingling sensation or tingling perception, a reduction in harshness or harshness perception, a reduction in bitterness or bitterness perception, a delayed onset of spice burn or spice burn perception, or a reduction in spice intensity when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0333] In some embodiments of the aforementioned methods of making, the mixture provides a taste perception in the subject of an enhancement of aging effect, an enhancement of wood tastes or notes, an enhancement of brown flavors or notes, an enhancement of sweet flavors or notes, an enhancement of caramel flavors or notes, an enhancement of floral flavors or notes, an enhancement of woodiness, an enhancement of hay flavors or notes, an enhancement of saffron taste or an enhancement of astringency or astringency perception when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0334] In some embodiments of the aforementioned methods of making, the food or beverage or granule, powder, or liquid formulation is selected from a sugar substitute, water, a carbonated beverage, such as a carbonated fruit beverage, carbonated cola drink or carbonated water, sport beverage, alcoholic beverages, alcohol-free beverages, spices and/or seasonings, such as chili, wasabi, horseradish, mustard, ginger, black pepper, or cinnamon, meat, vegetables, mushrooms, cheese, seafood, salt, energy beverages, flavored water, powders for drinks, dairy products, such as milk, yogurt, cheese, or ice cream, plant based milks, products of plant based milk, puddings, cakes, shakes, malts, brownies, pastries, cookies, cheesecakes, fudge, pies, cobblers, parfaits, mousse, biscuits, custards, frosting, fruits, vegetables, condiments, dry cereal, oatmeal, granola bars, hard candy, soft candy, taffy, chocolates, sugarless candies, chewing gum, bubble gum, juices, teas, coffees, salsa, gel beads,

film strips for breath, gelatin candies, pectin candies, starch candies, lozenges, cough drops, throat lozenges, throat sprays, toothpastes or mouth rinses.

[0335] In some embodiments of the aforementioned methods of making, the amount of component (a) in the mixture is at least 2 ppm, such as, 3, 4, 5, 7.5, 10, 20, 30, 40, 50, 60, 70, 80, 90, 100, 110, 120, 130, 140, 150, 160, 170, 180, 190, 200, 210, 220, 230, 240, 250, 260, 270, 280, 290, or 300 ppm or an amount within a range defined by any two of the aforementioned amounts, preferably 15-25 ppm, 12.5-40 ppm, 25-50 ppm, 25-60 ppm, 25-75 ppm, 50-90 ppm, 50-150 ppm, 100-150 ppm, 100-200 ppm, 150-200 ppm, 200-250 ppm, or 12-200 ppm.

[0336] In some embodiments of the aforementioned methods of making, component (a) is dissolved in food grade ethanol.

[0337] In some embodiments of the aforementioned methods of making, the food grade ethanol is at least 1%, such as 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 15, 20, 25, 30, 35, 40, 45, 50, 60, 70, 80, 85, 90, 95, or 100%, or with a range defined by any two of the aforementioned amounts, preferably 80, 90, or 95%.

[0338] Additional embodiments further include a composition obtained or obtainable by any one or more of the methods mentioned above.

[0339] More embodiments described herein relate to a mixture used for modulating a subject's taste perception of fruity flavors, white flavors, brown flavors, pungency, burning, harshness, bitterness, aging, oak, honey, alcohol, syrup, tea, or saffron in a subject, wherein the mixture includes at least two components (a) and (b): (a) a phenylpropanoid, a phenylethanol derivative, a glycoside or an analog thereof (for example, a glycosylation molecule of an aglycone, an aglycone of a glycosylated molecule, or a further glycosylated molecule of a glycosylated molecule) or an extract of a plant that includes a phenylpropanoid, a phenylethanol derivative or an analog thereof, such as a *Rhodiola rosea* root extract; and (b) a composition including a fruit, vanilla, cocoa, chocolate, coffee, a pungent compound, a burning compound, a harsh compound, a bitter compound, saffron, oak extract, honey, tea, syrup, or an alcohol; wherein component (a) is admixed with component (b); preferably, wherein the mixture is provided in a food, beverage, granule, powder or liquid formulation; and optionally, wherein the mixture includes one or more preservatives or antioxidants, such as a sulphite, sorbic acid, a sorbate compound, benzoic acid, benzoate, propionic acid,

propionate, ascorbic acid, ascorbate, citric acid, a tocopherol, a retinol, a polyphenol, a phenolic acid, a flavonoid, lipoic acid, N-acetylcysteine, butylated hydroxyanisole, butylated hydroxytoluene or derivatives thereof, preferably, wherein the one or more preservatives or antioxidants improve the shelf-life, flavor profile, or reduce spoilage of the mixture.

[0340] In some embodiments of the aforementioned mixtures for use, the phenylpropanoid, the phenylethanol derivative, a glycoside or an analog thereof or the extract of a plant that includes a phenylpropanoid, a phenylethanol derivative, a glycoside or an analog thereof includes molecules selected from one or more of the following: salidroside (rhodioloside), rosin, rosavin, rosarin, rosiridrin, rhodioniside, and p-tyrosol.

[0341] In some embodiments of the aforementioned mixtures for use, the phenylpropanoid, the phenylethanol derivative, the glycoside or an analog thereof or the extract of a plant that comprises a phenylpropanoid, a phenylethanol derivative, a glycoside or an analog thereof comprises a glucosylated phenylpropanoid, a glucosylated phenylethanol derivative, a glucosylated glycoside, an aglycone of a phenylpropanoid, an aglycone of a phenylethanol derivative, or an aglycone of a glycoside.

[0342] In some embodiments of the aforementioned mixtures for use, the composition is a fruit, such as citrus fruits, tropical fruits, or berries, juices, puree, jam, jelly, sports drinks, fruit flavored beverages, wine, dairy product, plant-based milk, product of plant-based milk, coffee, such as black coffee, milk-based coffee drinks, iced coffee drinks, instant coffee, coffee beans, or any combination thereof, alcoholic or non-alcoholic beverage, such as vodka, brandy, whiskey, or any combination thereof, a pungent compound, such as capsaicin, capsicum, piperine, allyl isothiocyanate, allicin, gingerol, sinigrin, eugenol, sinalbin, safrole, menthol, isothiocyanates, thymol, curcumin, resiniferatoxin, oleocanthal or any combination thereof, a harsh compound, such as quinine, caffeine, nicotine, tannins, catechins, limonene, pinene, amygdalin, saponins, oxalic acid, formic acid, allyl isothiocyanate, dimethyl sulfide, casein peptides, bromelain, capsaicin or any combination thereof, a burning compound, such as capsaicin, dihydrocapsaicin, nordihydrocapsaicin, allyl isothiocyanate, piperine, gingerol, allicin, allyl sulfide, diallyl disulfide, resiniferatoxin, acrolein, cinnamaldehyde, menthol, eugenol, ethanol, acetic acid, oleocanthal, citric acid or any combination thereof, a bitter compound, such as absinthin, aloin, alpha acid, amarogentin, andrographolide, brucine, caffeine, denatonium, eugenin, hesperidin, humulone, isohumulone, Kaempferol 3-O-

rutinoside, 6-Methoxymellein, naringin, papaverine, phenylthiocarbamide, propylthiouracil, quassin, quinidine, quinine, salicin, strychnine, sucrose octaacetate, sucrose octapropionate, theobromine, theophylline, vegetables, tea, chocolate, fruits or any combination thereof, honey, vanilla, chocolate, tea, saffron, safranal or syrup, such as maple syrup.

[0343] In some embodiments of the aforementioned mixtures for use, the dairy product, plant-based milk, or product of plant-based milk includes a milk, such as whole milk, nonfat milk, lactose-free milk, buttermilk, condensed milk, cashew milk, goat milk, rick milk, soy milk, oat milk, almond milk, coconut milk, chocolate milk, a yogurt, cheese, frosting, pudding, chocolate, custard, ice cream, gelato, sherbet, sorbet, frozen yogurt or any combination thereof.

[0344] In some embodiments of the aforementioned mixtures for use, the plant extract that includes a phenylpropanoid, a phenylethanol derivative, a glycoside or an analog thereof is obtained from a plant from any one or more of the following species: *Rhodiola rosea*, *Rhodiola alterna*, *Rhodiola brevipetiolata*, *Rhodiola crenulate*, *Rhodiola kirilowi*, *Rhodiola quadrifida*, *Rhodiola sachalinensis*, *Rhodiola sacra.*, or *Rhodiola iremelica.*.

[0345] In some embodiments of the aforementioned mixtures for use, the mixture provides a taste perception in the subject of an enhancement of ripeness or ripeness perception, an enhancement of juiciness or juiciness perception, an enhancement of freshness or freshness perception, an enhancement of fruity flavors or notes, an enhancement of flavor depth, an enhancement in mouthfeel or mouthfeel perception when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0346] In some embodiments of the aforementioned mixtures for use, the mixture provides a taste perception in the subject of an enhancement of cocoa flavors or notes, an enhancement of dark cocoa flavors or notes, an enhancement of vanilla bean flavors or notes, an enhancement of sweetness or sweetness perception, an enhancement of roasted coffee flavors or notes, an enhancement of dark roasted flavors or notes, or an enhancement of creaminess or creaminess perception when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared,

for example, to when component (b) is provided to the subject in the absence of component (a).

[0347] In some embodiments of the aforementioned mixtures for use, the mixture provides a taste perception in the subject of an enhancement of cinnamic notes, an enhancement of brown notes, or an enhancement of honey notes when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0348] In some embodiments of the aforementioned mixtures for use, the mixture provides a taste perception in the subject of a reduction in pungency or pungency perception, a reduction in initial pungency perception, a reduction in burning sensation or burning perception, a reduction in initial burning perception, a delayed onset of burning sensation or burning perception, a reduction in burning sensation duration, a masking of alcohol perception, an enhancement of aged fruit notes, enhancement of brandy flavors or notes, a reduction in tingling sensation or tingling perception, a reduction in initial tingling perception, a delayed onset of tingling sensation or tingling perception, a reduction in harshness or harshness perception, a reduction in bitterness or bitterness perception, a delayed onset of spice burn or spice burn perception, or a reduction in spice intensity when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0349] In some embodiments of the aforementioned mixtures for use, the mixture provides a taste perception in the subject of an enhancement of aging effect, an enhancement of wood tastes or notes, an enhancement of brown flavors or notes, an enhancement of sweet flavors or notes, an enhancement of caramel flavors or notes, an enhancement of floral flavors or notes, an enhancement of woodiness, an enhancement of hay flavors or notes, an enhancement of saffron taste or an enhancement of astringency or astringency perception when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0350] In some embodiments of the aforementioned mixtures for use, the food or beverage or granule, powder, or liquid formulation is selected from a sugar substitute, water, a carbonated beverage, such as a carbonated fruit beverage, carbonated cola drink or carbonated water, sport beverage, alcoholic beverages, alcohol-free beverages, spices and/or seasonings, such as chili, wasabi, horseradish, mustard, ginger, black pepper, or cinnamon, meat, vegetables, mushrooms, cheese, seafood, salt, energy beverages, flavored water, powders for drinks, dairy products, such as milk, yogurt, cheese, or ice cream, plant based milks, products of plant based milk, puddings, cakes, shakes, malts, brownies, pastries, cookies, cheesecakes, fudge, pies, cobblers, parfaits, mousse, biscuits, custards, frosting, fruits, vegetables, condiments, dry cereal, oatmeal, granola bars, hard candy, soft candy, taffy, chocolates, sugarless candies, chewing gum, bubble gum, juices, teas, coffees, salsa, gel beads, film strips for breath, gelatin candies, pectin candies, starch candies, lozenges, cough drops, throat lozenges, throat sprays, toothpastes or mouth rinses.

[0351] In some embodiments of the aforementioned mixtures for use, the use further includes selecting or identifying a subject to receive a composition, which modulates a taste perception in a subject, such as fruity flavors, white flavors, brown flavors, pungency, burning, harshness, bitterness, aging, oak tastes, or saffron tastes.

[0352] In some embodiments of the aforementioned mixtures for use, the use further includes determining or analyzing the ripeness perception, juiciness perception, freshness perception, flavor depth perception, mouthfeel perception, creaminess perception, pungency perception, initial pungency onset, burning perception, initial burning onset, tingling perception, initial tingling onset, harshness perception, bitterness perception, aging effect perception, initial spice burn onset, spice intensity perception, alcohol perception, astringency perception, or perception of fruity, vanilla bean, cocoa, dark cocoa, roasted coffee, dark roasted coffee, cinnamic, brown, honey, aged fruit, wood, sweet, hay, saffron, caramel, or floral flavor or notes or any combination thereof of the subject after consuming said mixture.

[0353] In some embodiments of the aforementioned mixtures for use, the amount of component (a) in the mixture is at least 2 ppm, such as, 3, 4, 5, 7.5, 10, 20, 30, 40, 50, 60, 70, 80, 90, 100, 110, 120, 130, 140, 150, 160, 170, 180, 190, 200, 210, 220, 230, 240, 250, 260, 270, 280, 290, or 300 ppm or an amount within a range defined by any two of the aforementioned amounts, preferably 15-25 ppm, 12.5-40 ppm, 25-50 ppm, 25-60 ppm, 25-75

ppm, 50-90 ppm, 50-150 ppm, 100-150 ppm, 100-200 ppm, 150-200 ppm, 200-250 ppm, or 12-200 ppm.

[0354] In some embodiments of the aforementioned mixtures for use, component (a) is dissolved in food grade ethanol.

[0355] In some embodiments of the aforementioned mixtures for use, the food grade ethanol is at least 1%, such as 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 15, 20, 25, 30, 35, 40, 45, 50, 60, 70, 80, 85, 90, 95, or 100%, or with a range defined by any two of the aforementioned amounts, preferably 80, 90, or 95%.

[0356] Several embodiments described herein relate to a method for modulating a subject's taste perception of astringency, spiciness, bitterness, plant protein, cooling, alcohol or sourness or for masking of astringency, bitterness or sourness, the method including: providing a subject a mixture that includes at least two components (a) and (b): (a) a steroidal saponin or an analog thereof (for example, a glycosylation molecule of an aglycone, an aglycone of a glycosylated molecule, or a further glycosylated molecule of a glycosylated molecule) or an extract of a plant that includes a steroidal saponin or an analog thereof, such as a *Trigonella foenum graecum L.* extract; and (b) a composition including an alcohol, a plant protein or plant protein product, a spice, a cooling compound, a spicy compound, an astringent compound, a bitter compound or a sour compound wherein component (a) is admixed with component (b); wherein the mixture is preferably provided in a food, beverage, granule, powder or liquid formulation; and optionally, wherein the mixture includes one or more preservatives or antioxidants, such as a sulphite, sorbic acid, a sorbate compound, benzoic acid, benzoate, propionic acid, propionate, ascorbic acid, ascorbate, citric acid, a tocopherol, a retinol, a polyphenol, a phenolic acid, a flavonoid, lipoic acid, N-acetylcysteine, butylated hydroxyanisole, butylated hydroxytoluene or derivatives thereof, preferably, wherein the one or more preservatives or antioxidants improve the shelf-life, flavor profile, or reduce spoilage of the mixture; and/or optionally, selecting a composition that includes an alcohol, a plant protein or plant protein product, a spice, a cooling compound, a spicy compound, an astringent compound, a bitter compound or a sour compound for receiving an agent that modulates the taste perception of a subject of astringency, spiciness, bitterness, plant protein, cooling, alcohol or sourness or that masks astringency, bitterness or sourness and providing said selected composition component (a); and/or optionally, evaluating the modulation of a subject's taste

perception of astringency, spiciness, bitterness, plant protein, cooling, alcohol or sourness or masking of astringency, bitterness or sourness after providing the subject the mixture.

[0357] In some of the aforementioned methods, the steroidal saponin or an analog thereof or the extract of a plant that includes the steroidal saponin or an analog thereof includes molecules selected from one or more of the following: yamogenin, diosgenin, smilagenin, sarsasapogenin, tigogenin, neotigogenin, gitogenin, yuccagenin, or saponaretin.

[0358] In some of the aforementioned methods, the steroidal saponin or an analog thereof or the extract of a plant that includes steroidal saponin or an analog thereof includes a glucosylated steroidal saponin or an aglycone of a steroidal saponin.

[0359] In some of the aforementioned methods, the composition is a fruit, such as citrus fruits, tropical fruits, or berries, juices, puree, jam, jelly, sports drinks, fruit flavored beverages, wine, dairy product, plant-based milk, product of plant-based milk, coffee, such as black coffee, milk-based coffee drinks, iced coffee drinks, instant coffee, coffee beans, or any combination thereof, alcoholic or non-alcoholic beverage, such as vodka, brandy, whiskey, or any combination thereof, a spice or spicy compound, such as a chili, wasabi, horseradish, mustard, ginger, black pepper, cinnamon, pumpkin spice, Szechuan pepper, or allspice, a salt, a sour compound, such as acetic acid, citric acid, hydrochloric acid, lactic acid, malic acid, nitric acid, fumaric acid, sulfuric acid, tartaric acid, phosphoric acid, other acid or any combination thereof, a bitter compound, such as absinthin, aloin, alpha acid, amarogentin, andrographolide, brucine, caffeine, denatonium, eugenin, hesperidin, humulone, isohumulone, Kaempferol 3-O-rutinoside, 6-Methoxymellein, naringin, papaverine, phenylthiocarbamide, propylthiouracil, quassin, quinidine, quinine, salicin, strychnine, sucrose octaacetate, sucrose octapropionate, theobromine, theophylline, vegetables, tea, chocolate, fruits or any combination thereof, an astringent compound, such as phenolic compounds, tannins, gallic acid, zinc oxide, zinc sulfate, tannic acid, potassium permanganate, silver nitrate, tincture of benzoin, potassium alum, caftaric acid, acacia, yarrow, sage, witch hazel, vinegar, tea, fruits, vegetables, dairy products, herbs, nuts or any combination thereof, a cooling compound, such as Menthol, Cyclohexanecarboxamide,N-Ethyl-5-Methyl-2-(1- Methylethyl) (WS-3), N-(Ethoxycarbonylmethyl)-3-p-menthanecarboxamide (WS-5), (1R,2S,5R)-N-(4-Methoxyphenyl)-5-methyl-2-(1- methylethyl)cyclohexanecarboxamide (WS-12), Butanamide, N,2,3-trimethyl-2-(1-methylethyl) (WS-23), or Menthyl Lactate or any

combination thereof honey, vanilla, chocolate, tea, saffron, safranal or syrup, such as maple syrup.

[0360] In some of the aforementioned methods, the dairy product, plant-based milk, or product of plant-based milk includes a milk, such as whole milk, nonfat milk, lactose-free milk, buttermilk, condensed milk, cashew milk, fermented milk, goat milk, rick milk, soy milk, oat milk, almond milk, pea milk, coconut milk, chocolate milk, a yogurt, cheese, frosting, pudding, chocolate, custard, ice cream, gelato, sherbet, sorbet, frozen yogurt or any combination thereof.

[0361] In some of the aforementioned methods, the mixture provides a taste perception in the subject of a reduction in bitterness perception, reduction in initial bitterness perception, enhancement of bitterness, masking of bitterness, reduction of sourness perception, reduction of lingering sourness perception, shorter duration of lingering sourness perception, reduction of initial sourness perception, reduction of astringency perception, masking of astringency, enhancement of mildness perception, reduction of beany tastes or flavors, reduction of grittiness perception, reduction in cooling perception, enhancement of spice intensity, increased duration of spiciness perception, enhancement of sourness perception, delayed onset of spiciness perception when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0362] In some of the aforementioned methods, the food or beverage or granule, powder, or liquid formulation is selected from a sugar substitute, water, a carbonated beverage, such as a carbonated fruit beverage, carbonated cola drink or carbonated water, sport beverage, alcoholic beverages, alcohol-free beverages, spices and/or seasonings, such as chili, wasabi, horseradish, mustard, ginger, black pepper, or cinnamon, meat, vegetables, mushrooms, cheese, seafood, salt, energy beverages, flavored water, powders for drinks, dairy products, such as milk, yogurt, cheese, or ice cream, plant based milks, products of plant based milk, puddings, cakes, shakes, malts, brownies, pastries, cookies, cheesecakes, fudge, pies, cobblers, parfaits, mousse, biscuits, custards, frosting, fruits, vegetables, condiments, dry cereal, oatmeal, granola bars, hard candy, soft candy, taffy, chocolates, sugarless candies, chewing gum, bubble gum, juices, teas, coffees, salsa, gel beads, film strips for breath, gelatin candies,

pectin candies, starch candies, lozenges, cough drops, throat lozenges, throat sprays, toothpastes or mouth rinses.

[0363] In some of the aforementioned methods, the amount of component (a) in the mixture is at least 2 ppm, such as, 3, 4, 5, 7.5, 10, 20, 30, 40, 50, 60, 70, 80, 90, 100, 110, 120, 130, 140, 150, 160, 170, 180, 190, 200, 210, 220, 230, 240, 250, 260, 270, 280, 290, or 300 ppm or an amount within a range defined by any two of the aforementioned amounts, preferably 15-25 ppm, 12.5-40 ppm, 25-50 ppm, 25-60 ppm, 25-75 ppm, 50-90 ppm, 50-150 ppm, 100-150 ppm, 100-200 ppm, 150-200 ppm, 200-250 ppm, or 12-200 ppm.

[0364] In some embodiments, the aforementioned methods further include selecting or identifying a subject to receive a composition, which modulates a taste perception in a subject, such as astringency, spiciness, bitterness, plant protein, cooling, alcohol or sourness or which masks astringency, bitterness or sourness.

[0365] In some embodiments, the aforementioned methods further include determining or analyzing the bitterness perception, initial bitterness perception, sourness perception, lingering sourness perception, duration of sourness perception, initial sourness perception, astringency perception, masking of astringency, mildness perception, perception of beany tastes or flavors, or grittiness perception or any combination thereof of the subject after consuming said mixture.

[0366] In some of the aforementioned methods, component (a) is dissolved in food grade ethanol.

[0367] In some of the aforementioned methods, the food grade ethanol is at least 1%, such as 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 15, 20, 25, 30, 35, 40, 45, 50, 60, 70, 80, 85, 90, 95, or 100%, or with a range defined by any two of the aforementioned amounts, preferably 80, 90, or 95%.

[0368] Additional embodiments described herein relate to methods of making a mixture which modulates a subject's taste perception of astringency, spiciness, bitterness, plant protein, cooling, alcohol or sourness or for masking of astringency, bitterness or sourness, the method including: admixing a component (a) with a component (b) to form said mixture: (a) a steroidal saponin or an analog thereof (for example, a glycosylation molecule of an aglycone, an aglycone of a glycosylated molecule, or a further glycosylated molecule of a glycosylated molecule) or an extract of a plant that includes a steroidal saponin or an analog thereof, such

as a *Trigonella foenum graecum L.* extract; and (b) a composition including an alcohol, a plant protein or plant protein product, a spice, a cooling compound, a spicy compound, an astringent compound, a bitter compound or a sour compound; wherein the composition is preferably provided in a food, beverage, granule, powder or liquid formulation; and optionally, wherein the composition includes one or more preservatives or antioxidants, such as a sulphite, sorbic acid, a sorbate compound, benzoic acid, benzoate, propionic acid, propionate, ascorbic acid, ascorbate, citric acid, a tocopherol, a retinol, a polyphenol, a phenolic acid, a flavonoid, lipoic acid, N-acetylcysteine, butylated hydroxyanisole, butylated hydroxytoluene or derivatives thereof, preferably, wherein the one or more preservatives or antioxidants improve the shelf-life, flavor profile, or reduce spoilage of the mixture.

[0369] In some embodiments of the aforementioned methods of making, the steroidal saponin or an analog thereof or the extract of a plant that includes the steroidal saponin or an analog thereof includes molecules selected from one or more of the following: yamogenin, diosgenin, smilagenin, sarsasapogenin, tigogenin, neotigogenin, gitogenin, yuccagenin, or saponaretin.

[0370] In some embodiments of the aforementioned methods of making, the steroidal saponin or an analog thereof or the extract of a plant that includes steroidal saponin or an analog thereof includes a glucosylated steroidal saponin or an aglycone of a steroidal saponin.

[0371] In some embodiments of the aforementioned methods of making, the composition is a fruit, such as citrus fruits, tropical fruits, or berries, juices, puree, jam, jelly, sports drinks, fruit flavored beverages, wine, dairy product, plant-based milk, product of plant-based milk, coffee, such as black coffee, milk-based coffee drinks, iced coffee drinks, instant coffee, coffee beans, or any combination thereof, alcoholic or non-alcoholic beverage, such as vodka, brandy, whiskey, or any combination thereof, a spice or spicy compound, such as a chili, wasabi, horseradish, mustard, ginger, black pepper, cinnamon, pumpkin spice, Szechuan pepper, or allspice, a salt, a sour compound, such as acetic acid, citric acid, hydrochloric acid, lactic acid, malic acid, nitric acid, fumaric acid, sulfuric acid, tartaric acid, phosphoric acid, other acid or any combination thereof, a bitter compound, such as absinthin, aloin, alpha acid, amarogentin, andrographolide, brucine, caffeine, denatonium, eugenin, hesperidin, humulone, isohumulone, Kaempferol 3-O-rutinoside, 6-Methoxymellein, naringin, papaverine,

phenylthiocarbamide, propylthiouracil, quassin, quinidine, quinine, salicin, strychnine, sucrose octaacetate, sucrose octapropionate, theobromine, theophylline, vegetables, tea, chocolate, fruits or any combination thereof, an astringent compound, such as phenolic compounds, tannins, gallic acid, zinc oxide, zinc sulfate, tannic acid, potassium permanganate, silver nitrate, tincture of benzoin, potassium alum, caftaric acid, acacia, yarrow, sage, witch hazel, vinegar, tea, fruits, vegetables, dairy products, herbs, nuts or any combination thereof, a cooling compound, such as Menthol, Cyclohexanecarboxamide,N-Ethyl-5-Methyl-2-(1-Methylethyl) (WS-3), N-(Ethoxycarbonylmethyl)-3-p-menthanecarboxamide (WS-5), (1R,2S,5R)-N-(4-Methoxyphenyl)-5-methyl-2-(1- methylethyl)cyclohexanecarboxamide (WS-12), Butanamide, N,2,3-trimethyl-2-(1-methylethyl) (WS-23), or Menthyl Lactate or any combination thereof honey, vanilla, chocolate, tea, saffron, safranal or syrup, such as maple syrup.

[0372] In some embodiments of the aforementioned methods of making, the dairy product, plant-based milk, or product of plant-based milk includes a milk, such as whole milk, nonfat milk, lactose-free milk, buttermilk, condensed milk, cashew milk, fermented milk, goat milk, rick milk, soy milk, oat milk, almond milk, pea milk, coconut milk, chocolate milk, a yogurt, cheese, frosting, pudding, chocolate, custard, ice cream, gelato, sherbet, sorbet, frozen yogurt or any combination thereof.

[0373] In some embodiments of the aforementioned methods of making, the mixture provides a taste perception in the subject of a reduction in bitterness perception, reduction in initial bitterness perception, enhancement of bitterness, masking of bitterness, reduction of sourness perception, reduction of lingering sourness perception, shorter duration of lingering sourness perception, reduction of initial sourness perception, reduction of astringency perception, masking of astringency, enhancement of mildness perception, reduction of beany tastes or flavors, reduction of grittiness perception, reduction in cooling perception, enhancement of spice intensity, increased duration of spiciness perception, enhancement of sourness perception, delayed onset of spiciness perception when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0374] In some embodiments of the aforementioned methods of making, the food or beverage or granule, powder, or liquid formulation is selected from a sugar substitute, water, a carbonated beverage, such as a carbonated fruit beverage, carbonated cola drink or carbonated water, sport beverage, alcoholic beverages, alcohol-free beverages, spices and/or seasonings, such as chili, wasabi, horseradish, mustard, ginger, black pepper, or cinnamon, meat, vegetables, mushrooms, cheese, seafood, salt, energy beverages, flavored water, powders for drinks, dairy products, such as milk, yogurt, cheese, or ice cream, plant based milks, products of plant based milk, puddings, cakes, shakes, malts, brownies, pastries, cookies, cheesecakes, fudge, pies, cobblers, parfaits, mousse, biscuits, custards, frosting, fruits, vegetables, condiments, dry cereal, oatmeal, granola bars, hard candy, soft candy, taffy, chocolates, sugarless candies, chewing gum, bubble gum, juices, teas, coffees, salsa, gel beads, film strips for breath, gelatin candies, pectin candies, starch candies, lozenges, cough drops, throat lozenges, throat sprays, toothpastes or mouth rinses.

[0375] In some embodiments of the aforementioned methods of making, the amount of component (a) in the mixture is at least 2 ppm, such as, 3, 4, 5, 7.5, 10, 20, 30, 40, 50, 60, 70, 80, 90, 100, 110, 120, 130, 140, 150, 160, 170, 180, 190, 200, 210, 220, 230, 240, 250, 260, 270, 280, 290, or 300 ppm or an amount within a range defined by any two of the aforementioned amounts, preferably 15-25 ppm, 12.5-40 ppm, 25-50 ppm, 25-60 ppm, 25-75 ppm, 50-90 ppm, 50-150 ppm, 100-150 ppm, 100-200 ppm, 150-200 ppm, 200-250 ppm, or 12-200 ppm.

[0376] In some embodiments of the aforementioned methods of making, component (a) is dissolved in food grade ethanol.

[0377] In some embodiments of the aforementioned methods of making, the food grade ethanol is at least 1%, such as 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 15, 20, 25, 30, 35, 40, 45, 50, 60, 70, 80, 85, 90, 95, or 100%, or with a range defined by any two of the aforementioned amounts, preferably 80, 90, or 95%.

[0378] Additional embodiments further include a composition obtained or obtainable by any one or more of the methods mentioned above.

[0379] More embodiments relate to a mixture used for modulating a subject's taste perception of astringency, spiciness, bitterness, plant protein, cooling, alcohol or sourness or for masking of astringency, bitterness or sourness in a subject, wherein the mixture includes at

least two components (a) and (b): (a) a steroidal saponin or an analog thereof (for example, a glycosylation molecule of an aglycone, an aglycone of a glycosylated molecule, or a further glycosylated molecule of a glycosylated molecule) or an extract of a plant that includes a steroidal saponin or an analog thereof, such as a *Trigonella foenum graecum L.* extract; and (b) a composition including an alcohol, a plant protein or plant protein product, a spice, a cooling compound, a spicy compound, an astringent compound, a bitter compound or a sour compound; wherein component (a) is admixed with component (b); preferably, wherein the mixture is provided in a food, beverage, granule, powder or liquid formulation; and optionally, wherein the mixture includes one or more preservatives or antioxidants, such as a sulphite, sorbic acid, a sorbate compound, benzoic acid, benzoate, propionic acid, propionate, ascorbic acid, ascorbate, citric acid, a tocopherol, a retinol, a polyphenol, a phenolic acid, a flavonoid, lipoic acid, N-acetylcysteine, butylated hydroxyanisole, butylated hydroxytoluene or derivatives thereof, preferably, wherein the one or more preservatives or antioxidants improve the shelf-life, flavor profile, or reduce spoilage of the mixture.

[0380] In some embodiments of the aforementioned mixtures, the steroidal saponin or an analog thereof or the extract of a plant that includes the steroidal saponin or an analog thereof includes molecules selected from one or more of the following: yamogenin, diosgenin, smilagenin, sarsasapogenin, tigogenin, neotigogenin, gitogenin, yuccagenin, or saponaretin.

[0381] In some embodiments of the aforementioned mixtures, the steroidal saponin or an analog thereof or the extract of a plant that includes steroidal saponin or an analog thereof includes a glucosylated steroidal saponin or an aglycone of a steroidal saponin.

[0382] In some embodiments of the aforementioned mixtures, the composition is fruit, such as citrus fruits, tropical fruits, or berries, juices, puree, jam, jelly, sports drinks, fruit flavored beverages, wine, dairy product, plant-based milk, product of plant-based milk, coffee, such as black coffee, milk-based coffee drinks, iced coffee drinks, instant coffee, coffee beans, or any combination thereof, alcoholic or non-alcoholic beverage, such as vodka, brandy, whiskey, or any combination thereof, a spice or spicy compound, such as a chili, wasabi, horseradish, mustard, ginger, black pepper, cinnamon, pumpkin spice, Szechuan pepper, or allspice, a salt, a sour compound, such as acetic acid, citric acid, hydrochloric acid, lactic acid, malic acid, nitric acid, fumaric acid, sulfuric acid, tartaric acid, phosphoric acid, other acid or any combination thereof, a bitter compound, such as absinthin, aloin, alpha acid, amarogentin,

andrographolide, brucine, caffeine, denatonium, eugenin, hesperidin, humulone, isohumulone, Kaempferol 3-O-rutinoside, 6-Methoxymellein, naringin, papaverine, phenylthiocarbamide, propylthiouracil, quassin, quinidine, quinine, salicin, strychnine, sucrose octaacetate, sucrose octapropionate, theobromine, theophylline, vegetables, tea, chocolate, fruits or any combination thereof, an astringent compound, such as phenolic compounds, tannins, gallic acid, zinc oxide, zinc sulfate, tannic acid, potassium permanganate, silver nitrate, tincture of benzoin, potassium alum, caftaric acid, acacia, yarrow, sage, witch hazel, vinegar, tea, fruits, vegetables, dairy products, herbs, nuts or any combination thereof, a cooling compound, such as Menthol, Cyclohexanecarboxamide,N-Ethyl-5-Methyl-2-(1- Methylethyl) (WS-3), N-(Ethoxycarbonylmethyl)-3-p-menthanecarboxamide (WS-5), (1R,2S,5R)-N-(4-Methoxyphenyl)-5-methyl-2-(1- methylethyl)cyclohexanecarboxamide (WS-12), Butanamide, N,2,3-trimethyl-2-(1-methylethyl) (WS-23), or Menthyl Lactate or any combination thereof honey, vanilla, chocolate, tea, saffron, safranal or syrup, such as maple syrup.

[0383] In some embodiments of the aforementioned mixtures, the dairy product, plant-based milk, or product of plant-based milk includes a milk, such as whole milk, nonfat milk, lactose-free milk, buttermilk, condensed milk, cashew milk, fermented milk, goat milk, rick milk, soy milk, oat milk, almond milk, pea milk, coconut milk, chocolate milk, a yogurt, cheese, frosting, pudding, chocolate, custard, ice cream, gelato, sherbet, sorbet, frozen yogurt or any combination thereof.

[0384] In some embodiments of the aforementioned mixtures, the mixture provides a taste perception in the subject of a reduction in bitterness perception, reduction in initial bitterness perception, enhancement of bitterness, masking of bitterness, reduction of sourness perception, reduction of lingering sourness perception, shorter duration of lingering sourness perception, reduction of initial sourness perception, reduction of astringency perception, masking of astringency, enhancement of mildness perception, reduction of beany tastes or flavors, reduction of grittiness perception, reduction in cooling perception, enhancement of spice intensity, increased duration of spiciness perception, enhancement of sourness perception, delayed onset of spiciness perception when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject,

as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0385] In some embodiments of the aforementioned mixtures, the food or beverage or granule, powder, or liquid formulation is selected from a sugar substitute, water, a carbonated beverage, such as a carbonated fruit beverage, carbonated cola drink or carbonated water, sport beverage, alcoholic beverages, alcohol-free beverages, spices and/or seasonings, such as chili, wasabi, horseradish, mustard, ginger, black pepper, or cinnamon, meat, vegetables, mushrooms, cheese, seafood, salt, energy beverages, flavored water, powders for drinks, dairy products, such as milk, yogurt, cheese, or ice cream, plant based milks, products of plant based milk, puddings, cakes, shakes, malts, brownies, pastries, cookies, cheesecakes, fudge, pies, cobblers, parfaits, mousse, biscuits, custards, frosting, fruits, vegetables, condiments, dry cereal, oatmeal, granola bars, hard candy, soft candy, taffy, chocolates, sugarless candies, chewing gum, bubble gum, juices, teas, coffees, salsa, gel beads, film strips for breath, gelatin candies, pectin candies, starch candies, lozenges, cough drops, throat lozenges, throat sprays, toothpastes or mouth rinses.

[0386] In some embodiments of the aforementioned mixtures, the amount of component (a) in the mixture is at least 2 ppm, such as, 3, 4, 5, 7.5, 10, 20, 30, 40, 50, 60, 70, 80, 90, 100, 110, 120, 130, 140, 150, 160, 170, 180, 190, 200, 210, 220, 230, 240, 250, 260, 270, 280, 290, or 300 ppm or an amount within a range defined by any two of the aforementioned amounts, preferably 15-25 ppm, 12.5-40 ppm, 25-50 ppm, 25-60 ppm, 25-75 ppm, 50-90 ppm, 50-150 ppm, 100-150 ppm, 100-200 ppm, 150-200 ppm, 200-250 ppm, or 12-200 ppm.

[0387] In some embodiments of the aforementioned mixtures, component (a) is dissolved in food grade ethanol.

In some embodiments of the aforementioned mixtures, the food grade ethanol is at least 1%, such as 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 15, 20, 25, 30, 35, 40, 45, 50, 60, 70, 80, 85, 90, 95, or 100%, or with a range defined by any two of the aforementioned amounts, preferably 80, 90, or 95%.Preferred alternatives include:

[0388] Clause 1. A method for modulating a taste perception in a subject, such as sweetness and/or mouthfeel, or for masking the off-taste of a compound in a subject, the method comprising: providing a subject a mixture comprising a first composition comprising

a sweetener admixed with a second composition comprising one or more flavonolignans, such as silibinin, silychristin, silydianin, dehydrosilybin, deoxysilycistin, deoxysilydianin, silandrin, silybinome, silyhermin or neosilyhermin, preferably, wherein the mixture is provided in a food or beverage or granule, powder or liquid formulation and, optionally, wherein the mixture comprises one or more preservatives, such as a sulphite, sorbic acid, a sorbate compound, benzoic acid, benzoate, propionic acid, propionate, ascorbic acid, ascorbate, or citric acid or derivatives thereof.

[0389] Clause 2. The method of clause 1, wherein the one or more flavonolignans comprises one or more of: isosilychristin B, silychristin A, silychristin B, silydianin, silybin A, silybin B, isosilybin A, isosilybin B, or 2,3-Dehydrosilybin-der1 or a derivative thereof.

[0390] Clause 3. The method of any one of clauses 1 or 2, wherein the one or more flavonolignans comprises a glucosylated flavonoligan or an aglycone of a flavonoligans.

[0391] Clause 4. The method of any one of clauses 1-3, wherein the sweetener comprises one or more of: a sugar, acesulfame potassium, advantame, alitame, aspartame, cyclamate, erythritol, isomalt, maltitol, lactitol, mannitol, neotame, saccharin, sucralose, sorbitol, xylitol, glycerol, thaumatin, glycyrrhizin, stevioside, luo han guo, stevia or a derivative thereof.

[0392] Clause 5. The method of any one of clauses 1-4, wherein the second composition comprises: (a) an extract of *Silybum marianum* or sylimarin, such as an extract from *Silybum marianum (L) Gaertn* or *Silybum eburneum Coss. & Dur.*, preferably an extract from *Silybum marianum (L.) Gaertn. var.marianum*, or *Silybum marianum (L.) Gaertn. var.albiflorum*; (b) an extract of *Iryanthera grandis* (Myristicaceae), *Iryanthera sagotiana*, or *Iryanthera lancifolia*; and/or (c) an extract from a plant comprising Sylimarin and/or one or more of its components.

[0393] Clause 6. The method of any one of clauses 1-5, wherein the mixture provides a sugar like or sugary mouthfeel sensation in the subject or sensation of an increase in viscosity when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when the sweetener is provided to the subject in the absence of the second composition.

[0394] Clause 7. The method of any one of clauses 1-6, wherein the mixture provides a taste perception in the subject of an increase in sweetness or sweetness intensity

when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when the sweetener is provided to the subject in the absence of the second composition.

[0395] Clause 8. The method of any one of clauses 1-7, wherein the mixture provides a taste perception in the subject of a faster onset of sweetness when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when the sweetener is provided to the subject in the absence of the second composition.

[0396] Clause 9. The method of any one of clauses 1-8, wherein the mixture provides a taste perception in the subject that masks a sour taste, lingering sweetness, metallic taste, or a bitter taste when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when the sweetener is provided to the subject in the absence of the second composition.

[0397] Clause 10. The method of any one of clauses 1-9, wherein the food or beverage or granule, powder, or liquid formulation is selected from a sugar substitute, carbonated fruit beverage, sport beverage, carbonated cola drink, wine cooler, cordial, flavored water, powders for drinks, hard candy, soft candy, taffy, chocolates, sugarless candies, chewing gum, bubble gum, condiments, spices and/or seasonings, dry cereal, oatmeal, granola bars, alcoholic beverages, energy beverages, juices, teas, coffees, salsa, gel beads, film strips for breath, gelatin candies, pectin candies, starch candies, lozenges, cough drops, throat lozenges, throat sprays, toothpastes or mouth rinses.

[0398] Clause 11. The method of any one of clauses 1-10, wherein the amount of the one or more flavonolignans or the amount of the second composition in the mixture is at least 0.5 ppm, such as 0.5, 1, 2, 3, 4, 5, 6, 7, 7.5 10, 20, 30, 40, 50, 60, 70, 80, 90, 100, 110, 120, 130, 140, 150, 160, 170, 180, 190, 200, 210, 220, 230, 240, 250, 260, 270, 280, 290, or 300 ppm or within a range defined by any two of the aforementioned amounts, preferably 7.5-150 ppm, 50-100 ppm, 50-200 ppm, or 50-300 ppm.

[0399] Clause 12. The method of any one of clauses 1-11 further comprising selecting or identifying a subject to receive a composition, which modulates taste perception in a subject, such as sweetness, onset of sweetness, sugar like or sugary mouthfeel sensation,

or which masks the off-taste of a compound, such as sourness, bitterness, lingering sweetness, or a metallic taste.

[0400] Clause 13. The method of any one of clauses 1-12 further comprising determining or analyzing the sweetness, sugar like or sugary mouthfeel sensation, the time of onset of sweetness, sweetness intensity, the masking of a sour, bitter, or metallic taste, or the masking of a lingering of sweetness or any combination thereof of the subject after consuming said mixture.

[0401] Clause 14. A method of making a composition, which modulates a taste perception of a subject, such as sweetness and/or mouthfeel, or which masks the off-taste of a compound comprising: admixing a first component comprising a sweetener with a second component comprising one or more flavonolignans, such as silibinin, silychristin, silydianin, dehydrosilybin, deoxysilycistin, deoxysilydianin, silandrin, silybinome, silyhermin or neosilyhermin, so as to prepare said composition, preferably, wherein the composition is incorporated into a food or beverage or granule, powder or liquid formulation and, optionally, wherein the composition comprises one or more preservatives, such as a sulphite, sorbic acid, a sorbate compound, benzoic acid, benzoate, propionic acid, propionate, ascorbic acid, ascorbate, or citric acid or derivatives thereof.

[0402] Clause 15. The method of clause 14, wherein the one or more flavonolignans comprises one or more of: isosilychristin B, silychristin A, silychristin B, silydianin, silybin A, silybin B, isosilybin A, isosilybin B, or 2,3-Dehydrosilybin-der1 or a derivative thereof.

[0403] Clause 16. The method of any one of clauses 14 or 15, wherein the one or more flavonolignans comprise a glucosylated flavonoligan or an aglycones of a flavonoligan.

[0404] Clause 17. The method of any one of clauses 14-16, wherein the sweetener comprises one or more of: a sugar, acesulfame potassium, advantame, alitame, aspartame, cyclamate, erythritol, isomalt, maltitol, lactitol, mannitol, neotame, saccharin, sucralose, sorbitol, xylitol, glycerol, thaumatin, glycyrrhizin, stevioside, luo han guo, stevia or a derivative thereof.

[0405] Clause 18. The method of any one of clauses 14-17, wherein the second component comprises: (a) an extract of *Silybum marianum* or sylimarin, such as an extract from *Silybum marianum (L) Gaertn* or *Silybum eburneum Coss. & Dur.*, preferably an extract

from *Silybum marianum (L.) Gaertn. var.marianum*, or *Silybum marianum (L.) Gaertn. var.albiflorum*; (b) an extract of *Iryanthera grandis* (Myristicaccae), *Iryanthera sagotiana*, or *Iryanthera lancifolia*; and/or (c) an extract from a plant comprising Sylimarin and/or one or more of its components.

[0406] Clause 19. The method of any one of clauses 14-18, wherein the composition provides a sugar like or sugary mouthfeel sensation in the subject or sensation of an increase in viscosity when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when the sweetener is provided to the subject in the absence of the second composition.

[0407] Clause 20. The method of any one of clauses 14-19, wherein the composition provides a taste perception in the subject of an increase in sweetness, a faster onset of sweetness, or a sugar like or a sugary mouthfeel sensation when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when the sweetener is provided to the subject in the absence of the second composition.

[0408] Clause 21. The method of any one of clauses 14-20, wherein the composition provides a taste perception in the subject that masks a lingering sweetness, a sourness, or a metallic or a bitter taste when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when the sweetener is provided to the subject in the absence of the second composition.

[0409] Clause 22. The method of any one of clauses 14-21, wherein the food or beverage or granule, powder, or liquid formulation is selected from a sugar substitute, carbonated fruit beverage, sport beverage, carbonated cola drink, wine cooler, cordial, flavored water, powders for drinks, hard candy, soft candy, taffy, chocolates, sugarless candies, chewing gum, bubble gum, condiments, spices and/or seasonings, dry cereal, oatmeal, granola bars, alcoholic beverages, energy beverages, juices, teas, coffees, salsa, gel beads, film strips for breath, gelatin candies, pectin candies, starch candies, lozenges, cough drops, throat lozenges, throat sprays, toothpastes or mouth rinses.

[0410] Clause 23. The method of any one of clauses 14-22, wherein the amount of the one or more flavonolignans or the amount of the second component in the mixture is at

least 0.5 ppm, such as 0.5, 1, 2, 3, 4, 5, 6, 7, 7.5 10, 20, 30, 40, 50, 60, 70, 80, 90, 100, 110, 120, 130, 140, 150, 160, 170, 180, 190, 200, 210, 220, 230, 240, 250, 260, 270, 280, 290, or 300 ppm or within a range defined by any two of the aforementioned amounts, preferably 7.5-150 ppm, 50-100 ppm, 50-200 ppm, or 50-300 ppm.

[0411] Clause 24. A composition obtained by the method of any one of clauses 14-23.

[0412] Clause 25. Use of a composition comprising one or more flavonolignans for modulating a taste perception in a subject, such as sweetness and/or mouthfeel, or for masking the off-taste of a compound in a subject.

[0413] Clause 26. The use of clause 25, wherein the subject is provided a mixture comprising a first composition comprising a sweetener admixed with a second composition comprising the one or more flavonolignans, such as silibinin, silychristin, silydianin, dehydrosilybin, deoxysilycistin, deoxysilydianin, silandrin, silybinome, silyhermin or neosilyhermin, preferably, wherein the mixture is provided in a food or beverage or granule, powder or liquid formulation and, optionally, wherein the mixture comprises one or more preservatives, such as a sulphite, sorbic acid, a sorbate compound, benzoic acid, benzoate, propionic acid, propionate, ascorbic acid, ascorbate, or citric acid or derivatives thereof.

[0414] Clause 27. The use of any one of clauses 25 or 26, wherein the one or more flavonolignans comprises one or more of: isosilychristin B, silychristin A, silychristin B, silydianin, silybin A, silybin B, isosilybin A, isosilybin B, or 2,3-Dehydrosilybin-der1 or a derivative thereof.

[0415] Clause 28. The method of any one of clauses 25-27, wherein the one or more flavonolignans comprise a glucosylated flavonoligan or an aglycone of a flavonoligan.

[0416] Clause 29. The use of any one of clauses 26-27, wherein the sweetener comprises one or more of: a sugar, acesulfame potassium, advantame, alitame, aspartame, cyclamate, erythritol, isomalt, maltitol, lactitol, mannitol, neotame, saccharin, sucralose, sorbitol, xylitol, glycerol, thaumatin, glycyrrhizin, stevioside, luo han guo, stevia or a derivative thereof.

[0417] Clause 30. The use of any one of clauses 26-29, wherein the second composition comprises: (a) an extract of *Silybum marianum* or sylimarin, such as an extract from *Silybum marianum (L) Gaertn* or *Silybum eburneum Coss. & Dur.*, preferably an extract

from *Silybum marianum (L.) Gaertn. var.marianum*, or *Silybum marianum (L.) Gaertn. var.albiflorum*; (b) an extract of *Iryanthera grandis* (Myristicaccae), *Iryanthera sagotiana*, or *Iryanthera lancifolia*; and/or (c) an extract from a plant comprising Sylimarin and/or one or more of its components.

[0418] Clause 31. The use of any one of clauses 25-30, wherein the composition or mixture provides a sugar like or sugary mouthfeel sensation in the subject or sensation of an increase in viscosity when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when the sweetener is provided to the subject in the absence of the second composition.

[0419] Clause 32. The use of any one of clauses 25-31, wherein the composition or mixture provides a taste perception in the subject of an increase in sweetness or sweetness intensity when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when the sweetener is provided to the subject in the absence of the second composition.

[0420] Clause 33. The use of any one of clauses 25-32, wherein the composition or mixture provides a taste perception in the subject that masks a metallic or a bitter taste when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when the sweetener is provided to the subject in the absence of the second composition.

[0421] Clause 34. The use of any one of clauses 25-33, wherein the food or beverage or granule, powder, or liquid formulation is selected from a sugar substitute, alcoholic beverage, carbonated fruit beverage, sport beverage, carbonated cola drink, wine cooler, cordial, flavored water, powders for drinks, hard candy, soft candy, taffy, chocolates, sugarless candies, chewing gum, bubble gum, condiments, spices and/or seasonings, dry cereal, oatmeal, granola bars, alcoholic beverages, energy beverages, juices, teas, coffees, salsa, gel beads, film strips for breath, gelatin candies, pectin candies, starch candies, lozenges, cough drops, throat lozenges, throat sprays, toothpastes or mouth rinses.

[0422] Clause 35. The use of any one of clauses 25-34, wherein the amount of the one or more flavonolignans or the amount of the second composition in the mixture is at least 0.5 ppm, such as 0.5, 1, 2, 3, 4, 5, 6, 7, 7.5 10, 20, 30, 40, 50, 60, 70, 80, 90, 100, 110, 120, 130, 140, 150, 160, 170, 180, 190, 200, 210, 220, 230, 240, 250, 260, 270, 280, 290, or 300

ppm or within a range defined by any two of the aforementioned amounts, preferably 7.5-150 ppm, 50-100 ppm, 50-200 ppm, or 50-300 ppm.

[0423] Clause 36. The use of any one of clauses 25-35 further comprising selecting or identifying a subject to receive a composition, which modulates taste perception in a subject, such as sweetness, onset of sweetness, sugar like or sugary mouthfeel sensation, or which masks the off-taste of a compound, such as bitterness, lingering sweetness, or a metallic taste.

[0424] Clause 37. The use of any one of clauses 25-36 further comprising determining or analyzing the sweetness, sugar like or sugary mouthfeel sensation, the time of onset of sweetness, sweetness intensity, the masking of a sour, bitter, or metallic taste, or the masking of a lingering of sweetness or any combination thereof of the subject after consuming said mixture.

[0425] Clause 38. The use of any one of clauses 25-35, wherein the composition is dissolved in food grade ethanol.

[0426] Clause 39. The use of clause 38, wherein the food grade ethanol is at least 50%, such as 50, 60, 70, 80, 85, 90, 95, or 100%, or with a range defined by any two of the aforementioned amounts, preferably 80, 90, or 95%.

[0427] Clause 40. A method for modulating a subject's taste perception of alcohol, spice, cooling, carbonation, astringency, bitterness or sourness or for masking off-tastes, the method comprising: providing a subject a mixture that comprises at least two components (a) and (b): (a) a steroidal saponin or analog thereof (for example, a glycosylation molecule of an aglycone, an aglycone of a glycosylated molecule, or a further glycosylated molecule of a glycosylated molecule) or an extract of a plant that comprises a steroidal saponin or an analog thereof, such as an *Asparagus racemosus* rhizome extract, a *Trigonella foenum graecum L.* extract or a *Smilax china* extract; and (b) a composition comprising an alcohol, a spice, a cooling compound, carbonation, an astringent compound, a bitter compound, a sour compound, or a compound with an off-taste; wherein component (a) is admixed with component (b); wherein the mixture is preferably provided in a food, beverage, granule, powder or liquid formulation; and optionally, wherein the mixture comprises one or more preservatives or antioxidants, such as a sulphite, sorbic acid, a sorbate compound, benzoic acid, benzoate, propionic acid, propionate, ascorbic acid, ascorbate, citric acid, a tocopherol, a retinol, a polyphenol, a phenolic acid, a flavonoid, lipoic acid, N-acetylcysteine, butylated

hydroxyanisole, butylated hydroxytoluene or derivatives thereof, preferably, wherein the one or more preservatives or antioxidants improve the shelf-life, flavor profile, or reduce spoilage of the mixture; and/or optionally, selecting a composition that comprises an alcohol, a spice, a cooling compound, carbonation, an astringent compound, a bitter compound, a sour compound, or a compound with an off-taste for receiving an agent that modulates the taste perception of a subject of astringency, bitterness or sourness or masks off-tastes and providing said selected composition component (a); and/or optionally, evaluating the modulation of a subject's taste perception of alcohol, spice, cooling, carbonation, astringency, bitterness, or sourness or evaluating the masking of off-tastes after providing the subject the mixture.

[0428] Clause 41. The method of clause 40, wherein the steroidal saponin has one of the following sapogenin structures: spirostane, isospirostane, furostane, pregnane, or cholestane.

[0429] Clause 42. The method of any one of clauses 40 or 41, wherein the steroidal saponin or extract of a plant that comprises a steroidal saponin or an analog thereof comprises saponins selected from one or more of the following: Shatavarin I, Shatavarin VIII, Protodioscin, Shatavarin IV, Shatarvain IX, Asparagoside A, Asparenydiol, Asparacosin A, Asparoside B, Sarsasapogenin, Schidigera saponin D5, Shatavarin VI, Immunoside, Shatavarin VII, Shatavarin X, Aspoligonin A, Prosapogenin A, Methyl gracillin, Methyl protodioscin, Neotigogenin-3-O-α-l-rhamnopyranosyl-(1 → 6)-β-d-glucopyranoside, Neotigogenin-3-O-β-d-glucopyranosyl-(l → 4)-O-[α-l-rhamnopyranosyl-(l → 6)]-β-d-glucopyranoside, Neotigogenin-3-O-β-d-glucopyranoside, Smilanippin A, Neotigogenin-3-O-β-d-glucopyranosyl-(1 → 4)-O-[α-l-arabinopyranosyl-(1 → 6)]-β-d-glucopyranoside, Sarsasapogenin-3-O-β-d-glucopyranosyl-(1 → 4)-[α-l-arabinopyranosyl- (1 → 6)]-β-d-glucopyranoside, (25S)-5β-Spirostane-3β-ol-3-O-α-l-rhamnopyranosyl-(1 → 2)-β-d-glucopyranosyl-(1 → 2)-β-d-glucopyranoside, Curillin G, Parillin, (25S)-Spirostan-6β-ol-3-O-β-d-glucopyranosyl-(1 → 4)-O-[α-l-arabinopyranosyl-(1 → 6)]-β-d-glucopyranoside, Trinervuloside C, Diosgenin-3-O-α-l-rhamnopyranoside, Dioscin, Diosgenin-3-O-[α-l-rhamnopyranosyl-(l → 4)]-β-d-glucopyranoside, Diosgenin-3-O-[α-l-rhamnopyranosyl-(l → 2)]-β-d-glucopyranoside, (25R)-Spirostan-5-en-3-O-α-l-rhamnopyranosyl-(l → 2)-[α-l-rhamnopyranosyl-(l → 4)-α-l-rhamnopyranosyl-(l → 4)]-O-β-d-glucopyranoside, Gracillin, Parisyunnanoside C, Parisyunnanoside D, Parisyunnanoside E, Paris D, Paris H, (25R)-

Spirost-5-en-3β,17α,27-triol-3-O-α-l-rhamnopyranosyl-(l → 2)-[α-l-rhamnopyranosyl-(l → 4)]-β-d-glucopyranoside, (25S)-Spirostan-5-en-3β,17α,27-triol-3-O-α-l-arabinopyranosyl-(1 → 6)-β-d-glucopyranoside, (25S)-Spirostan-5-en-3β,17α,27-triol-3-O-β-d-glucopyranosyl-(1 → 4)-[α-l-arabinopyranosyl-(1 → 6)]-β-d-glucopyranoside, (25S)-spirost-5-ene-3β,17α,27-triol-3-O-α-l-rhamnopyranosyl-(l → 4)-β-d-glucopyranoside, (25S)-Spirost-5-en-3β,17α,27-triol-3-O-β-d-galactopyranoside, (25S)-Spirostan-5-en-3β,27-diol-3-O-α-l-arabinopyranosyl-(1 → 6)-β-d- glucopyranoside, Isonarthogenin3-O-α-l-rhamnopyranosyl-(l → 2)-O-[α-l-rhamnopyranosyl-(l → 4)]-β-d-glucopyranoside, Smilscobinoside A, Sieboldiin A, Sieboldiin B, Sieboldogenin, (25R)-5α-Spirostan-3β-ol-6-one-3-O-[α-l-arabinopyranosyl-(l → 4)]-β-d-glucopyranoside, Smilaxin A, Smilaxin B, Parisvietnaside A, Smilaxin C, (25R)-5α-Spirostan-3β,6β-diol-3-O-β-d-glucopyranosyl-(1 → 4)-[α-l-arabinopyranosyl-(1 → 6)]-β-d-glucopyranoside, Smilscobinoside B, (25R)-5α-Spirostan-3β,17α,27-triol-3-O-β-d-glucopyranosyl-(1 → 4)-[α-l-arabinopyranosyl-(1 → 6)]-β-d-glucopyranosie, (25R)-5βSpirostan-3β-ol-3-O-β-d-glucopyranosyl-(1 → 6)-[β-d-glucopyranosyl-(1 → 4)]-β-d-glucopyranoside, (25R)-5β-Spirostan-3β-ol-3-O-β-d-glucopyranosyl-(1 → 6)-[β-d-glucopyranosyl-(1 → 2)]-[β-d-glucopyranosyl-(1 → 4)]-β-d-glucopyranoside, Disporoside A, (25R)-5β-Spirostan-3β-ol-3-O-β-d-glucopyranosyl-(1 → 6)-β-d-glucopyranoside, (25R)-5β-Spirostan-3β-ol-3-O-β-d-glucopyranosyl-(1 → 6)-[β-d-glucopyranosyl-(1 → 2)]-[α-l-rhamnopyranosyl-(l → 4)]-β-d-glucopyranoside, Smilagenin 3-O-β-d-glucopyranoside, Methylprotodioscin, 26-O-β-d-Glucopyranosyl-(25R)-furostan-5-en-3β,26-diol-22-methoxy-3-O-α-l-rhamnopyranosyl-(l → 2)-β-d-glucopyranoside, 26-O-β-d-Glucopyranosyl-22α-O-methyl-(25R)-furost-5-en-3β,26-diol-3-O-α-l-rhamnopyranosyl-(l → 4)-α-l-rhamnopyranosyl-(l → 4)-[α-l-rhamnopyranosyl-(l → 2)]-β-d-glucopyranoside, Protodiosgenin-3-O-α-l-rhamnopyranosyl-(1 → 4)-α-l-rhamnopyranosyl(1 → 4)-[α-l-rhamnopyranosyl(1 → 2)]-β-d-glucopyranoside, 26-O-β-d-Glucopyranosyl-22α-hydroxy-(25R)-furost-5-en-3β,26-diol-3-O-[4-O-acetyl-α-l-rhamnopyranosyl]-(l → 2)-[α-l-rhamnopyranosyl-(l → 4)]-β-d-glucopyranoside, 26-O-β-d-Glucopyranosyl-22α-hydroxy-(25R)-furost-5-en-3β,26-diol-3-O-[2-O-acetyl-α-l-rhamnopyranosyl]-(l → 2)-[α-l-rhamnopyranosyl-(l → 4)]-β-d-glucopyranoside, 26-O-β-d-Glucopyranosyl-22α-hydroxy-(25R)-furost-5-en-3β,26-diol-3-O-[3-O-acetyl-α-l-rhamnopyranosyl]-(l → 2)-[α-l-rhamnopyranosyl-(l → 4)]-β-d-glucopyranoside, 26-O-β-d-Glucopyranosyl-(25R)-furostan-5-

en-3β,17α-diol-3-O-α-l-rhamnopyranosyl-(1 → 2)-α-l-rhamnopyranoside, Protogracillin, Parisaponin I, Parisyunnanoside A, Pseudoprotodioscin, 26-O-β-d-Glucopyranosyl-(25R)-furostan-5,20(22)-dien-3β,26-diol-3-O-α-l-rhamnopyranosyl-(1 → 2)-β-d-glucopyranoside, 15-Hydroxypseudoprotodioscin, 15-Methoxypseudoprotodioscin, 23-Oxopseudoprotodioscin, 26-O-β-d-Glucopyranosyl-(25S)-5-furosa-20(22)-en-3β,26-diol-3-O-α-l-rhamnopyranosyl-(1 → 2)-O-[α-l-rhamnopyranosyl-(1 → 6)]-β-d-glucopyranoside, Pseudoproto-pb, 26-O-β-d-Glucopyranosyl-(25R)-5α-furostan-3β,22,26-triol-6-one-3-O-α-l-arabinopyranosyl-(1 → 6)-β-d-glucopyranoside, 26-O-β-d-Glucopyranosyl-(25R)-5α-furostan-3β,22,26-triol-6-one-3-O-β-d-glucopyranosyl-(1 → 4)-[α-l-arabinopyranosyl-(1 → 6)]-β-d-glucopyranoside, 26-O-β-d-Glucopyranosyl-(25R)-5α-furostan-3β,26-diol-22-methoxyl-6-one-3-O-α-l-arabinopyranosyl-(1 → 6)-β-d-glucopyranoside, 26-O-β-d-Glucopyranosyl-(25R)-5α-furostan-3β,26-diol-22-methoxyl-6-one, 26-O-β-d-Glucopyranosyl-(25S)-5β-furostan-3β,26-diol-22α-methoxy-3-O-β-d-glucopyranosyl-(1 → 6)-[β-d-glucopyranosyl-(1 → 2)]-[β-d-glucopyranosyl-(1 → 4)]-β-d-glucopyranoside, (25S)-26-O-β-d-glucopyranosyl-3β,5β,22α-furostan-3,22,26-triol-3-O-α-l-rhamnopyranosyl-(1 → 2)-O-β-d-glucopyranosyl-(1 → 2)-O-β-d-glucopyranoside, Asparagoside E, Asparoside A, Asparoside B, 26-O-β-d-Glucopyranosyl-(25S)-5β-furostan-3β,22α-diol-3-O-α-l-arabinopyranosyl-(1 → 6)-[β-d-glucopyranosyl-(1 → 4)]-β-d-glucopyranoside, 26-O-β-d-Glucopyranosyl-(25S)-5α-furostan-3β,22α-diol-3-O-α-l-arabinopyranosyl-(1 → 6)-[β-d-glucopyranosyl-(1 → 4)]-β-d-glucopyranoside, 26-O-β-d-Glucopyranosyl-(25S)-5α-furostan-3β,6β,22α-tetraol-3-O-α-l-arabinopyranosyl-(1 → 6)-[β-d-glucopyranosyl-(1 → 4)]-β-d-glucopyranoside, Sarsaparilloside B, Sarsaparilloside C, Sarsaparilloside, Δ20(22)-Sarsaparilloside, Riparoside A, Smilaxchinoside A, (25R)-Smilaxchinoside A, Smilaxchinoside B, Smilaxchinoside C, Dioscoreside E, (25R)-5α-Furostan-3β,26-diol-20(22)-en-6-one-26-O-β-d-glucopyranoside, (23R,25R)-5α-Furostan-3β,23,26-triol-20(22)-en-6-one-26-O-β-d-glucopyranoside, 26-O-β-d-Glucopyranosyl-(25R)-5α-furostan-3β,26-diol-20(22)-en-6-one-3-O-α-l-arabinopyranosyl-(1 → 6)-β-d-glucopyranoside, (25S)-5β-Furostan-1β,2β,3β,5β,22α,26-hexaol-26-O-β-d-glucopyranoside, 26-O-β-d-Glucopyranosyl-(25S)-5β-furostan-1β,3β,22α,26-tetraol-1-O-β-d-glucopyranoside, Trinervuloside A, Riparoside B, Timosaponin J, Timosaponin K, Trinervuloside B, Pregna-5,16-diene-3β-ol-20-one-3-O-α-l-rhamnopyranosyl-(1 → 2)-O-[α-l-rhamnopyranosyl-(1 → 4)]-β-d-

glucopyranoside, Pregna-5,16-diene-3β-ol-20-one-3-O-α-l-rhamnopyranosyl-(l → 4)-α-l-rhamnopyranosyl-(l → 4)-[α-l-rhamnopyranosyl-(l → 2)]-β-d-glucopyranoside, Pregna-5,16-diene-3β-ol-20-one-3-O-α-l-rhamnopyranosyl-(l → 2)-[α-l-rhamnopyranosyl-(l → 4)]-α-l-rhamnopyranosyl-(l → 2)-β-d-glucopyranoside, Pallidfloside D, Anguivioside XV, Yamogenin, Diosgenin, Smilagenin, Sarsasapogenin, Tigogenin, Neotigogenin, Gitogenin, Yuccagenin, Saponaretin or Smilaxchinoside D.

[0430] Clause 43. The method of any one of clauses 40-42, wherein the steroidal saponin or analog thereof or extract of a plant that comprises a steroidal saponin or an analog thereof comprises a glucosylated steroidal saponins or an aglycone of a steroidal sanponin.

[0431] Clause 44. The method of any one of clauses 40-43, wherein the composition is an alcoholic or non-alcoholic beverage, a carbonated beverage, a spice or spicy compound, such as a chili, wasabi, horseradish, mustard, ginger, black pepper, cinnamon, pumpkin spice, Szechuan pepper, allspice or any combination thereof, an astringent compound, such as phenolic compounds, tannins, gallic acid, zinc oxide, zinc sulfate, tannic acid, potassium permanganate, silver nitrate, tincture of benzoin, potassium alum, caftaric acid, acacia, yarrow, sage, witch hazel, vinegar, tea, fruits, vegetables, dairy products, herbs, nuts or any combination thereof, a bitter compound, such as Absinthin, Aloin, Alpha acid, Amarogentin, Andrographolide, Brucine, Caffeine, Denatonium, Eugenin, Hesperidin, Humulone, Isohumulone, Kaempferol 3-O-rutinoside, 6-Methoxymellein, Naringin, Papaverine, Phenylthiocarbamide, Propylthiouracil, Quassin, Quinidine, Quinine, Salicin, Strychnine, Sucrose octaacetate, Sucrose octapropionate, Theobromine, Theophylline, vegetables, tea, chocolate, fruits or any combination thereof, a sour compound, such as acetic acid, citric acid, hydrochloric acid, lactic acid, malic acid, nitric acid, fumaric acid, sulfuric acid, tartaric acid, phosphoric acid, other acid or any combination thereof, a cooling compound, such as Menthol, Cyclohexanecarboxamide,N-Ethyl-5-Methyl-2-(1- Methylethyl) (WS-3), N-(Ethoxycarbonylmethyl)-3-p-menthanecarboxamide (WS-5), (1R,2S,5R)-N-(4-Methoxyphenyl)-5-methyl-2-(1- methylethyl)cyclohexanecarboxamide (WS-12), Butanamide, N,2,3-trimethyl-2-(1-methylethyl) (WS-23), or Menthyl Lactate or any combination thereof, a compound with an off-taste, such as plant-based milks or products of plant-based milks, dairy products, fruits, juices, proteins, plant protein, whole grain products or any combination thereof.

[0432] Clause 45. The method of clause 44, wherein the dairy product, plant-based milk, or product of plant-based milk comprises a milk, such as whole milk, nonfat milk, lactose-free milk, buttermilk, condensed milk, cashew milk, goat milk, rick milk, soy milk, oat milk, almond milk, coconut milk, a yogurt, cheese, frosting, pudding, chocolate, custard, ice cream, gelato, sherbet, sorbet, frozen yogurt or any combination thereof.

[0433] Clause 46. The method of any one of clauses 40-45, wherein the plant extract comprising a steroidal saponin is obtained from a plant from any one or more of the following families or genera: Asparagaceae, Amaryllidaceae, Dioscoreaceae, Liliaceae, Costaceae, Melanthiaceae, Plantaginaceae, Fabaceae, Asteraceae, Asparagus, Tupistra, Anemarrhena, Sansevieria, Polygonatum, Nolina, Convallaria, Ophipogon, Hosta, Ornithogalum, Ruscus, Agapanthus, Dioscorea, Fritillaria, Lilium, Costus, Paris, Digitalis, Trigonella, Smilax, or Vernonia.

[0434] Clause 47. The method of any one of clauses 40-46, wherein the plant extract comprising a steroidal saponin is obtained from a plant from any one or more of the following species: *Smilax riparia*, *Smilax lanceaefolia*, *Smilax nipponica*, *Smilax nigrescens*, *Smilax officinalis*, *Smilax aspera subsp. Mauritanica*, *Smilax aristolochiifolia*, *Smilax ornate*, *Smilax glabra*, *Smilax china*, *Smilax menispermoides*, *Smilax lebrunii*, *Smilax stans*, *Smilax bockii*, *Smilax excelsa*, *Smilax microphylla*, *Smilax scobinicaulis*, *Smilax sieboldii*, *Smilax krausiana*, *Smilax medica*, *Asparagus acutifolius*, *Asparagus aethiopicus*, *Asparagus africanus*, *Asparagus asparagoides*, *Asparagus burchellii*, *Asparagus cochinchinensis*, *Asparagus declinatus*, *Asparagus capensis*, *Asparagus curillus*, *Asparagus densiflorus*, *Asparagus exuvialis*, *Asparagus falcatus*, *Asparagus fallax*, *Asparagus flagellaris*, *Asparagus horridus*, *Asparagus krebsianus*, *Asparagus laricinus*, *Asparagus lignosus*, *Asparagus macowanii*, *Asparagus mariae*, *Asparagus maritimus*, *Asparagus mucronatus*, *Asparagus multiflorus*, *Asparagus nesiotes*, *Asparagus officinalis*, *Asparagus ovatus*, *Asparagus pastorianus*, *Asparagus persicus*, *Asparagus racemosus*, *Asparagus retrofractus*, *Asparagus rubicundus*, *Asparagus scandens*, *Asparagus schoberioides*, *Asparagus scoparius*, *Asparagus setaceus*, *Asparagus striatus*, *Asparagus suaveolens*, *Asparagus tenuifolius*, *Asparagus umbellatus*, *Asparagus vaginellatus*, *Trigonella foenum graecum* or *Asparagus virgatus*.

[0435] Clause 48. The method of any one of clauses 40-47, wherein the mixture provides a taste perception in the subject of a reduction in bitterness or bitterness perception,

a masking of bitter tastes or bitterness, a reduction in sourness or sourness perception, a masking of sour tastes or sourness, a reduction in initial sourness perception or lingering sourness perception, a reduction in astringency or astringency perception, a masking of astringency, or a masking of off tastes when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0436] Clause 49. The method of any one of clauses 40-48, wherein the mixture provides a taste perception in the subject of masked cooked tastes, masked metallic tastes, enhanced beer flavor, enhanced alcohol flavor, enhanced retro-nasal effect, increased bitterness perception, enhanced alcohol perception, enhanced spice intensity, increased sour perception, enhanced cooling intensity, faster onset of cooling sensation, increased duration of taste, or reduced stinging taste when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0437] Clause 50. The method of any one of clauses 40-49, wherein the mixture increases the amount of carbonation bubbles or reduces the carbonation bubble size of a beverage when the mixture is provided to the subject, such as when the mixture is incorporated in a beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0438] Clause 51. The method of any one of clauses 40-50, wherein the food or beverage or granule, powder, or liquid formulation is selected from water, a carbonated beverage, such as a carbonated fruit beverage, carbonated cola drink or carbonated water, alcoholic beverages, alcohol-free beverages, spices and/or seasonings, such as chili, wasabi, horseradish, mustard, ginger, black pepper, or cinnamon, energy beverages, flavored water, powders for drinks, dairy products, such as milk, yogurt, cheese, or ice cream, plant based milks, products of plant based milk, puddings, cakes, shakes, malts, brownies, pastries, cookies, cheesecakes, fudge, pies, cobblers, parfaits, mousse, biscuits, custards, frosting, fruits, vegetables, hard candy, soft candy, taffy, chocolates, sugarless candies, chewing gum, bubble gum, juices, teas, coffees, salsa, gel beads, film strips for breath, gelatin candies, pectin

candies, starch candies, lozenges, cough drops, throat lozenges, throat sprays, toothpastes or mouth rinses.

[0439] Clause 52. The method of any one of clauses 40-51, wherein the amount of component (a) in the mixture is at least 2 ppm, such as, 3, 4, 5, 7.5, 10, 20, 30, 40, 50, 60, 70, 80, 90, 100, 110, 120, 130, 140, 150, 160, 170, 180, 190, 200, 210, 220, 230, 240, 250, 260, 270, 280, 290, or 300 ppm or an amount within a range defined by any two of the aforementioned amounts, preferably 2-40 ppm, 6-75 ppm, 6-100 ppm, or 12-200 ppm.

[0440] Clause 53. The method of any one of clauses 40-52 further comprising selecting or identifying a subject to receive a composition, which modulates a taste perception in a subject, such as alcohol, spice, cooling carbonation, bitterness, sourness, or astringency, or which masks off-tastes in a subject, such as bitter or sour tastes.

[0441] Clause 54. The method of any one of clauses 40-53 further comprising determining or analyzing the alcohol perception, bitterness perception, bitterness intensity, the masking of bitterness, the sourness perception, sourness intensity, the masking of sourness, astringency perception, astringency intensity, the masking of astringency, or the masking of off-tastes or any combination thereof of the subject after consuming said mixture or determining or analyzing the increase of carbonation bubbles, the reduction of carbonation bubble size of a carbonated beverage after providing composition component (a) .

[0442] Clause 55. The method of any one of clauses 40-54, wherein component (a) is dissolved in food grade ethanol.

[0443] Clause 56. The method of clause 55, wherein the food grade ethanol is at least 1%, such as 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 15, 20, 25, 30, 35, 40, 45, 50, 60, 70, 80, 85, 90, 95, or 100%, or with a range defined by any two of the aforementioned amounts, preferably 80, 90, or 95%.

[0444] Clause 57. A method of making a mixture, which modulates a subject's taste perception of alcohol, spice, cooling, carbonation, astringency, bitterness, or sourness or which masks off-tastes, the method comprising the method comprising: admixing a component (a) with a component (b) to form said mixture: (a) a steroidal saponin or analog thereof (for example, a glycosylation molecule of an aglycone, an aglycone of a glycosylated molecule, or a further glycosylated molecule of a glycosylated molecule) or an extract of a plant that comprises a steroidal saponin or an analog thereof, such as an *Asparagus racemosus* rhizome

extract, a *Trigonella foenum graecum L.* extract or a *Smilax china* extract; and (b) a composition comprising an alcohol, a spice, a cooling compound, carbonation, an astringent compound, a bitter compound, a sour compound, or a compound with an off-taste; wherein component (a) is admixed with component (b); wherein the mixture is preferably provided in a food, beverage, granule, powder or liquid formulation; and optionally, wherein the composition comprises one or more preservatives or antioxidants, such as a sulphite, sorbic acid, a sorbate compound, benzoic acid, benzoate, propionic acid, propionate, ascorbic acid, ascorbate, citric acid, a tocopherol, a retinol, a polyphenol, a phenolic acid, a flavonoid, lipoic acid, N-acetylcysteine, butylated hydroxyanisole, butylated hydroxytoluene or derivatives thereof, preferably, wherein the one or more preservatives or antioxidants improve the shelf-life, flavor profile, or reduce spoilage of the mixture.

[0445] Clause 58. The method of clause 57, wherein the steroidal saponin has one of the following sapogenin structures: spirostane, isospirostane, furostane, pregnane, or cholestane.

[0446] Clause 59. The method of any one of clauses 57 or 58, wherein the steroidal saponin or extract of a plant that comprises a steroidal saponin or an analog thereof comprises saponins selected from one or more of the following: Shatavarin I, Shatavarin VIII, Protodioscin, Shatavarin IV, Shatarvain IX, Asparagoside A, Asparenydiol, Asparacosin A, Asparoside B, Sarsasapogenin, Schidigera saponin D5, Shatavarin VI, Immunoside, Shatavarin VII, Shatavarin X, Aspoligonin A, Prosapogenin A, Methyl gracillin, Methyl protodioscin, Neotigogenin-3-O-α-l-rhamnopyranosyl-(1 → 6)-β-d-glucopyranoside, Neotigogenin-3-O-β-d-glucopyranosyl-(1 → 4)-O-[α-l-rhamnopyranosyl-(1 → 6)]-β-d-glucopyranoside, Neotigogenin-3-O-β-d-glucopyranoside, Smilanippin A, Neotigogenin-3-O-β-d-glucopyranosyl-(1 → 4)-O-[α-l-arabinopyranosyl-(1 → 6)]-β-d-glucopyranoside, Sarsasapogenin-3-O-β-d-glucopyranosyl-(1 → 4)-[α-l-arabinopyranosyl- (1 → 6)]-β-d-glucopyranoside, (25S)-5β-Spirostane-3β-ol-3-O-α-l-rhamnopyranosyl-(1 → 2)-β-d-glucopyranosyl-(1 → 2)-β-d-glucopyranoside, Curillin G, Parillin, (25S)-Spirostan-6β-ol-3-O-β-d-glucopyranosyl-(1 → 4)-O-[α-l-arabinopyranosyl-(1 → 6)]-β-d-glucopyranoside, Trinervuloside C, Diosgenin-3-O-α-l-rhamnopyranoside, Dioscin, Diosgenin-3-O-[α-l-rhamnopyranosyl-(1 → 4)]-β-d-glucopyranoside, Diosgenin-3-O-[α-l-rhamnopyranosyl-(1 → 2)]-β-d-glucopyranoside, (25R)-Spirostan-5-en-3-O-α-l-rhamnopyranosyl-(1 → 2)-[α-l-

rhamnopyranosyl-(1 → 4)-α-l-rhamnopyranosyl-(1 → 4)]-O-β-d-glucopyranoside, Gracillin, Parisyunnanosidc C, Parisyunnanosidc D, Parisyunnanosidc E, Paris D, Paris H, (25R)-Spirost-5-en-3β,17α,27-triol-3-O-α-l-rhamnopyranosyl-(1 → 2)-[α-l-rhamnopyranosyl-(1 → 4)]-β-d-glucopyranoside, (25S)-Spirostan-5-en-3β,17α,27-triol-3-O-α-l-arabinopyranosyl-(1 → 6)-β-d-glucopyranoside, (25S)-Spirostan-5-en-3β,17α,27-triol-3-O-β-d-glucopyranosyl-(1 → 4)-[α-l-arabinopyranosyl-(1 → 6)]-β-d-glucopyranoside, (25S)-spirost-5-ene-3β,17α,27-triol-3-O-α-l-rhamnopyranosyl-(1 → 4)-β-d-glucopyranoside, (25S)-Spirost-5-en-3β,17α,27-triol-3-O-β-d-galactopyranoside, (25S)-Spirostan-5-en-3β,27-diol-3-O-α-l-arabinopyranosyl-(1 → 6)-β-d- glucopyranoside, Isonarthogenin3-O-α-l-rhamnopyranosyl-(1 → 2)-O-[α-l-rhamnopyranosyl-(1 → 4)]-β-d-glucopyranoside, Smilscobinoside A, Sieboldiin A, Sieboldiin B, Sieboldogenin, (25R)-5α-Spirostan-3β-ol-6-one-3-O-[α-l-arabinopyranosyl-(1 → 4)]-β-d-glucopyranoside, Smilaxin A, Smilaxin B, Parisvietnaside A, Smilaxin C, (25R)-5α-Spirostan-3β,6β-diol-3-O-β-d-glucopyranosyl-(1 → 4)-[α-l-arabinopyranosyl-(1 → 6)]-β-d-glucopyranoside, Smilscobinoside B, (25R)-5α-Spirostan-3β,17α,27-triol-3-O-β-d-glucopyranosyl-(1 → 4)-[α-l-arabinopyranosyl-(1 → 6)]-β-d-glucopyranosie, (25R)-5βSpirostan-3β-ol-3-O-β-d-glucopyranosyl-(1 → 6)-[β-d-glucopyranosyl-(1 → 4)]-β-d-glucopyranoside, (25R)-5β-Spirostan-3β-ol-3-O-β-d-glucopyranosyl-(1 → 6)-[β-d-glucopyranosyl-(1 → 2)]-[β-d-glucopyranosyl-(1 → 4)]-β-d-glucopyranoside, Disporoside A, (25R)-5β-Spirostan-3β-ol-3-O-β-d-glucopyranosyl-(1 → 6)-β-d-glucopyranoside, (25R)-5β-Spirostan-3β-ol-3-O-β-d-glucopyranosyl-(1 → 6)-[β-d-glucopyranosyl-(1 → 2)]-[α-l-rhamnopyranosyl-(1 → 4)]-β-d-glucopyranoside, Smilagenin 3-O-β-d-glucopyranoside, Methylprotodioscin, 26-O-β-d-Glucopyranosyl-(25R)-furostan-5-en-3β,26-diol-22-methoxy-3-O-α-l-rhamnopyranosyl-(1 → 2)-β-d-glucopyranoside, 26-O-β-d-Glucopyranosyl-22α-O-methyl-(25R)-furost-5-en-3β,26-diol-3-O-α-l-rhamnopyranosyl-(1 → 4)-α-l-rhamnopyranosyl-(1 → 4)-[α-l-rhamnopyranosyl-(1 → 2)]-β-d-glucopyranoside, Protodiosgenin-3-O-α-l-rhamnopyranosyl-(1 → 4)-α-l-rhamnopyranosyl(1 → 4)-[α-l-rhamnopyranosyl(1 → 2)]-β-d-glucopyranoside, 26-O-β-d-Glucopyranosyl-22α-hydroxy-(25R)-furost-5-en-3β,26-diol-3-O-[4-O-acetyl-α-l-rhamnopyranosyl]-(1 → 2)-[α-l-rhamnopyranosyl-(1 → 4)]-β-d-glucopyranoside, 26-O-β-d-Glucopyranosyl-22α-hydroxy-(25R)-furost-5-en-3β,26-diol-3-O-[2-O-acetyl-α-l-rhamnopyranosyl]-(1 → 2)-[α-l-rhamnopyranosyl-(1 → 4)]-β-d-glucopyranoside, 26-O-β-d-Glucopyranosyl-22α-hydroxy-

(25R)-furost-5-en-3β,26-diol-3-O-[3-O-acetyl-α-l-rhamnopyranosyl]-(1 → 2)-[α-l-rhamnopyranosyl-(1 → 4)]-β-d-glucopyranoside, 26-O-β-d-Glucopyranosyl-(25R)-furostan-5-en-3β,17α-diol-3-O-α-l-rhamnopyranosyl-(1 → 2)-α-l-rhamnopyranoside, Protogracillin, Parisaponin I, Parisyunnanoside A, Pseudoprotodioscin, 26-O-β-d-Glucopyranosyl-(25R)-furostan-5,20(22)-dien-3β,26-diol-3-O-α-l-rhamnopyranosyl-(1 → 2)-β-d-glucopyranoside, 15-Hydroxypseudoprotodioscin, 15-Methoxypseudoprotodioscin, 23-Oxopseudoprotodioscin, 26-O-β-d-Glucopyranosyl-(25S)-5-furosa-20(22)-en-3β,26-diol-3-O-α-l-rhamnopyranosyl-(1 → 2)-O-[α-l-rhamnopyranosyl-(1 → 6)]-β-d-glucopyranoside, Pseudoproto-pb, 26-O-β-d-Glucopyranosyl-(25R)-5α-furostan-3β,22,26-triol-6-one-3-O-α-l-arabinopyranosyl-(1 → 6)-β-d-glucopyranoside, 26-O-β-d-Glucopyranosyl-(25R)-5α-furostan-3β,22,26-triol-6-one-3-O-β-d-glucopyranosyl-(1 → 4)-[α-l-arabinopyranosyl-(1 → 6)]-β-d-glucopyranoside, 26-O-β-d-Glucopyranosyl-(25R)-5α-furostan-3β,26-diol-22-methoxyl-6-one-3-O-α-l-arabinopyranosyl-(1 → 6)-β-d-glucopyranoside, 26-O-β-d-Glucopyranosyl-(25R)-5α-furostan-3β,26-diol-22-methoxyl-6-one, 26-O-β-d-Glucopyranosyl-(25S)-5β-furostan-3β,26-diol-22α-methoxy-3-O-β-d-glucopyranosyl-(1 → 6)-[β-d-glucopyranosyl-(1 → 2)]-[β-d-glucopyranosyl-(1 → 4)]-β-d-glucopyranoside, (25S)-26-O-β-d-glucopyranosyl-3β,5β,22α-furostan-3,22,26-triol-3-O-α-l-rhamnopyranosyl-(1 → 2)-O-β-d-glucopyranosyl-(1 → 2)-O-β-d-glucopyranoside, Asparagoside E, Asparoside A, Asparoside B, 26-O-β-d-Glucopyranosyl-(25S)-5β-furostan-3β,22α-diol-3-O-α-l-arabinopyranosyl-(1 → 6)-[β-d-glucopyranosyl-(1 → 4)]-β-d-glucopyranoside, 26-O-β-d-Glucopyranosyl-(25S)-5α-furostan-3β,22α-diol-3-O-α-l-arabinopyranosyl-(1 → 6)-[β-d-glucopyranosyl-(1 → 4)]-β-d-glucopyranoside, 26-O-β-d-Glucopyranosyl-(25S)-5α-furostan-3β,6β,22α-tetraol-3-O-α-l-arabinopyranosyl-(1 → 6)-[β-d-glucopyranosyl-(1 → 4)]-β-d-glucopyranoside, Sarsaparilloside B, Sarsaparilloside C, Sarsaparilloside, Δ20(22)-Sarsaparilloside, Riparoside A, Smilaxchinoside A, (25R)-Smilaxchinoside A, Smilaxchinoside B, Smilaxchinoside C, Dioscoreside E, (25R)-5α-Furostan-3β,26-diol-20(22)-en-6-one-26-O-β-d-glucopyranoside, (23R,25R)-5α-Furostan-3β,23,26-triol-20(22)-en-6-one-26-O-β-d-glucopyranoside, 26-O-β-d-Glucopyranosyl-(25R)-5α-furostan-3β,26-diol-20(22)-en-6-one-3-O-α-l-arabinopyranosyl-(1 → 6)-β-d-glucopyranoside, (25S)-5β-Furostan-1β,2β,3β,5β,22α,26-hexaol-26-O-β-d-glucopyranoside, 26-O-β-d-Glucopyranosyl-(25S)-5β-furostan-1β,3β,22α,26-tetraol-1-O-β-d-glucopyranoside, Trinervuloside A,

Riparoside B, Timosaponin J, Timosaponin K, Trinervuloside B, Pregna-5,16-diene-3β-ol-20-onc-3-O-α-l-rhamnopyranosyl-(1 → 2)-O-[α-l-rhamnopyranosyl-(1 → 4)]-β-d-glucopyranoside, Pregna-5,16-diene-3β-ol-20-one-3-O-α-l-rhamnopyranosyl-(1 → 4)-α-l-rhamnopyranosyl-(1 → 4)-[α-l-rhamnopyranosyl-(1 → 2)]-β-d-glucopyranoside, Pregna-5,16-diene-3β-ol-20-one-3-O-α-l-rhamnopyranosyl-(1 → 2)-[α-l-rhamnopyranosyl-(1 → 4)]-α-l-rhamnopyranosyl-(1 → 2)-β-d-glucopyranoside, Pallidfloside D, Anguivioside XV, Yamogenin, Diosgenin, Smilagenin, Sarsasapogenin, Tigogenin, Neotigogenin, Gitogenin, Yuccagenin, Saponaretin or Smilaxchinoside D.

[0447] Clause 60. The method of any one of clauses 57-59, wherein the steroidal saponin or analog thereof or extract of a plant that comprises a steroidal saponin or an analog thereof comprises a glucosylated steroidal saponins or an aglycone of a steroidal saponin.

[0448] Clause 61. The method of any one of clauses 57-60, wherein the composition is an alcoholic or non-alcoholic beverage, a carbonated beverage, a spice or spicy compound, such as a chili, wasabi, horseradish, mustard, ginger, black pepper, cinnamon, pumpkin spice, Szechuan pepper, allspice or any combination thereof, an astringent compound, such as phenolic compounds, tannins, gallic acid, zinc oxide, zinc sulfate, tannic acid, potassium permanganate, silver nitrate, tincture of benzoin, potassium alum, caftaric acid, acacia, yarrow, sage, witch hazel, vinegar, tea, fruits, vegetables, dairy products, herbs, nuts or any combination thereof, a bitter compound, such as Absinthin, Aloin, Alpha acid, Amarogentin, Andrographolide, Brucine, Caffeine, Denatonium, Eugenin, Hesperidin, Humulone, Isohumulone, Kaempferol 3-O-rutinoside, 6-Methoxymellein, Naringin, Papaverine, Phenylthiocarbamide, Propylthiouracil, Quassin, Quinidine, Quinine, Salicin, Strychnine, Sucrose octaacetate, Sucrose octapropionate, Theobromine, Theophylline, vegetables, tea, chocolate, fruits or any combination thereof, a sour compound, such as acetic acid, citric acid, hydrochloric acid, lactic acid, malic acid, nitric acid, fumaric acid, sulfuric acid, tartaric acid, phosphoric acid, other acid or any combination thereof, a cooling compound, such as Menthol, Cyclohexanecarboxamide,N-Ethyl-5-Methyl-2-(1- Methylethyl) (WS-3), N-(Ethoxycarbonylmethyl)-3-p-menthanecarboxamide (WS-5), (1R,2S,5R)-N-(4-Methoxyphenyl)-5-methyl-2-(1- methylethyl)cyclohexanecarboxamide (WS-12), Butanamide, N,2,3-trimethyl-2-(1-methylethyl) (WS-23), or Menthyl Lactate or any combination thereof, a compound with an off-taste, such as plant-based milks or products of

plant-based milks, dairy products, fruits, juices, proteins, plant protein, whole grain products or any combination thereof.

[0449] Clause 62. The method of clause 61, wherein the dairy product, plant-based milk, or product of plant-based milk comprises a milk, such as whole milk, nonfat milk, lactose-free milk, buttermilk, condensed milk, cashew milk, goat milk, rick milk, soy milk, oat milk, almond milk, coconut milk, a yogurt, cheese, frosting, pudding, chocolate, custard, ice cream, gelato, sherbet, sorbet, frozen yogurt or any combination thereof.

[0450] Clause 63. The method of any one of clauses 57-62, wherein the plant extract comprising a steroidal saponin is obtained from a plant from any one or more of the following families or genera: Asparagaceae, Amaryllidaceae, Dioscoreaceae, Liliaceae, Costaceae, Melanthiaceae, Plantaginaceae, Fabaceae, Asteraceae, Asparagus, Tupistra, Anemarrhena, Sansevieria, Polygonatum, Nolina, Convallaria, Ophipogon, Hosta, Ornithogalum, Ruscus, Agapanthus, Dioscorea, Fritillaria, Lilium, Costus, Paris, Digitalis, Trigonella, Smilax, or Vernonia.

[0451] Clause 64. The method of any one of clauses 57-63, wherein the plant extract comprising a steroidal saponin is obtained from a plant from any one or more of the following species: *Smilax riparia*, *Smilax lanceaefolia*, *Smilax nipponica*, *Smilax nigrescens*, *Smilax officinalis*, *Smilax aspera subsp. Mauritanica*, *Smilax aristolochiifolia*, *Smilax ornate*, *Smilax glabra*, *Smilax china*, *Smilax menispermoides*, *Smilax lebrunii*, *Smilax stans*, *Smilax bockii*, *Smilax excelsa*, *Smilax microphylla*, *Smilax scobinicaulis*, *Smilax sieboldii*, *Smilax krausiana*, *Smilax medica*, *Asparagus acutifolius*, *Asparagus aethiopicus*, *Asparagus africanus*, *Asparagus asparagoides*, *Asparagus burchellii*, *Asparagus cochinchinensis*, *Asparagus declinatus*, *Asparagus capensis*, *Asparagus curillus*, *Asparagus densiflorus*, *Asparagus exuvialis*, *Asparagus falcatus*, *Asparagus fallax*, *Asparagus flagellaris*, *Asparagus horridus*, *Asparagus krebsianus*, *Asparagus laricinus*, *Asparagus lignosus*, *Asparagus macowanii*, *Asparagus mariae*, *Asparagus maritimus*, *Asparagus mucronatus*, *Asparagus multiflorus*, *Asparagus nesiotes*, *Asparagus officinalis*, *Asparagus ovatus*, *Asparagus pastorianus*, *Asparagus persicus*, *Asparagus racemosus*, *Asparagus retrofractus*, *Asparagus rubicundus*, *Asparagus scandens*, *Asparagus schoberioides*, *Asparagus scoparius*, *Asparagus setaceus*, *Asparagus striatus*, *Asparagus suaveolens*, *Asparagus tenuifolius*, *Asparagus umbellatus*, *Asparagus vaginellatus*, *Trigonella foenum graecum* or *Asparagus virgatus*.

[0452] Clause 65. The method of any one of clauses 57-64, wherein the mixture provides a taste perception in the subject of a reduction in bitterness or bitterness perception, a masking of bitter tastes or bitterness, a reduction in sourness or sourness perception, a masking of sour tastes or sourness, a reduction in initial sourness perception or lingering sourness perception, a reduction in astringency or astringency perception, a masking of astringency, or a masking of off tastes when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0453] Clause 66. The method of any one of clauses 57-65, wherein the mixture provides a taste perception in the subject of masked cooked tastes, masked metallic tastes, enhanced beer flavor, enhanced alcohol flavor, enhanced retro-nasal effect, increased bitterness perception, enhanced alcohol perception, enhanced spice intensity, increased sour perception, enhanced cooling intensity, faster onset of cooling sensation, increased duration of taste, or reduced stinging taste when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0454] Clause 67. The method of any one of clauses 57-66, wherein the mixture increases the amount of carbonation bubbles or reduces the carbonation bubble size of a beverage when the mixture is provided to the subject, such as when the mixture is incorporated in a beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0455] Clause 68. The method of any one of clauses 57-67, wherein the food or beverage or granule, powder, or liquid formulation is selected from water, a carbonated beverage, such as a carbonated fruit beverage, carbonated cola drink or carbonated water, alcoholic beverages, alcohol-free beverages, spices and/or seasonings, such as chili, wasabi, horseradish, mustard, ginger, black pepper, or cinnamon, energy beverages, flavored water, powders for drinks, dairy products, such as milk, yogurt, cheese, or ice cream, plant based milks, products of plant based milk, puddings, cakes, shakes, malts, brownies, pastries, cookies, cheesecakes, fudge, pies, cobblers, parfaits, mousse, biscuits, custards, frosting, fruits, vegetables, hard candy, soft candy, taffy, chocolates, sugarless candies, chewing gum, bubble

gum, juices, teas, coffees, salsa, gel beads, film strips for breath, gelatin candies, pectin candies, starch candies, lozenges, cough drops, throat lozenges, throat sprays, toothpastes or mouth rinses.

[0456] Clause 69. The method of any one of clauses 57-68, wherein the amount of component (a) in the mixture is at least 2 ppm, such as, 3, 4, 5, 7.5, 10, 20, 30, 40, 50, 60, 70, 80, 90, 100, 110, 120, 130, 140, 150, 160, 170, 180, 190, 200, 210, 220, 230, 240, 250, 260, 270, 280, 290, or 300 ppm or an amount within a range defined by any two of the aforementioned amounts, preferably 2-40 ppm, 6-75 ppm, 6-100 ppm, or 12-200 ppm.

[0457] Clause 70. The method of any one of clauses 57-69, wherein component (a) is dissolved in food grade ethanol.

[0458] Clause 71. The method of clause 70, wherein the food grade ethanol is at least 1%, such as 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 15, 20, 25, 30, 35, 40, 45, 50, 60, 70, 80, 85, 90, 95, or 100%, or with a range defined by any two of the aforementioned amounts, preferably 80, 90, or 95%.

[0459] Clause 72. A composition obtained or obtainable by the method of any one of clauses 57-71.

[0460] Clause 73. A mixture suitable for modulating a subject's taste perception of alcohol, spice, cooling, carbonation, astringency, bitterness, or sourness or for masking off-tastes, wherein the mixture comprises at least two components (a) and (b): (a) a steroidal saponin or analog thereof (for example, a glycosylation molecule of an aglycone, an aglycone of a glycosylated molecule, or a further glycosylated molecule of a glycosylated molecule) or an extract of a plant that comprises a steroidal saponin or an analog thereof, such as an *Asparagus racemosus* rhizome extract, a *Trigonella foenum graecum L.* extract or a *Smilax china* extract; and (b) a composition comprising an alcohol, a spice, a cooling compound, carbonation, an astringent compound, a bitter compound, a sour compound, or a compound with an off-taste; wherein component (a) is admixed with component (b); preferably, wherein the mixture is provided in a food, beverage, granule, powder or liquid formulation; and optionally, wherein the mixture comprises one or more preservatives or antioxidants, such as a sulphite, sorbic acid, a sorbate compound, benzoic acid, benzoate, propionic acid, propionate, ascorbic acid, ascorbate, citric acid, a tocopherol, a retinol, a polyphenol, a phenolic acid, a flavonoid, lipoic acid, N-acetylcysteine, butylated hydroxyanisole, butylated hydroxytoluene

or derivatives thereof, preferably, wherein the one or more preservatives or antioxidants improve the shelf-life, flavor profile, or reduce spoilage of the mixture.

[0461] Clause 74. The mixture of clause 73, wherein the steroidal saponin has one of the following sapogenin structures: spirostane, isospirostane, furostane, pregnane, or cholestane.

[0462] Clause 75. The mixture of any one of clauses 73 or 74, wherein the steroidal saponin or extract of a plant that comprises a steroidal saponin or an analog thereof comprises saponins selected from one or more of the following: Shatavarin I, Shatavarin VIII, Protodioscin, Shatavarin IV, Shatarvain IX, Asparagoside A, Asparenydiol, Asparacosin A, Asparoside B, Sarsasapogenin, Schidigera saponin D5, Shatavarin VI, Immunoside, Shatavarin VII, Shatavarin X, Aspoligonin A, Prosapogenin A, Methyl gracillin, Methyl protodioscin, Neotigogenin-3-O-α-l-rhamnopyranosyl-(1 → 6)-β-d-glucopyranoside, Neotigogenin-3-O-β-d-glucopyranosyl-(1 → 4)-O-[α-l-rhamnopyranosyl-(1 → 6)]-β-d-glucopyranoside, Neotigogenin-3-O-β-d-glucopyranoside, Smilanippin A, Neotigogenin-3-O-β-d-glucopyranosyl-(1 → 4)-O-[α-l-arabinopyranosyl-(1 → 6)]-β-d-glucopyranoside, Sarsasapogenin-3-O-β-d-glucopyranosyl-(1 → 4)-[α-l-arabinopyranosyl- (1 → 6)]-β-d-glucopyranoside, (25S)-5β-Spirostane-3β-ol-3-O-α-l-rhamnopyranosyl-(1 → 2)-β-d-glucopyranosyl-(1 → 2)-β-d-glucopyranoside, Curillin G, Parillin, (25S)-Spirostan-6β-ol-3-O-β-d-glucopyranosyl-(1 → 4)-O-[α-l-arabinopyranosyl-(1 → 6)]-β-d-glucopyranoside, Trinervuloside C, Diosgenin-3-O-α-l-rhamnopyranoside, Dioscin, Diosgenin-3-O-[α-l-rhamnopyranosyl-(1 → 4)]-β-d-glucopyranoside, Diosgenin-3-O-[α-l-rhamnopyranosyl-(1 → 2)]-β-d-glucopyranoside, (25R)-Spirostan-5-en-3-O-α-l-rhamnopyranosyl-(1 → 2)-[α-l-rhamnopyranosyl-(1 → 4)-α-l-rhamnopyranosyl-(1 → 4)]-O-β-d-glucopyranoside, Gracillin, Parisyunnanoside C, Parisyunnanoside D, Parisyunnanoside E, Paris D, Paris H, (25R)-Spirost-5-en-3β,17α,27-triol-3-O-α-l-rhamnopyranosyl-(1 → 2)-[α-l-rhamnopyranosyl-(1 → 4)]-β-d-glucopyranoside, (25S)-Spirostan-5-en-3β,17α,27-triol-3-O-α-l-arabinopyranosyl-(1 → 6)-β-d-glucopyranoside, (25S)-Spirostan-5-en-3β,17α,27-triol-3-O-β-d-glucopyranosyl-(1 → 4)-[α-l-arabinopyranosyl-(1 → 6)]-β-d-glucopyranoside, (25S)-spirost-5-ene-3β,17α,27-triol-3-O-α-l-rhamnopyranosyl-(1 → 4)-β-d-glucopyranoside, (25S)-Spirost-5-en-3β,17α,27-triol-3-O-β-d-galactopyranoside, (25S)-Spirostan-5-en-3β,27-diol-3-O-α-l-arabinopyranosyl-(1 → 6)-β-d- glucopyranoside, Isonarthogenin3-O-α-l-rhamnopyranosyl-(1 → 2)-O-[α-l-

rhamnopyranosyl-(1 → 4)]-β-d-glucopyranoside, Smilscobinoside A, Sieboldiin A, Sieboldiin B, Sieboldogenin, (25R)-5α-Spirostan-3β-ol-6-one-3-O-[α-l-arabinopyranosyl-(1 → 4)]-β-d-glucopyranoside, Smilaxin A, Smilaxin B, Parisvietnaside A, Smilaxin C, (25R)-5α-Spirostan-3β,6β-diol-3-O-β-d-glucopyranosyl-(1 → 4)-[α-l-arabinopyranosyl-(1 → 6)]-β-d-glucopyranoside, Smilscobinoside B, (25R)-5α-Spirostan-3β,17α,27-triol-3-O-β-d-glucopyranosyl-(1 → 4)-[α-l-arabinopyranosyl-(1 → 6)]-β-d-glucopyranosie, (25R)-5βSpirostan-3β-ol-3-O-β-d-glucopyranosyl-(1 → 6)-[β-d-glucopyranosyl-(1 → 4)]-β-d-glucopyranoside, (25R)-5β-Spirostan-3β-ol-3-O-β-d-glucopyranosyl-(1 → 6)-[β-d-glucopyranosyl-(1 → 2)]-[β-d-glucopyranosyl-(1 → 4)]-β-d-glucopyranoside, Disporoside A, (25R)-5β-Spirostan-3β-ol-3-O-β-d-glucopyranosyl-(1 → 6)-β-d-glucopyranoside, (25R)-5β-Spirostan-3β-ol-3-O-β-d-glucopyranosyl-(1 → 6)-[β-d-glucopyranosyl-(1 → 2)]-[α-l-rhamnopyranosyl-(1 → 4)]-β-d-glucopyranoside, Smilagenin 3-O-β-d-glucopyranoside, Methylprotodioscin, 26-O-β-d-Glucopyranosyl-(25R)-furostan-5-en-3β,26-diol-22-methoxy-3-O-α-l-rhamnopyranosyl-(1 → 2)-β-d-glucopyranoside, 26-O-β-d-Glucopyranosyl-22α-O-methyl-(25R)-furost-5-en-3β,26-diol-3-O-α-l-rhamnopyranosyl-(1 → 4)-α-l-rhamnopyranosyl-(1 → 4)-[α-l-rhamnopyranosyl-(1 → 2)]-β-d-glucopyranoside, Protodiosgenin-3-O-α-l-rhamnopyranosyl-(1 → 4)-α-l-rhamnopyranosyl(1 → 4)-[α-l-rhamnopyranosyl(1 → 2)]-β-d-glucopyranoside, 26-O-β-d-Glucopyranosyl-22α-hydroxy-(25R)-furost-5-en-3β,26-diol-3-O-[4-O-acetyl-α-l-rhamnopyranosyl]-(1 → 2)-[α-l-rhamnopyranosyl-(1 → 4)]-β-d-glucopyranoside, 26-O-β-d-Glucopyranosyl-22α-hydroxy-(25R)-furost-5-en-3β,26-diol-3-O-[2-O-acetyl-α-l-rhamnopyranosyl]-(1 → 2)-[α-l-rhamnopyranosyl-(1 → 4)]-β-d-glucopyranoside, 26-O-β-d-Glucopyranosyl-22α-hydroxy-(25R)-furost-5-en-3β,26-diol-3-O-[3-O-acetyl-α-l-rhamnopyranosyl]-(1 → 2)-[α-l-rhamnopyranosyl-(1 → 4)]-β-d-glucopyranoside, 26-O-β-d-Glucopyranosyl-(25R)-furostan-5-en-3β,17α-diol-3-O-α-l-rhamnopyranosyl-(1 → 2)-α-l-rhamnopyranoside, Protogracillin, Parisaponin I, Parisyunnanoside A, Pseudoprotodioscin, 26-O-β-d-Glucopyranosyl-(25R)-furostan-5,20(22)-dien-3β,26-diol-3-O-α-l-rhamnopyranosyl-(1 → 2)-β-d-glucopyranoside, 15-Hydroxypseudoprotodioscin, 15-Methoxypseudoprotodioscin, 23-Oxopseudoprotodioscin, 26-O-β-d-Glucopyranosyl-(25S)-5-furosa-20(22)-en-3β,26-diol-3-O-α-l-rhamnopyranosyl-(1 → 2)-O-[α-l-rhamnopyranosyl-(1 → 6)]-β-d-glucopyranoside, Pseudoproto-pb, 26-O-β-d-Glucopyranosyl-(25R)-5α-furostan-3β,22,26-triol-6-one-3-O-α-l-

arabinopyranosyl-(1 → 6)-β-d-glucopyranoside, 26-O-β-d-Glucopyranosyl-(25R)-5α-furostan-3β,22,26-triol-6-onc-3-O-β-d-glucopyranosyl-(1 → 4)-[α-l-arabinopyranosyl-(1 → 6)]-β-d-glucopyranoside, 26-O-β-d-Glucopyranosyl-(25R)-5α-furostan-3β,26-diol-22-methoxyl-6-one-3-O-α-l-arabinopyranosyl-(1 → 6)-β-d-glucopyranoside, 26-O-β-d-Glucopyranosyl-(25R)-5α-furostan-3β,26-diol-22-methoxyl-6-one, 26-O-β-d-Glucopyranosyl-(25S)-5β-furostan-3β,26-diol-22α-methoxy-3-O-β-d-glucopyranosyl-(1 → 6)-[β-d-glucopyranosyl-(1 → 2)]-[β-d-glucopyranosyl-(1 → 4)]-β-d-glucopyranoside, (25S)-26-O-β-d-glucopyranosyl-3β,5β,22α-furostan-3,22,26-triol-3-O-α-l-rhamnopyranosyl-(1 → 2)-O-β-d-glucopyranosyl-(1 → 2)-O-β-d-glucopyranoside, Asparagoside E, Asparoside A, Asparoside B, 26-O-β-d-Glucopyranosyl-(25S)-5β-furostan-3β,22α-diol-3-O-α-l-arabinopyranosyl-(1 → 6)-[β-d-glucopyranosyl-(1 → 4)]-β-d-glucopyranoside, 26-O-β-d-Glucopyranosyl-(25S)-5α-furostan-3β,22α-diol-3-O-α-l-arabinopyranosyl-(1 → 6)-[β-d-glucopyranosyl-(1 → 4)]-β-d-glucopyranoside, 26-O-β-d-Glucopyranosyl-(25S)-5α-furostan-3β,6β,22α-tetraol-3-O-α-l-arabinopyranosyl-(1 → 6)-[β-d-glucopyranosyl-(1 → 4)]-β-d-glucopyranoside, Sarsaparilloside B, Sarsaparilloside C, Sarsaparilloside, Δ20(22)-Sarsaparilloside, Riparoside A, Smilaxchinoside A, (25R)-Smilaxchinoside A, Smilaxchinoside B, Smilaxchinoside C, Dioscoreside E, (25R)-5α-Furostan-3β,26-diol-20(22)-en-6-one-26-O-β-d-glucopyranoside, (23R,25R)-5α-Furostan-3β,23,26-triol-20(22)-en-6-one-26-O-β-d-glucopyranoside, 26-O-β-d-Glucopyranosyl-(25R)-5α-furostan-3β,26-diol-20(22)-en-6-one-3-O-α-l-arabinopyranosyl-(1 → 6)-β-d-glucopyranoside, (25S)-5β-Furostan-1β,2β,3β,5β,22α,26-hexaol-26-O-β-d-glucopyranoside, 26-O-β-d-Glucopyranosyl-(25S)-5β-furostan-1β,3β,22α,26-tetraol-1-O-β-d-glucopyranoside, Trinervuloside A, Riparoside B, Timosaponin J, Timosaponin K, Trinervuloside B, Pregna-5,16-diene-3β-ol-20-one-3-O-α-l-rhamnopyranosyl-(1 → 2)-O-[α-l-rhamnopyranosyl-(1 → 4)]-β-d-glucopyranoside, Pregna-5,16-diene-3β-ol-20-one-3-O-α-l-rhamnopyranosyl-(1 → 4)-α-l-rhamnopyranosyl-(1 → 4)-[α-l-rhamnopyranosyl-(1 → 2)]-β-d-glucopyranoside, Pregna-5,16-diene-3β-ol-20-one-3-O-α-l-rhamnopyranosyl-(1 → 2)-[α-l-rhamnopyranosyl-(1 → 4)]-α-l-rhamnopyranosyl-(1 → 2)-β-d-glucopyranoside, Pallidfloside D, Anguivioside XV, Yamogenin, Diosgenin, Smilagenin, Sarsasapogenin, Tigogenin, Neotigogenin, Gitogenin, Yuccagenin, Saponaretin or Smilaxchinoside D.

[0463] Clause 76. The mixture for use of any one of clauses 73-75, wherein the steroidal saponin or analog thereof or extract of a plant that comprises a steroidal saponin or an analog thereof comprises a glucosylated steroidal saponin or an aglycone of a steroidal sanponin.

[0464] Clause 77. The mixture of any one of clauses 73-76, wherein the composition is an alcoholic or non-alcoholic beverage, a carbonated beverage, a spice or spicy compound, such as a chili, wasabi, horseradish, mustard, ginger, black pepper, cinnamon, pumpkin spice, Szechuan pepper, allspice or any combination thereof, an astringent compound, such as phenolic compounds, tannins, gallic acid, zinc oxide, zinc sulfate, tannic acid, potassium permanganate, silver nitrate, tincture of benzoin, potassium alum, caftaric acid, acacia, yarrow, sage, witch hazel, vinegar, tea, fruits, vegetables, dairy products, herbs, nuts or any combination thereof, a bitter compound, such as Absinthin, Aloin, Alpha acid, Amarogentin, Andrographolide, Brucine, Caffeine, Denatonium, Eugenin, Hesperidin, Humulone, Isohumulone, Kaempferol 3-O-rutinoside, 6-Methoxymellein, Naringin, Papaverine, Phenylthiocarbamide, Propylthiouracil, Quassin, Quinidine, Quinine, Salicin, Strychnine, Sucrose octaacetate, Sucrose octapropionate, Theobromine, Theophylline, vegetables, tea, chocolate, fruits or any combination thereof, a sour compound, such as acetic acid, citric acid, hydrochloric acid, lactic acid, malic acid, nitric acid, fumaric acid, sulfuric acid, tartaric acid, phosphoric acid, other acid or any combination thereof, a cooling compound, such as Menthol, Cyclohexanecarboxamide,N-Ethyl-5-Methyl-2-(1- Methylethyl) (WS-3), N-(Ethoxycarbonylmethyl)-3-p-menthanecarboxamide (WS-5), (1R,2S,5R)-N-(4-Methoxyphenyl)-5-methyl-2-(1- methylethyl)cyclohexanecarboxamide (WS-12), Butanamide, N,2,3-trimethyl-2-(1-methylethyl) (WS-23), or Menthyl Lactate or any combination thereof, a compound with an off-taste, such as plant-based milks or products of plant-based milks, dairy products, fruits, juices, proteins, plant protein, whole grain products or any combination thereof.

[0465] Clause 78. The mixture of clause 77, wherein the dairy product, plant-based milk, or product of plant-based milk comprises a milk, such as whole milk, nonfat milk, lactose-free milk, buttermilk, condensed milk, cashew milk, goat milk, rick milk, soy milk, oat milk, almond milk, coconut milk, a yogurt, cheese, frosting, pudding, chocolate, custard, ice cream, gelato, sherbet, sorbet, frozen yogurt or any combination thereof.

[0466] Clause 79. The mixture of any one of clauses 73-78, wherein the plant extract comprising a steroidal saponin is obtained from a plant from any one or more of the following families or genera: Asparagaceae, Amaryllidaceae, Dioscoreaceae, Liliaceae, Costaceae, Melanthiaceae, Plantaginaceae, Fabaceae, Asteraceae, Asparagus, Tupistra, Anemarrhena, Sansevieria, Polygonatum, Nolina, Convallaria, Ophipogon, Hosta, Ornithogalum, Ruscus, Agapanthus, Dioscorea, Fritillaria, Lilium, Costus, Paris, Digitalis, Trigonella, Smilax or Vernonia.

[0467] Clause 80. The mixture of any one of clauses 73-79, wherein the plant extract comprising a steroidal saponin is obtained from a plant from any one or more of the following species: *Smilax riparia*, *Smilax lanceaefolia*, *Smilax nipponica*, *Smilax nigrescens*, *Smilax officinalis*, *Smilax aspera subsp. Mauritanica*, *Smilax aristolochiifolia*, *Smilax ornate*, *Smilax glabra*, *Smilax china*, *Smilax menispermoides*, *Smilax lebrunii*, *Smilax stans*, *Smilax bockii*, *Smilax excelsa*, *Smilax microphylla*, *Smilax scobinicaulis*, *Smilax sieboldii*, *Smilax krausiana*, *Smilax medica*, *Asparagus acutifolius*, *Asparagus aethiopicus*, *Asparagus africanus*, *Asparagus asparagoides*, *Asparagus burchellii*, *Asparagus cochinchinensis*, *Asparagus declinatus*, *Asparagus capensis*, *Asparagus curillus*, *Asparagus densiflorus*, *Asparagus exuvialis*, *Asparagus falcatus*, *Asparagus fallax*, *Asparagus flagellaris*, *Asparagus horridus*, *Asparagus krebsianus*, *Asparagus laricinus*, *Asparagus lignosus*, *Asparagus macowanii*, *Asparagus mariae*, *Asparagus maritimus*, *Asparagus mucronatus*, *Asparagus multiflorus*, *Asparagus nesiotes*, *Asparagus officinalis*, *Asparagus ovatus*, *Asparagus pastorianus*, *Asparagus persicus*, *Asparagus racemosus*, *Asparagus retrofractus*, *Asparagus rubicundus*, *Asparagus scandens*, *Asparagus schoberioides*, *Asparagus scoparius*, *Asparagus setaceus*, *Asparagus striatus*, *Asparagus suaveolens*, *Asparagus tenuifolius*, *Asparagus umbellatus*, *Asparagus vaginellatus*, *Trigonella foenum graecum* or *Asparagus virgatus*.

[0468] Clause 81. The mixture of any one of clauses 73-80, wherein the mixture provides a taste perception in the subject of a reduction in bitterness or bitterness perception, a masking of bitter tastes or bitterness, a reduction in sourness or sourness perception, a masking of sour tastes or sourness, a reduction in initial sourness perception or lingering sourness perception, a reduction in astringency or astringency perception, a masking of astringency, or a masking of off tastes when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as

compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0469] Clause 82. The mixture of any one of clauses 73-81, wherein the mixture provides a taste perception in the subject of masked cooked tastes, masked metallic tastes, enhanced beer flavor, enhanced alcohol flavor, enhanced retro-nasal effect, increased bitterness perception, enhanced alcohol perception, enhanced spice intensity, increased sour perception, enhanced cooling intensity, faster onset of cooling sensation, increased duration of taste, or reduced stinging taste when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0470] Clause 83. The mixture of any one of clauses 57-82, wherein the mixture increases the amount of carbonation bubbles or reduces the carbonation bubble size of a beverage when the mixture is provided to the subject, such as when the mixture is incorporated in a beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0471] Clause 84. The mixture of any one of clauses 73-83, wherein the food or beverage or granule, powder, or liquid formulation is selected from water, a carbonated beverage, such as a carbonated fruit beverage, carbonated cola drink or carbonated water, alcoholic beverages, alcohol-free beverages, spices and/or seasonings, such as chili, wasabi, horseradish, mustard, ginger, black pepper, or cinnamon, energy beverages, flavored water, powders for drinks, dairy products, such as milk, yogurt, cheese, or ice cream, plant based milks, products of plant based milk, puddings, cakes, shakes, malts, brownies, pastries, cookies, cheesecakes, fudge, pies, cobblers, parfaits, mousse, biscuits, custards, frosting, fruits, vegetables, hard candy, soft candy, taffy, chocolates, sugarless candies, chewing gum, bubble gum, juices, teas, coffees, salsa, gel beads, film strips for breath, gelatin candies, pectin candies, starch candies, lozenges, cough drops, throat lozenges, throat sprays, toothpastes or mouth rinses.

[0472] Clause 85. The mixture of any one of clauses 73-84, wherein the amount of component (a) in the mixture is at least 2 ppm, such as, 3, 4, 5, 7.5, 10, 20, 30, 40, 50, 60, 70, 80, 90, 100, 110, 120, 130, 140, 150, 160, 170, 180, 190, 200, 210, 220, 230, 240, 250, 260,

270, 280, 290, or 300 ppm or an amount within a range defined by any two of the aforementioned amounts, preferably 2-40 ppm, 6-75 ppm, 6-100 ppm, or 12-200 ppm.

[0473] Clause 86. The mixture of any one of clauses 73-85 further comprising selecting or identifying a subject to receive a composition, which modulates a taste perception in a subject, such as alcohol, spice, cooling carbonation, bitterness, sourness, or astringency, or which masks off-tastes in a subject, such as bitter or sour tastes.

[0474] Clause 87. The mixture of any one of clauses 73-86 further comprising determining or analyzing the alcohol perception, bitterness perception, bitterness intensity, the masking of bitterness, the sourness perception, sourness intensity, the masking of sourness, astringency perception, astringency intensity, the masking of astringency, or the masking of off-tastes or any combination thereof of the subject after consuming said mixture or determining or analyzing the increase of carbonation bubbles, the reduction of carbonation bubble size of a carbonated beverage after providing composition component (a).

[0475] Clause 88. The mixture of clauses 73-87, wherein component (a) is dissolved in food grade ethanol.

[0476] Clause 89. The mixture of clause 88, wherein the food grade ethanol is at least 1%, such as 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 15, 20, 25, 30, 35, 40, 45, 50, 60, 70, 80, 85, 90, 95, or 100%, or with a range defined by any two of the aforementioned amounts, preferably 80, 90, or 95%.

[0477] Clause 90. A method for modulating a subject's taste perception of astringency, bitterness, acidity, or sourness or masking off-tastes, the method comprising: providing a subject a mixture that comprises at least two components (a) and (b): (a) an iridoid glycoside or analog thereof (for example, a glycosylation molecule of an aglycone, an aglycone of a glycosylated molecule, or a further glycosylated molecule of a glycosylated molecule) or an extract of a plant that comprises an iridoid glycoside or an analog thereof, such as a *Rehmannia glutinosa* root extract; and (b) a composition comprising an astringent compound, a bitter compound, a sour compound, an acidic compound, or a compound with an off-taste; wherein component (a) is admixed with component (b); wherein the mixture is preferably provided in a food, beverage, granule, powder or liquid formulation; and optionally, wherein the mixture comprises one or more preservatives or antioxidants, such as a sulphite, sorbic acid, a sorbate compound, benzoic acid, benzoate, propionic acid, propionate, ascorbic acid,

ascorbate, citric acid, a tocopherol, a retinol, a polyphenol, a phenolic acid, a flavonoid, lipoic acid, N-acetylcysteine, butylated hydroxyanisole, butylated hydroxytoluene or derivatives thereof, preferably, wherein the one or more preservatives or antioxidants improve the shelf-life, flavor profile, or reduce spoilage of the mixture; and/or optionally, selecting a composition that comprises an astringent compound, a bitter compound, a sour compound, an acidic compound, or a compound with an off-taste for receiving an agent that modulates the taste perception of a subject of astringency, bitterness, acidity, or sourness or masks off-tastes and providing said selected composition component (a); and/or optionally, evaluating the modulation of a subject's taste perception of astringency, bitterness, acidity, or sourness or evaluating the masking of off-tastes after providing the subject the mixture.

[0478] Clause 91. The method of clause 90, wherein the iridoid glycoside or extract of a plant that comprises an iridoid glycoside comprises iridoid glycosides selected from one or more of the following: Aucubin, Catalpol, Rehmannioside A, Rehmannioside B, Rehmannioside C, Rehmannioside D, Rehmannioside E, or Rehmannioside F.

[0479] Clause 92. The method of any one of clauses 90 or 91, wherein the iridoid glycoside or analog thereof or extract of a plant that comprises an iridoid glycoside or analog thereof comprises a glucosylated iridoid glycoside or an aglycones of an iridoid glycoside.

[0480] Clause 93. The method of any one of clauses 90-92, wherein the composition is an alcoholic or non-alcoholic beverage, an astringent compound, such as phenolic compounds, tannins, tannic acid, citric acid, gallic acid, zinc oxide, zinc sulfate, tannic acid, potassium permanganate, silver nitrate, tincture of benzoin, potassium alum, caftaric acid, acacia, yarrow, sage, witch hazel, vinegar, tea, fruits, vegetables, dairy products, herbs, nuts or any combination thereof, a bitter compound, such as Absinthin, Aloin, Alpha acid, Amarogentin, Andrographolide, Brucine, Caffeine, Denatonium, Eugenin, Hesperidin, Humulone, Isohumulone, Kaempferol 3-O-rutinoside, 6-Methoxymellein, Naringin, Papaverine, Phenylthiocarbamide, Propylthiouracil, Quassin, Quinidine, Quinine, Salicin, Strychnine, Sucrose octaacetate, Sucrose octapropionate, Theobromine, Theophylline, vegetables, tea, chocolate, fruits or any combination thereof, a sour compound, such as acetic acid, citric acid, hydrochloric acid, lactic acid, malic acid, nitric acid, fumaric acid, sulfuric acid, tartaric acid, phosphoric acid, other acid or any combination thereof, a compound with

an off-taste, such as plant-based milks or products of plant-based milks, dairy products, fruits, juices, proteins, plant protein, whole grain products or any combination thereof.

[0481] Clause 94. The method of clause 93, wherein the dairy product, plant-based milk, or product of plant-based milk comprises a milk, such as whole milk, nonfat milk, lactose-free milk, buttermilk, condensed milk, cashew milk, goat milk, rick milk, soy milk, oat milk, almond milk, coconut milk, a yogurt, cheese, frosting, pudding, chocolate, custard, ice cream, gelato, sherbet, sorbet, frozen yogurt or any combination thereof.

[0482] Clause 95. The method of any one of clauses 90-94, wherein the plant extract comprising an iridoid glycoside is obtained from a plant from any one or more of the following families or genera: Cornaceae, Gentianaceae, Eucommiaceae, Scrophulariaceae, Rubiaceae, Lamiaceae, Pedaliaceae, Verbenaceae, Bignoniaceae, Gentiana, Rehmannia, or Antirrhinum.

[0483] Clause 96. The method of any one of clauses 90-95, wherein the plant extract comprising an iridoid glycoside is obtained from a plant from any one or more of the following species: *Coronus officinalis*, *Eucommia ulmoides*, *Gardenia jasminoides*, *Stachys betonica*, *Harpagophytum procumbens*, *Rehmannia glutinosa*, *Rehmannia chingii*, *Rehmannia chrysantha*, *Rehmannia henryi*, *Rehmannia japonica*, *Rehmannia piasezkii*, *Rehmannia solanifolia*, *Verbena officinalis*, or *Kigelia pinnata*.

[0484] Clause 97. The method of any one of clauses 90-96, wherein the mixture provides a taste perception in the subject of a reduction in bitterness or bitterness perception, a masking of bitter tastes or bitterness, a reduction in sourness or sourness perception, a masking of sour tastes or sourness, a reduction in initial sourness perception or lingering sourness perception, a reduction in acidic taste or acidic taste perception, a reduction in lingering acidic taste perception, a reduction in astringency or astringency perception, a masking of astringency, a masking of acidic tastes, or a masking of off tastes when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0485] Clause 98. The method of any one of clauses 90-97, wherein the mixture provides a taste perception in the subject of an enhancement of creaminess, creamy flavor, or creaminess perception, an enhancement of fattiness, fatty flavor, or fattiness perception, an

enhancement in fruitiness, fruity flavor, or fruitiness perception, an enhancement of brightness, bright flavor, or bright perception or an increase of sweetness or sweetness perception when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0486] Clause 99. The method of any one of clauses 90-98, wherein the mixture modulates a subject's acidity taste perception when the mixture is provided to the subject without negatively affecting the shelf life of a food or beverage or without increasing the pH of the food or beverage when the mixture is incorporated into the food or beverage.

[0487] Clause 100. The method of any one of clauses 90-99, wherein the food or beverage or granule, powder, or liquid formulation is selected from water, a carbonated beverage, such as a carbonated fruit beverage, carbonated cola drink or carbonated water, alcoholic beverages, alcohol-free beverages, spices and/or seasonings, such as chili, wasabi, horseradish, mustard, ginger, black pepper, or cinnamon, energy beverages, flavored water, powders for drinks, dairy products, such as milk, yogurt, cheese, or ice cream, plant based milks, products of plant based milk, puddings, cakes, shakes, malts, brownies, pastries, cookies, cheesecakes, fudge, pies, cobblers, parfaits, mousse, biscuits, custards, frosting, fruits, vegetables, hard candy, soft candy, taffy, chocolates, sugarless candies, chewing gum, bubble gum, juices, teas, coffees, salsa, gel beads, film strips for breath, gelatin candies, pectin candies, starch candies, lozenges, cough drops, throat lozenges, throat sprays, toothpastes or mouth rinses.

[0488] Clause 101. The method of any one of clauses 90-100, wherein the amount of component (a) in the mixture is at least 2 ppm, such as, 3, 4, 5, 7.5, 10, 20, 30, 40, 50, 60, 70, 80, 90, 100, 110, 120, 130, 140, 150, 160, 170, 180, 190, 200, 210, 220, 230, 240, 250, 260, 270, 280, 290, or 300 ppm or an amount within a range defined by any two of the aforementioned amounts, preferably 2-40 ppm, 6-75 ppm, 6-100 ppm, or 50-300 ppm.

[0489] Clause 102. The method of any one of clauses 90-101 further comprising selecting or identifying a subject to receive a composition, which modulates a taste perception in a subject, such as bitterness, sourness, or astringency, or which masks off-tastes in a subject, such as bitter or sour tastes.

[0490] Clause 103. The method of any one of clauses 90-102 further comprising determining or analyzing the bitterness perception, bitterness intensity, the masking of bitterness, the sourness perception, sourness intensity, the masking of sourness, sweetness perception, sweetness intensity, astringency perception, astringency intensity, the masking of astringency, the masking of acidic tastes, the enhancement of creaminess, creamy flavor, or creaminess perception, an enhancement of fattiness, fatty flavor, or fattiness perception, an enhancement in fruitiness, fruity flavor, or fruitiness perception, or the masking of off-tastes or any combination thereof of the subject after consuming said mixture.

[0491] Clause 104. The method of any one of clauses 90-103, wherein component (a) is dissolved in food grade ethanol.

[0492] Clause 105. The method of clause 104, wherein the food grade ethanol is at least 1%, such as 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 15, 20, 25, 30, 35, 40, 45, 50, 60, 70, 80, 85, 90, 95, or 100%, or with a range defined by any two of the aforementioned amounts, preferably 80, 90, or 95%.

[0493] Clause 106. A method of making a mixture, which modulates a subject's taste perception of astringency, bitterness, acidity, or sourness or masking off-tastes, the method comprising: admixing a component (a) with a component (b) to form said mixture: (a) an iridoid glycoside or analog thereof (for example, a glycosylation molecule of an aglycone, an aglycone of a glycosylated molecule, or a further glycosylated molecule of a glycosylated molecule) or an extract of a plant that comprises an iridoid glycoside or an analog thereof, such as a *Rehmannia glutinosa* root extract; and (b) a composition comprising an astringent compound, a bitter compound, a sour compound, an acidic compound, or a compound with an off-taste; wherein component (a) is admixed with component (b); wherein the mixture is preferably provided in a food, beverage, granule, powder or liquid formulation; and optionally, wherein the composition comprises one or more preservatives or antioxidants, such as a sulphite, sorbic acid, a sorbate compound, benzoic acid, benzoate, propionic acid, propionate, ascorbic acid, ascorbate, citric acid, a tocopherol, a retinol, a polyphenol, a phenolic acid, a flavonoid, lipoic acid, N-acetylcysteine, butylated hydroxyanisole, butylated hydroxytoluene or derivatives thereof, preferably, wherein the one or more preservatives or antioxidants improve the shelf-life, flavor profile, or reduce spoilage of the mixture.

[0494] Clause 107. The method of clause 106, wherein the iridoid glycoside or extract of a plant that comprises an iridoid glycoside comprises iridoid glycosides selected from one or more of the following: Aucubin, Catalpol, Rehmannioside A, Rehmannioside B, Rehmannioside C, Rehmannioside D, Rehmannioside E, or Rehmannioside F.

[0495] Clause 108. The method of any one of clauses 106 or 107, wherein the iridoid glycoside or analog thereof or extract of a plant that comprises an iridoid glycoside or analog thereof comprises a glucosylated iridoid glycoside or an aglycones of an iridoid glycoside.

[0496] Clause 109. The method of any one of clauses 106-108, wherein the composition is an alcoholic or non-alcoholic beverage, an astringent compound, such as phenolic compounds, tannins, citric acid, gallic acid, zinc oxide, zinc sulfate, tannic acid, potassium permanganate, silver nitrate, tincture of benzoin, potassium alum, caftaric acid, acacia, yarrow, sage, witch hazel, vinegar, tea, fruits, vegetables, dairy products, herbs, nuts or any combination thereof, a bitter compound, such as Absinthin, Aloin, Alpha acid, Amarogentin, Andrographolide, Brucine, Caffeine, Denatonium, Eugenin, Hesperidin, Humulone, Isohumulone, Kaempferol 3-O-rutinoside, 6-Methoxymellein, Naringin, Papaverine, Phenylthiocarbamide, Propylthiouracil, Quassin, Quinidine, Quinine, Salicin, Strychnine, Sucrose octaacetate, Sucrose octapropionate, Theobromine, Theophylline, vegetables, tea, chocolate, fruits or any combination thereof, a sour compound, such as acetic acid, citric acid, hydrochloric acid, lactic acid, malic acid, nitric acid, fumaric acid, sulfuric acid, tartaric acid, phosphoric acid, other acid or any combination thereof, a compound with an off-taste, such as plant-based milks or products of plant-based milks, dairy products, fruits, juices, proteins, plant protein, whole grain products or any combination thereof.

[0497] Clause 110. The method of clause 109, wherein the dairy product, plant-based milk, or product of plant-based milk comprises a milk, such as whole milk, nonfat milk, lactose-free milk, buttermilk, condensed milk, cashew milk, goat milk, rick milk, soy milk, oat milk, almond milk, coconut milk, a yogurt, cheese, frosting, pudding, chocolate, custard, ice cream, gelato, sherbet, sorbet, frozen yogurt or any combination thereof.

[0498] Clause 111. The method of any one of clauses 106-110, wherein the plant extract comprising an iridoid glycoside is obtained from a plant from any one or more of the following families or genera: Cornaceae, Gentianaceae, Eucommiaceae, Scrophulariaceae,

Rubiaceae, Lamiaceae, Pedaliaceae, Verbenaceae, Bignoniaceae, Gentiana, Rehmannia, or Antirrhinum.

[0499] Clause 112. The method of any one of clauses 106-111, wherein the plant extract comprising an iridoid glycoside is obtained from a plant from any one or more of the following species: *Coronus officinalis*, *Eucommia ulmoides*, *Gardenia jasminoides*, *Stachys betonica*, *Harpagophytum procumbens*, *Rehmannia glutinosa*, *Rehmannia chingii*, *Rehmannia chrysantha*, *Rehmannia henryi*, *Rehmannia japonica*, *Rehmannia piasezkii*, *Rehmannia solanifolia*, *Verbena officinalis*, or *Kigelia pinnata*.

[0500] Clause 113. The method of any one of clauses 106-112, wherein the mixture provides a taste perception in the subject of a reduction in bitterness or bitterness perception, a masking of bitter tastes or bitterness, a reduction in sourness or sourness perception, a masking of sour tastes or sourness, a reduction in initial sourness perception or lingering sourness perception, a reduction in acidic taste or acidic taste perception, a reduction in lingering acidic taste perception, a reduction in astringency or astringency perception, a masking of astringency, a masking of acidic tastes, or a masking of off tastes when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0501] Clause 114. The method of any one of clauses 106-113, wherein the mixture provides a taste perception in the subject of an enhancement of creaminess, creamy flavor, or creaminess perception, an enhancement of fattiness, fatty flavor, or fattiness perception, an enhancement in fruitiness, fruity flavor, or fruitiness perception, an enhancement of brightness, bright flavor, or bright perception, or an increase of sweetness or sweetness perception when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0502] Clause 115. The method of any one of clauses 106-114, wherein the mixture modulates a subject's acidity taste perception when the mixture is provided to the subject without negatively affecting the shelf life of a food or beverage or without increasing the pH of the food or beverage when the mixture is incorporated into the food or beverage.

[0503] Clause 116. The method of any one of clauses 106-115, wherein the food or beverage or granule, powder, or liquid formulation is selected from water, a carbonated beverage, such as a carbonated fruit beverage, carbonated cola drink or carbonated water, alcoholic beverages, alcohol-free beverages, spices and/or seasonings, such as chili, wasabi, horseradish, mustard, ginger, black pepper, or cinnamon, energy beverages, flavored water, powders for drinks, dairy products, such as milk, yogurt, cheese, or ice cream, plant based milks, products of plant based milk, puddings, cakes, shakes, malts, brownies, pastries, cookies, cheesecakes, fudge, pies, cobblers, parfaits, mousse, biscuits, custards, frosting, fruits, vegetables, hard candy, soft candy, taffy, chocolates, sugarless candies, chewing gum, bubble gum, juices, teas, coffees, salsa, gel beads, film strips for breath, gelatin candies, pectin candies, starch candies, lozenges, cough drops, throat lozenges, throat sprays, toothpastes or mouth rinses.

[0504] Clause 117. The method of any one of clauses 106-116, wherein the amount of component (a) in the mixture is at least 2 ppm, such as, 3, 4, 5, 7.5, 10, 20, 30, 40, 50, 60, 70, 80, 90, 100, 110, 120, 130, 140, 150, 160, 170, 180, 190, 200, 210, 220, 230, 240, 250, 260, 270, 280, 290, or 300 ppm or an amount within a range defined by any two of the aforementioned amounts, preferably 2-40 ppm, 6-75 ppm, 6-100 ppm, or 50-300 ppm.

[0505] Clause 118. The method of any one of clauses 106-117, wherein component (a) is dissolved in food grade ethanol.

[0506] Clause 119. The method of clause 118, wherein the food grade ethanol is at least 1%, such as 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 15, 20, 25, 30, 35, 40, 45, 50, 60, 70, 80, 85, 90, 95, or 100%, or with a range defined by any two of the aforementioned amounts, preferably 80, 90, or 95%.

[0507] Clause 120. A composition obtained or obtainable by the method of any one of clauses 106-119.

[0508] Clause 121. A mixture suitable for modulating a subject's taste perception of astringency, bitterness, acidity, or sourness or masking off-tastes, wherein the mixture comprises at least two components (a) and (b): (a) an iridoid glycoside or analog thereof (for example, a glycosylation molecule of an aglycone, an aglycone of a glycosylated molecule, or a further glycosylated molecule of a glycosylated molecule) or an extract of a plant that comprises an iridoid glycoside or an analog thereof, such as a *Rehmannia glutinosa* root

extract; and (b) a composition comprising an astringent compound, a bitter compound, a sour compound, an acidic compound, or a compound with an off-taste; wherein component (a) is admixed with component (b); preferably, wherein the mixture is provided in a food, beverage, granule, powder or liquid formulation; and optionally, wherein the mixture comprises one or more preservatives or antioxidants, such as a sulphite, sorbic acid, a sorbate compound, benzoic acid, benzoate, propionic acid, propionate, ascorbic acid, ascorbate, citric acid, a tocopherol, a retinol, a polyphenol, a phenolic acid, a flavonoid, lipoic acid, N-acetylcysteine, butylated hydroxyanisole, butylated hydroxytoluene or derivatives thereof, preferably, wherein the one or more preservatives or antioxidants improve the shelf-life, flavor profile, or reduce spoilage of the mixture.

[0509] Clause 122. The mixture of clause 122, wherein the iridoid glycoside or extract of a plant that comprises an iridoid glycoside comprises iridoid glycosides selected from one or more of the following: Aucubin, Catalpol, Rehmannioside A, Rehmannioside B, Rehmannioside C, Rehmannioside D, Rehmannioside E, or Rehmannioside F.

[0510] Clause 123. The mixture for use of any one of clauses 121 or 122, wherein the iridoid glycoside or analog thereof or extract of a plant that comprises an iridoid glycoside or analog thereof comprises a glucosylated iridoid glycoside or an aglycone of an iridoid glycoside.

[0511] Clause 124. The mixture of any one of clauses 121-123, wherein the composition is an alcoholic or non-alcoholic beverage, an astringent compound, such as phenolic compounds, tannins, citric acid, gallic acid, zinc oxide, zinc sulfate, tannic acid, potassium permanganate, silver nitrate, tincture of benzoin, potassium alum, caftaric acid, acacia, yarrow, sage, witch hazel, vinegar, tea, fruits, vegetables, dairy products, herbs, nuts or any combination thereof, a bitter compound, such as Absinthin, Aloin, Alpha acid, Amarogentin, Andrographolide, Brucine, Caffeine, Denatonium, Eugenin, Hesperidin, Humulone, Isohumulone, Kaempferol 3-O-rutinoside, 6-Methoxymellein, Naringin, Papaverine, Phenylthiocarbamide, Propylthiouracil, Quassin, Quinidine, Quinine, Salicin, Strychnine, Sucrose octaacetate, Sucrose octapropionate, Theobromine, Theophylline, vegetables, tea, chocolate, fruits or any combination thereof, a sour compound, such as acetic acid, citric acid, hydrochloric acid, lactic acid, malic acid, nitric acid, fumaric acid, sulfuric acid, tartaric acid, phosphoric acid, other acid or any combination thereof, a compound with

an off-taste, such as plant-based milks or products of plant-based milks, dairy products, fruits, juices, proteins, plant protein, whole grain products or any combination thereof.

[0512] Clause 125. The mixture of clause 124, wherein the dairy product, plant-based milk, or product of plant-based milk comprises a milk, such as whole milk, nonfat milk, lactose-free milk, buttermilk, condensed milk, cashew milk, goat milk, rick milk, soy milk, oat milk, almond milk, coconut milk, a yogurt, cheese, frosting, pudding, chocolate, custard, ice cream, gelato, sherbet, sorbet, frozen yogurt or any combination thereof.

[0513] Clause 126. The mixture of any one of clauses 121-125, wherein the plant extract comprising an iridoid glycoside is obtained from a plant from any one or more of the following families or genera: Cornaceae, Gentianaceae, Eucommiaceae, Scrophulariaceae, Rubiaceae, Lamiaceae, Pedaliaceae, Verbenaceae, Bignoniaceae, Gentiana, Rehmannia, or Antirrhinum.

[0514] Clause 127. The mixture of any one of clauses 121-126, wherein the plant extract comprising an iridoid glycoside is obtained from a plant from any one or more of the following species: *Coronus officinalis*, *Eucommia ulmoides*, *Gardenia jasminoides*, *Stachys betonica*, *Harpagophytum procumbens*, *Rehmannia glutinosa*, *Rehmannia chingii*, *Rehmannia chrysantha*, *Rehmannia henryi*, *Rehmannia japonica*, *Rehmannia piasezkii*, *Rehmannia solanifolia*, *Verbena officinalis*, or *Kigelia pinnata*.

[0515] Clause 128. The mixture of any one of clauses 121-127, wherein the mixture provides a taste perception in the subject of a reduction in bitterness or bitterness perception, a masking of bitter tastes or bitterness, a reduction in sourness or sourness perception, a masking of sour tastes or sourness, a reduction in initial sourness perception or lingering sourness perception, a reduction in acidic taste or acidic taste perception, a reduction in lingering acidic taste perception, a reduction in astringency or astringency perception, a masking of astringency, a masking of acidic tastes, or a masking of off tastes when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0516] Clause 129. The mixture of any one of clauses 121-128, wherein the mixture provides a taste perception in the subject of an enhancement of creaminess, creamy flavor, or creaminess perception, an enhancement of fattiness, fatty flavor, or fattiness perception, an

enhancement in fruitiness, fruity flavor, or fruitiness perception, an enhancement of brightness, bright flavor, or bright perception, or an increase of sweetness or sweetness perception when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0517] Clause 130. The method of any one of clauses 121-129, wherein the mixture modulates a subject's acidity taste perception when the mixture is provided to the subject without negatively affecting the shelf life of a food or beverage or without increasing the pH of the food or beverage when the mixture is incorporated into the food or beverage.

[0518] Clause 131. The mixture of any one of clauses 121-130, wherein the food or beverage or granule, powder, or liquid formulation is selected from water, a carbonated beverage, such as a carbonated fruit beverage, carbonated cola drink or carbonated water, alcoholic beverages, alcohol-free beverages, spices and/or seasonings, such as chili, wasabi, horseradish, mustard, ginger, black pepper, or cinnamon, energy beverages, flavored water, powders for drinks, dairy products, such as milk, yogurt, cheese, or ice cream, plant based milks, products of plant based milk, puddings, cakes, shakes, malts, brownies, pastries, cookies, cheesecakes, fudge, pies, cobblers, parfaits, mousse, biscuits, custards, frosting, fruits, vegetables, hard candy, soft candy, taffy, chocolates, sugarless candies, chewing gum, bubble gum, juices, teas, coffees, salsa, gel beads, film strips for breath, gelatin candies, pectin candies, starch candies, lozenges, cough drops, throat lozenges, throat sprays, toothpastes or mouth rinses.

[0519] Clause 132. The mixture of any one of clauses 121-131, wherein the amount of component (a) in the mixture is at least 2 ppm, such as, 3, 4, 5, 7.5, 10, 20, 30, 40, 50, 60, 70, 80, 90, 100, 110, 120, 130, 140, 150, 160, 170, 180, 190, 200, 210, 220, 230, 240, 250, 260, 270, 280, 290, or 300 ppm or an amount within a range defined by any two of the aforementioned amounts, preferably 2-40 ppm, 6-75 ppm, 6-100 ppm, or 50-300 ppm.

[0520] Clause 133. The mixture of any one of clauses 121-132, wherein component (a) is dissolved in food grade ethanol.

[0521] Clause 134. The mixture of clause 133, wherein the food grade ethanol is at least 1%, such as 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 15, 20, 25, 30, 35, 40, 45, 50, 60, 70, 80, 85, 90,

95, or 100%, or with a range defined by any two of the aforementioned amounts, preferably 80, 90, or 95%.

[0522] Clause 135. A method for modulating a subject's taste perception of alcohol, carbonation, spice, or cooling, the method comprising: providing a subject a mixture that comprises at least two components (a) and (b): (a) an amentoflavone or analog thereof (for example, a glycosylation molecule of an aglycone, an aglycone of a glycosylated molecule, or a further glycosylated molecule of a glycosylated molecule) or an extract of a plant that comprises an amentoflavone or an analog thereof, such as a *Selaginella tamariscina* extract; and (b) a composition comprising an alcohol, carbonation, spice or a cooling compound or a non-alcoholic beverage; wherein component (a) is admixed with component (b); wherein the mixture is preferably provided in a food, beverage, granule, powder or liquid formulation; and optionally, wherein the mixture comprises one or more preservatives or antioxidants, such as a sulphite, sorbic acid, a sorbate compound, benzoic acid, benzoate, propionic acid, propionate, ascorbic acid, ascorbate, citric acid, a tocopherol, a retinol, a polyphenol, a phenolic acid, a flavonoid, lipoic acid, N-acetylcysteine, butylated hydroxyanisole, butylated hydroxytoluene or derivatives thereof, preferably, wherein the one or more preservatives or antioxidants improve the shelf-life, flavor profile, or reduce spoilage of the mixture; and/or optionally, selecting a composition that comprises an alcohol, carbonation, spice or cooling compound for receiving an agent that modulates the taste perception of a subject to an alcohol, carbonation, a spice, a cooling compound or a non-alcoholic beverage and providing said selected composition component (a); and/or optionally, evaluating the modulation of a subject's taste perception of alcohol, carbonation, spice, or cooling after providing the subject the mixture.

[0523] Clause 136. The method of clause 135, wherein the amentoflavone or analog thereof or the extract of a plant that comprises an amentoflavone or an analog thereof comprises flavonoids selected from one or more of the following: amentoflavone, 2',8"-biapigenin, delicaflavone, ginkgetin, heveaflavone, hinokiflavone, isocryptomerin, kayaflavone, ochnaflavone, podocarpusflavone A, robustaflavone, sumaflavone, or taiwaniaflavone.

[0524] Clause 137. The method of any one of clauses 135 or 136, wherein the amentoflavone or analog thereof or the extract of a plant that comprises an amentoflavone or

an analog thereof comprises a glucosylated amentoflavone or an aglycone of an amentoflavone.

[0525] Clause 138. The method of any one of clauses 135-137, wherein the composition is an alcoholic or non-alcoholic beverage, a spicey product that comprises a chili, wasabi, horseradish, mustard, ginger, black pepper, cinnamon, pumpkin spice, Szechuan pepper, or allspice, a carbonated beverage e.g., to reduce the bubble size of the beverage or impart a champagne-like effect, or a cooling compound, such as Menthol, Cyclohexanecarboxamide,N-Ethyl-5-Methyl-2-(1- Methylethyl) (WS-3), N-(Ethoxycarbonylmethyl)-3-p-menthanecarboxamide (WS-5), (1R,2S,5R)-N-(4-Methoxyphenyl)-5-methyl-2-(1- methylethyl)cyclohexanecarboxamide (WS-12), Butanamide, N,2,3-trimethyl-2-(1-methylethyl) (WS-23), or Menthyl Lactate or any combination thereof.

[0526] Clause 139. The method of any one of clauses 135-138, wherein the plant extract comprising amentoflavone is obtained from a plant from any one or more of the following families: Phyllanthaceae, Euphorbiaceae, Liliaceae, Guttiferae, Primulaceae, Oxalidaceae, Cupressaceae, Malpighiaceae, Leguminosae, Calophyllaceae, Ochnaceae, Burseraceae, Flacourtiaceae, Cephalotaxaceae, Connaraceae, Taxodiaceae, Cycadaceae, Podocarpaceae, Moraceae, Labiatae, Clusiaceae, Ginkgoaceae, Hypericaceae, Lanariaceae, Caprifoliaceae, Anacardiaceae, Berberidaceae, Velloziaceae, Ranunculaceae, Thymelaeaceae, Taxaceae, or Psilotaceae, such as *Amanoa almerindae*, *Alchornea glandulosa*, *Alchornea triplinervia*, *Aletris spicata*, *Allanblackia monticola*, *Androsace umbellate*, *Antidesma bunius*, *Antidesma laciniatum*, *Biophytum sensitivum*, *Biota semipervirens*, *Byrsonima crassa*, *Byrsonima intermedia*, *Caesalpinia pyramidalis*, *Callitris rhomboidea*, *Calocedrus microlepic* var. *formosana formosana*, *Calophyllum brasiliense*, *Calophyllum ferrugineum*, *Calophyllum flavoramulum*, *Calophyllum incrassatum*, *Calophyllum inophylloide*, *Calophyllum inophyllum*, *Calophyllum membranaceum*, *Calophyllum pinetorum*, *Calophyllum rivulare*, *Calophyllum symingtonianum*, *Calophyllum venulosum*, *Campylospermum calanthum*, *Campylospermum mannii*, *Canarium album*, *Canarium pimela*, *Canarium schweinfurthii*, *Casearia clarkei*, *Celaenodendron mexicanum*, *Cephalotaxus fortunei*, *Cephalotaxus koreana*, *Cephalotaxus oliveri*, *Chamaecyparis obtusa*, *Chrozophora tinctoria*, *Cnestis ferruginea*, *Cunninghamia lanceolata*, *Cupressocyparis leylandii*, *Cupressus chengiana*, *Cupressus*

sempervirens, *Cycas beddomei*, *Cycas circinalis*, *Cycas panzhihuaensis*, *Cycas pectinate*, *Cycas revoluta*, *Dacrydium araucarioides*, *Decussocarpus rospigliosii*, *Discocleidion rufescens*, *Dorstenia barteri*, *Drypetes gerrardii*, *Drypetes hainanensis*, *Elateriospermum tapos*, *Galeobdolon chinense*, *Garcinia bakeriana*, *Garcinia brasiliensis*, *Garcinia brevipedicellata*, *Garcinia cowa*, *Garcinia intermedia*, *Garcinia livingstonei*, *Garcinia merguensis*, *Garcinia subelliptica*, *Garcinia xanthochymus*, *Gingko biloba*, *Hypericum connatum*, *Hypericum perforatum*, *Hyeronima alchorneoides*, *Juniperus occidentalis*, *Juniperus rigida*, *Lanaria lanata*, *Lonicera chrysantha*, *Lonicera macranthoides*, *Lonicera similes*, *Luxemburgia nobilis*, *Lysimachia christinae*, *Mangifera indica*, *Manihot esculenta*, *Microbiota decussata*, *Nandina domestica*, *Nanuza plicata*, *Ochna schweinfurthiana*, *Ouratea parviflora*, *Ouratea semiserrata*, *Ouratea sulcate*, *Pistacia chinensis*, *Podocarpus imbricadus*, *Ranunculus ternatus*, *Retrophyllum rospigliosii*, *Rhus pyroides*, *Rhus succedanea*, *Sabina pingii* var. *wilsonii*, *Sabina sinoalpina*, *Sabina vulgaris*, *Speranskia Tuberculata*, *Struthiola argentea*, *Taxus baccata*, *Thuja orientalis*, *Tmesipteris tannensis*, *Torreya nucifera*, *Torreya yunnanensis*, *Viburnum chinshanense*, or *Zabelia tyaihyonii*.

[0527] Clause 140. The method of any one of clauses 135-139, wherein the plant extract comprising amentoflavone is obtained from a plant from any one or more of the following species: *Selaginella bryopteris*, *Selaginella chrysocaulos*, *Selaginella delicatula*, *Selaginella denticulate*, *Selaginella doederleinii*, *Selaginella involvens*, *Selaginella labordei*, *Selaginella moellendorffii*, *Selaginella nipponica*, *Selaginella nothohybrida*, *Selaginella pachystachys*, *Selaginella pulvinate*, *Selaginella remotifolia*, *Selaginella rupestris*, *Selaginella sanquinolenta*, *Selaginella selaginoides*, *Selaginella sinensis*, *Selaginella stauntoniana*, *Selaginella tamariscina*, *Selaginella uncinate*, or *Selaginella willdenowii*.

[0528] Clause 141. The method of any one of clauses 135-140, wherein the mixture provides an increased alcohol perception, increased alcoholic bitterness, increased cooling intensity, enhanced spiciness duration, a tingling spice sensation, or an increased spiciness sensation in the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0529] Clause 142. The method of any one of clauses 135-141, wherein the mixture provides a taste perception in the subject of an increase in alcohol perception or alcohol

intensity when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0530] Clause 143. The method of any one of clauses 135-142, wherein the mixture provides a taste perception in the subject of an increase in alcoholic bitterness when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0531] Clause 144. The method of any one of clauses 135-143, wherein the mixture provides a taste perception in the subject of an increase in retro nasal effect or tongue tingling effect when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0532] Clause 145. The method of any one of clauses 135-144, wherein the mixture provides a taste perception in the subject of an increase in spiciness or spice intensity when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0533] Clause 146. The method of any one of clauses 135-145, wherein the mixture provides a taste perception in the subject of an increased spiciness duration when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0534] Clause 147. The method of any one of clauses 135-146, wherein the mixture provides a taste perception in the subject of an increase in burning sensation or spice tingling sensation when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0535] Clause 148. The method of any one of clauses 135-147, wherein the mixture provides a taste perception in the subject of an increase in cooling perception or cooling intensity when the mixture is provided to the subject, such as when the mixture is incorporated

in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0536] Clause 149. The method of any one of clauses 135-148, wherein the mixture provides a taste perception in the subject of a faster onset of coolness when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0537] Clause 150. The method of any one of clauses 135-149, wherein the mixture provides a taste perception in the subject of an increased duration of coolness when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0538] Clause 151. The method of any one of clauses 135-150, wherein the mixture provides a taste perception in the subject of an increase in carbonation perception or reduced bubble size or champagne-like effect when the mixture is provided to the subject, such as when the mixture is incorporated in a beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0539] Clause 152. The method of any one of clauses 135-151, wherein the mixture provides a taste perception in the subject of an increase in fizzy sensation or frothy sensation when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0540] Clause 153. The method of any one of clauses 135-152, wherein the mixture provides a taste perception in the subject of a decrease in harshness when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0541] Clause 154. The method of any one of clauses 135-153, wherein the mixture reduces the carbonation bubble size of a beverage when the mixture is incorporated into a beverage, as compared to the carbonation bubble size of the beverage in the absence of component (a).

[0542] Clause 155. The method of any one of clauses 135-154, wherein the mixture increases the amount of carbonation bubbles of a beverage when the mixture is incorporated into a beverage as compared to amount of carbonation bubbles of the beverage in the absence of component (a).

[0543] Clause 156. The method of any one of clauses 135-155, wherein the food or beverage or granule, powder, or liquid formulation is selected from a carbonated beverage, such as a carbonated fruit beverage, carbonated cola drink or carbonated water, alcoholic beverages, alcohol-free beverages, spices and/or seasonings, such as chili, wasabi, horseradish, mustard, ginger, black pepper, or cinnamon, energy beverages, flavored water, powders for drinks, hard candy, soft candy, taffy, chocolates, sugarless candies, chewing gum, bubble gum, juices, teas, coffees, salsa, gel beads, film strips for breath, gelatin candies, pectin candies, starch candies, lozenges, cough drops, throat lozenges, throat sprays, toothpastes or mouth rinses.

[0544] Clause 157. The method of any one of clauses 135-156, wherein the amount of component (a) in the mixture is at least 2 ppm, such as, 3, 4, 5, 7.5, 10, 20, 30, 40, 50, 60, 70, 80, 90, 100, 110, 120, 130, 140, 150, 160, 170, 180, 190, 200, 210, 220, 230, 240, 250, 260, 270, 280, 290, or 300 ppm or an amount within a range defined by any two of the aforementioned amounts, preferably 2-40 ppm, 6-75 ppm, 6-100 ppm, or 12-200 ppm.

[0545] Clause 158. The method of any one of clauses 135-157 further comprising selecting or identifying a subject to receive a composition, which modulates taste perception in a subject, such as alcohol perception, alcohol intensity, alcoholic bitterness, alcoholic bitterness intensity, tongue tingling effect, cooling perception, cooling intensity, the time of onset of cooling, cooling duration, carbonation perception, fizzy sensation, frothy sensation, harshness, spiciness, spiciness duration, burning sensation, spice tingling sensation, or spiciness intensity, which decreases the carbonation bubble size or increases the carbonation bubble amount in a carbonated beverage, or which increases the retro nasal effect in subject.

[0546] Clause 159. The method of any one of clauses 135-158 further comprising determining or analyzing the alcohol perception, alcohol intensity, alcoholic bitterness, alcoholic bitterness intensity, tongue tingling effect, cooling perception, cooling intensity, the time of onset of cooling, cooling duration, carbonation perception, fizzy sensation, frothy sensation, harshness, spiciness, spiciness duration, burning sensation, spice tingling sensation,

spiciness intensity, the reduction of carbonation bubble size or increase of carbonation bubble amount in a carbonated beverage, or the increase of the retro nasal effect or any combination thereof of the subject after consuming said mixture.

[0547] Clause 160. The method of any one of clauses 135-159, wherein component (a) is dissolved in food grade ethanol.

[0548] Clause 161. The method of clause 160, wherein the food grade ethanol is at least 1%, such as 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 15, 20, 25, 30, 35, 40, 45, 50, 60, 70, 80, 85, 90, 95, or 100%, or with a range defined by any two of the aforementioned amounts, preferably 80, 90, or 95%.

[0549] Clause 162. A method of making a mixture, which modulates a subject's taste perception of alcohol, carbonation, spice or cooling, the method comprising: admixing a component (a) with a component (b) to form said mixture: (a) an amentoflavone or analog thereof (for example, a glycosylation molecule of an aglycone, an aglycone of a glycosylated molecule, or a further glycosylated molecule of a glycosylated molecule) or an extract of a plant that comprises an amentoflavone or an analog thereof, such as a *Selaginella tamariscina* extract; and (b) a composition comprising an alcohol, carbonation, spice or a cooling compound or a non-alcoholic beverage; wherein the composition is preferably provided in a food, beverage, granule, powder or liquid formulation; and optionally, wherein the composition comprises one or more preservatives or antioxidants, such as a sulphite, sorbic acid, a sorbate compound, benzoic acid, benzoate, propionic acid, propionate, ascorbic acid, ascorbate, citric acid, a tocopherol, a retinol, a polyphenol, a phenolic acid, a flavonoid, lipoic acid, N-acetylcysteine, butylated hydroxyanisole, butylated hydroxytoluene or derivatives thereof, preferably, wherein the one or more preservatives or antioxidants improve the shelf-life, flavor profile, or reduce spoilage of the mixture.

[0550] Clause 163. The method of clause 162, wherein the amentoflavone or analog thereof or the extract of a plant that comprises an amentoflavone or an analog thereof comprises flavonoids selected from one or more of the following: amentoflavone, 2',8''-biapigenin, delicaflavone, ginkgetin, heveaflavone, hinokiflavone, isocryptomerin, kayaflavone, ochnaflavone, podocarpusflavone A, robustaflavone, sumaflavone, or taiwaniaflavone.

[0551] Clause 164. The method of any one of clauses 162 or 163, wherein the amentoflavone or analog thereof or the extract of a plant that comprises an amentoflavone or an analog thereof comprises a glucosylated amentoflavone or an aglycone of an amentoflavone.

[0552] Clause 165. The method of any one of clauses 162-164, wherein the composition is an alcoholic or non-alcoholic beverage, a spicey product that comprises a chili, wasabi, horseradish, mustard, ginger, black pepper, cinnamon, pumpkin spice, Szechuan pepper, or allspice, a carbonated beverage e.g., to reduce the bubble size of the beverage or impart a champagne-like effect, or a cooling compound, such as Menthol, Cyclohexanecarboxamide,N-Ethyl-5-Methyl-2-(1- Methylethyl) (WS-3), N-(Ethoxycarbonylmethyl)-3-p-menthanecarboxamide (WS-5), (1R,2S,5R)-N-(4-Methoxyphenyl)-5-methyl-2-(1- methylethyl)cyclohexanecarboxamide (WS-12), Butanamide, N,2,3-trimethyl-2-(1-methylethyl) (WS-23), or Menthyl Lactate or any combination thereof.

[0505] Clause 166. The method of any one of clauses 162-165, wherein the plant extract comprising amentoflavone is obtained from a plant from any one or more of the following families: Phyllanthaceae, Euphorbiaceae, Liliaceae, Guttiferae, Primulaceae, Oxalidaceae, Cupressaceae, Malpighiaceae, Leguminosae, Calophyllaceae, Ochnaceae, Burseraceae, Flacourtiaceae, Cephalotaxaceae, Connaraceae, Taxodiaceae, Cycadaceae, Podocarpaceae, Moraceae, Labiatae, Clusiaceae, Ginkgoaceae, Hypericaceae, Lanariaceae, Caprifoliaceae, Anacardiaceae, Berberidaceae, Velloziaceae, Ranunculaceae, Thymelaeaceae, Taxaceae, or Psilotaceae, such as *Amanoa almerindae*, *Alchornea glandulosa*, *Alchornea triplinervia*, *Aletris spicata*, *Allanblackia monticola*, *Androsace umbellate*, *Antidesma bunius*, *Antidesma laciniatum*, *Biophytum sensitivum*, *Biota semipervirens*, *Byrsonima crassa*, *Byrsonima intermedia*, *Caesalpinia pyramidalis*, *Callitris rhomboidea*, *Calocedrus microlepic* var. *formosana formosana*, *Calophyllum brasiliense*, *Calophyllum ferrugineum*, *Calophyllum flavoramulum*, *Calophyllum incrassatum*, *Calophyllum inophylloide*, *Calophyllum inophyllum*, *Calophyllum membranaceum*, *Calophyllum pinetorum*, *Calophyllum rivulare*, *Calophyllum symingtonianum*, *Calophyllum venulosum*, *Campylospermum calanthum*, *Campylospermum mannii*, *Canarium album*, *Canarium pimela*, *Canarium schweinfurthii*, *Casearia clarkei*, *Celaenodendron mexicanum*, *Cephalotaxus fortunei*, *Cephalotaxus*

koreana, *Cephalotaxus oliveri*, *Chamaecyparis obtusa*, *Chrozophora tinctoria*, *Cnestis ferruginea*, *Cunninghamia lanceolata*, *Cupressocyparis leylandii*, *Cupressus chengiana*, *Cupressus sempervirens*, *Cycas beddomei*, *Cycas circinalis*, *Cycas panzhihuaensis*, *Cycas pectinate*, *Cycas revoluta*, *Dacrydium araucarioides*, *Decussocarpus rospigliosii*, *Discocleidion rufescens*, *Dorstenia barteri*, *Drypetes gerrardii*, *Drypetes hainanensis*, *Elateriospermum tapos*, *Galeobdolon chinense*, *Garcinia bakeriana*, *Garcinia brasiliensis*, *Garcinia brevipedicellata*, *Garcinia cowa*, *Garcinia intermedia*, *Garcinia livingstonei*, *Garcinia merguensis*, *Garcinia subelliptica*, *Garcinia xanthochymus*, *Gingko biloba*, *Hypericum connatum*, *Hypericum perforatum*, *Hyeronima alchorneoides*, *Juniperus occidentalis*, *Juniperus rigida*, *Lanaria lanata*, *Lonicera chrysantha*, *Lonicera macranthoides*, *Lonicera similes*, *Luxemburgia nobilis*, *Lysimachia christinae*, *Mangifera indica*, *Manihot esculenta*, *Microbiota decussata*, *Nandina domestica*, *Nanuza plicata*, *Ochna schweinfurthiana*, *Ouratea parviflora*, *Ouratea semiserrata*, *Ouratea sulcate*, *Pistacia chinensis*, *Podocarpus imbricadus*, *Ranunculus ternatus*, *Retrophyllum rospigliosii*, *Rhus pyroides*, *Rhus succedanea*, *Sabina pingii* var. *wilsonii*, *Sabina sinoalpina*, *Sabina vulgaris*, *Speranskia Tuberculata*, *Struthiola argentea*, *Taxus baccata*, *Thuja orientalis*, *Tmesipteris tannensis*, *Torreya nucifera*, *Torreya yunnanensis*, *Viburnum chinshanense*, or *Zabelia tyaihyonii*.

[0553] Clause 167. The method of any one of clauses 162-166, wherein the plant extract comprising amentoflavone is obtained from a plant from any one or more of the following species: *Selaginella bryopteris*, *Selaginella chrysocaulos*, *Selaginella delicatula*, *Selaginella denticulate*, *Selaginella doederleinii*, *Selaginella involvens*, *Selaginella labordei*, *Selaginella moellendorffii*, *Selaginella nipponica*, *Selaginella nothohybrida*, *Selaginella pachystachys*, *Selaginella pulvinate*, *Selaginella remotifolia*, *Selaginella rupestris*, *Selaginella sanquinolenta*, *Selaginella selaginoides*, *Selaginella sinensis*, *Selaginella stauntoniana*, *Selaginella tamariscina*, *Selaginella uncinate*, or *Selaginella willdenowii.*

[0554] Clause 168. The method of any one of clauses 162-167, wherein the mixture provides an increased alcohol perception, increased alcoholic bitterness, increased cooling intensity, enhanced spiciness duration, a tingling spice sensation, or an increased spiciness sensation in the subject, such as when the mixture is incorporated in a food or beverage that is

provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0555] Clause 169. The method of any one of clauses 162-168, wherein the mixture provides a taste perception in the subject of an increase in alcohol perception or alcohol intensity when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0556] Clause 170. The method of any one of clauses 162-169, wherein the mixture provides a taste perception in the subject of an increase in alcoholic bitterness when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0557] Clause 171. The method of any one of clauses 162-170, wherein the mixture provides a taste perception in the subject of an increase in retro nasal effect or tongue tingling effect when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0558] Clause 172. The method of any one of clauses 162-171, wherein the mixture provides a taste perception in the subject of an increase in spiciness or spice intensity when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0559] Clause 173. The method of any one of clauses 162-172, wherein the mixture provides a taste perception in the subject of an increased spiciness duration when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0560] Clause 174. The method of any one of clauses 162-173, wherein the mixture provides a taste perception in the subject of an increase in burning sensation or spice tingling sensation when the mixture is provided to the subject, such as when the mixture is incorporated

in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0561] Clause 175. The method of any one of clauses 162-174, wherein the mixture provides a taste perception in the subject of an increase in cooling perception or cooling intensity when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0562] Clause 176. The method of any one of clauses 162-175, wherein the mixture provides a taste perception in the subject of a faster onset of coolness when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0563] Clause 177. The method of any one of clauses 162-176, wherein the mixture provides a taste perception in the subject of an increased duration of coolness when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0564] Clause 178. The method of any one of clauses 162-177, wherein the mixture provides a taste perception in the subject of an increase in carbonation perception or reduced bubble size or champagne-like effect when the mixture is provided to the subject, such as when the mixture is incorporated in a beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0565] Clause 179. The method of any one of clauses 162-178, wherein the mixture provides a taste perception in the subject of an increase in fizzy sensation or frothy sensation when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0566] Clause 180. The method of any one of clauses 162-179, wherein the mixture provides a taste perception in the subject of a decrease in harshness when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is

provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0567] Clause 181. The method of any one of clauses 162-180, wherein the mixture reduces the carbonation bubble size of a beverage when the mixture is incorporated into a beverage, as compared to the carbonation bubble size of the beverage in the absence of component (a).

[0568] Clause 182. The method of any one of clauses 162-181, wherein the mixture increases the amount of carbonation bubbles of a beverage when the mixture is incorporated into a beverage as compared to amount of carbonation bubbles of the beverage in the absence of component (a).

[0569] Clause 183. The method of any one of clauses 162-182, wherein the food or beverage or granule, powder, or liquid formulation is selected from a carbonated beverage, such as a carbonated fruit beverage, carbonated cola drink or carbonated water, alcoholic beverages, alcohol-free beverages, spices and/or seasonings, such as chili, wasabi, horseradish, mustard, ginger, black pepper, or cinnamon, energy beverages, flavored water, powders for drinks, hard candy, soft candy, taffy, chocolates, sugarless candies, chewing gum, bubble gum, juices, teas, coffees, salsa, gel beads, film strips for breath, gelatin candies, pectin candies, starch candies, lozenges, cough drops, throat lozenges, throat sprays, toothpastes or mouth rinses.

[0570] Clause 184. The method of any one of clauses 162-183, wherein the amount of component (a) in the mixture is at least 2 ppm, such as, 3, 4, 5, 7.5, 10, 20, 30, 40, 50, 60, 70, 80, 90, 100, 110, 120, 130, 140, 150, 160, 170, 180, 190, 200, 210, 220, 230, 240, 250, 260, 270, 280, 290, or 300 ppm or an amount within a range defined by any two of the aforementioned amounts, preferably 2-40 ppm, 6-75 ppm, 6-100 ppm, or 12-200 ppm.

[0571] Clause 185. The method of any one of clause 162-184 further comprising dissolving component (a) in food grade ethanol.

[0572] Clause 186. The method of clause 185, wherein the food grade ethanol is at least 1%, such as 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 15, 20, 25, 30, 35, 40, 45, 50, 60, 70, 80, 85, 90, 95, or 100%, or with a range defined by any two of the aforementioned amounts, preferably 80, 90, or 95%.

[0573] Clause 187. A composition obtained or obtainable by the method of any one of clauses 162-186.

[0574] Clause 188. A mixture used for modulating a subject's taste perception of alcohol, carbonation, spice, or cooling, wherein the mixture comprises at least two components (a) and (b): (a) an amentoflavone or analog thereof (for example, a glycosylation molecule of an aglycone, an aglycone of a glycosylated molecule, or a further glycosylated molecule of a glycosylated molecule) or an extract of a plant that comprises an amentoflavone or an analog thereof, such as a *Selaginella tamariscina* extract; (b) a composition comprising an alcohol, carbonation, spice or a cooling compound or a non-alcoholic beverage; wherein component (a) is admixed with component (b); preferably, wherein the mixture is provided in a food, beverage, granule, powder or liquid formulation; and optionally, wherein the mixture comprises one or more preservatives or antioxidants, such as a sulphite, sorbic acid, a sorbate compound, benzoic acid, benzoate, propionic acid, propionate, ascorbic acid, ascorbate, citric acid, a tocopherol, a retinol, a polyphenol, a phenolic acid, a flavonoid, lipoic acid, N-acetylcysteine, butylated hydroxyanisole, butylated hydroxytoluene or derivatives thereof, preferably, wherein the one or more preservatives or antioxidants improve the shelf-life, flavor profile, or reduce spoilage of the mixture.

[0575] Clause 189. The mixture for use of clause 188, wherein the amentoflavone or analog thereof or the extract of a plant that comprises an amentoflavone or an analog thereof comprises flavonoids selected from one or more of the following: amentoflavone, 2',8''-biapigenin, delicaflavone, ginkgetin, heveaflavone, hinokiflavone, isocryptomerin, kayaflavone, ochnaflavone, podocarpusflavone A, robustaflavone, sumaflavone, or taiwaniaflavone.

[0576] Clause 190. The mixture for use of any one of clauses 188 or 189, wherein the amentoflavone or analog thereof or the extract of a plant that comprises an amentoflavone or an analog thereof comprises a glucosylated amentoflavone or an aglycone of an amentoflavone.

[0577] Clause 191. The mixture for use of any one of clauses 188-190, wherein the composition is an alcoholic or non-alcoholic beverage, a spicey product that comprises a chili, wasabi, horseradish, mustard, ginger, black pepper, cinnamon, pumpkin spice, Szechuan pepper, or allspice, a carbonated beverage e.g., to reduce the bubble size of the beverage or

impart a champagne-like effect, or a cooling compound, such as Menthol, Cyclohexanecarboxamide,N-Ethyl-5-Methyl-2-(1- Methylethyl) (WS-3), N-(Ethoxycarbonylmethyl)-3-p-menthanecarboxamide (WS-5), (1R,2S,5R)-N-(4-Methoxyphenyl)-5-methyl-2-(1- methylethyl)cyclohexanecarboxamide (WS-12), Butanamide, N,2,3-trimethyl-2-(1-methylethyl) (WS-23), or Menthyl Lactate or any combination thereof.

[0531] Clause 192. The mixture for use of any one of clauses 188-191, wherein the plant extract comprising amentoflavone is obtained from a plant from any one or more of the following families: Phyllanthaceae, Euphorbiaceae, Liliaceae, Guttiferae, Primulaceae, Oxalidaceae, Cupressaceae, Malpighiaceae, Leguminosae, Calophyllaceae, Ochnaceae, Burseraceae, Flacourtiaceae, Cephalotaxaceae, Connaraceae, Taxodiaceae, Cycadaceae, Podocarpaceae, Moraceae, Labiatae, Clusiaceae, Ginkgoaceae, Hypericaceae, Lanariaceae, Caprifoliaceae, Anacardiaceae, Berberidaceae, Velloziaceae, Ranunculaceae, Thymelaeaceae, Taxaceae, or Psilotaceae, such as *Amanoa almerindae*, *Alchornea glandulosa*, *Alchornea triplinervia*, *Aletris spicata*, *Allanblackia monticola*, *Androsace umbellate*, *Antidesma bunius*, *Antidesma laciniatum*, *Biophytum sensitivum*, *Biota semipervirens*, *Byrsonima crassa*, *Byrsonima intermedia*, *Caesalpinia pyramidalis*, *Callitris rhomboidea*, *Calocedrus microlepic* var. *formosana formosana*, *Calophyllum brasiliense*, *Calophyllum ferrugineum*, *Calophyllum flavoramulum*, *Calophyllum incrassatum*, *Calophyllum inophylloide*, *Calophyllum inophyllum*, *Calophyllum membranaceum*, *Calophyllum pinetorum*, *Calophyllum rivulare*, *Calophyllum symingtonianum*, *Calophyllum venulosum*, *Campylospermum calanthum*, *Campylospermum mannii*, *Canarium album*, *Canarium pimela*, *Canarium schweinfurthii*, *Casearia clarkei*, *Celaenodendron mexicanum*, *Cephalotaxus fortunei*, *Cephalotaxus koreana*, *Cephalotaxus oliveri*, *Chamaecyparis obtusa*, *Chrozophora tinctoria*, *Cnestis ferruginea*, *Cunninghamia lanceolata*, *Cupressocyparis leylandii*, *Cupressus chengiana*, *Cupressus sempervirens*, *Cycas beddomei*, *Cycas circinalis*, *Cycas panzhihuaensis*, *Cycas pectinate*, *Cycas revoluta*, *Dacrydium araucarioides*, *Decussocarpus rospigliosii*, *Discocleidion rufescens*, *Dorstenia barteri*, *Drypetes gerrardii*, *Drypetes hainanensis*, *Elateriospermum tapos*, *Galeobdolon chinense*, *Garcinia bakeriana*, *Garcinia brasiliensis*, *Garcinia brevipedicellata*, *Garcinia cowa*, *Garcinia intermedia*, *Garcinia livingstonei*, *Garcinia merguensis*, *Garcinia subelliptica*, *Garcinia xanthochymus*,

Gingko biloba, *Hypericum connatum*, *Hypericum perforatum*, *Hyeronima alchorneoides*, *Juniperus occidentalis*, *Juniperus rigida*, *Lanaria lanata*, *Lonicera chrysantha*, *Lonicera macranthoides*, *Lonicera similes*, *Luxemburgia nobilis*, *Lysimachia christinae*, *Mangifera indica*, *Manihot esculenta*, *Microbiota decussata*, *Nandina domestica*, *Nanuza plicata*, *Ochna schweinfurthiana*, *Ouratea parviflora*, *Ouratea semiserrata*, *Ouratea sulcate*, *Pistacia chinensis*, *Podocarpus imbricadus*, *Ranunculus ternatus*, *Retrophyllum rospigliosii*, *Rhus pyroides*, *Rhus succedanea*, *Sabina pingii* var. *wilsonii*, *Sabina sinoalpina*, *Sabina vulgaris*, *Speranskia Tuberculata*, *Struthiola argentea*, *Taxus baccata*, *Thuja orientalis*, *Tmesipteris tannensis*, *Torreya nucifera*, *Torreya yunnanensis*, *Viburnum chinshanense*, or *Zabelia tyaihyonii*.

[0578] Clause 193. The mixture for use of any one of clauses 188-192, wherein the plant extract comprising amentoflavone is obtained from a plant from any one or more of the following species: *Selaginella bryopteris*, *Selaginella chrysocaulos*, *Selaginella delicatula*, *Selaginella denticulate*, *Selaginella doederleinii*, *Selaginella involvens*, *Selaginella labordei*, *Selaginella moellendorffii*, *Selaginella nipponica*, *Selaginella nothohybrida*, *Selaginella pachystachys*, *Selaginella pulvinate*, *Selaginella remotifolia*, *Selaginella rupestris*, *Selaginella sanquinolenta*, *Selaginella selaginoides*, *Selaginella sinensis*, *Selaginella stauntoniana*, *Selaginella tamariscina*, *Selaginella uncinate*, or *Selaginella willdenowii*.

[0579] Clause 194. The mixture for use of any one of clauses 188-193, wherein the mixture provides an increased alcohol perception, increased alcoholic bitterness, increased cooling intensity, enhanced spiciness duration, a tingling spice sensation, or an increased spiciness sensation in the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0580] Clause 195. The mixture for use of any one of clauses 188-194, wherein the mixture provides a taste perception in the subject of an increase in alcohol perception or alcohol intensity when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0581] Clause 196. The mixture for use of any one of clauses 188-195, wherein the mixture provides a taste perception in the subject of an increase in alcoholic bitterness when

the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0582] Clause 197. The mixture for use of any one of clauses 188-196, wherein the mixture provides a taste perception in the subject of an increase in retro nasal effect or tongue tingling effect when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0583] Clause 198. The mixture for use of any one of clauses 188-197, wherein the mixture provides a taste perception in the subject of an increase in spiciness or spice intensity when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0584] Clause 199. The mixture for use of any one of clauses 188-198, wherein the mixture provides a taste perception in the subject of an increased spiciness duration when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0585] Clause 200. The mixture for use of any one of clauses 188-199, wherein the mixture provides a taste perception in the subject of an increase in burning sensation or spice tingling sensation when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0586] Clause 201. The mixture for use of any one of clauses 188-200, wherein the mixture provides a taste perception in the subject of an increase in cooling perception or cooling intensity when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0587] Clause 202. The mixture for use of any one of clauses 188-201, wherein the mixture provides a taste perception in the subject of a faster onset of coolness when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that

is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0588] Clause 203. The mixture for use of any one of clauses 188-202, wherein the mixture provides a taste perception in the subject of an increased duration of coolness when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0589] Clause 204. The mixture for use of any one of clauses 188-203, wherein the mixture provides a taste perception in the subject of an increase in carbonation perception or reduced bubble size or champagne-like effect when the mixture is provided to the subject, such as when the mixture is incorporated in a beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0590] Clause 205. The mixture for use of any one of clauses 188-204, wherein the mixture provides a taste perception in the subject of an increase in fizzy sensation or frothy sensation when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0591] Clause 206. The mixture for use of any one of clauses 188-205, wherein the mixture provides a taste perception in the subject of a decrease in harshness when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0592] Clause 207. The mixture for use of any one of clauses 188-206, wherein the mixture reduces the carbonation bubble size of a beverage when the mixture is incorporated into a beverage, as compared to the carbonation bubble size of the beverage in the absence of component (a).

[0593] Clause 208. The mixture for use of any one of clauses 188-207, wherein the mixture increases the amount of carbonation bubbles of a beverage when the mixture is incorporated into a beverage as compared to amount of carbonation bubbles of the beverage in the absence of component (a).

[0594] Clause 209. The mixture for use of any one of clauses 188-208, wherein the food or beverage or granule, powder, or liquid formulation is selected from a carbonated beverage, such as a carbonated fruit beverage, carbonated cola drink or carbonated water, alcoholic beverages, alcohol-free beverages, spices and/or seasonings, such as chili, wasabi, horseradish, mustard, ginger, black pepper, or cinnamon, energy beverages, flavored water, powders for drinks, hard candy, soft candy, taffy, chocolates, sugarless candies, chewing gum, bubble gum, juices, teas, coffees, salsa, gel beads, film strips for breath, gelatin candies, pectin candies, starch candies, lozenges, cough drops, throat lozenges, throat sprays, toothpastes or mouth rinses.

[0595] Clause 210. The mixture for use of any one of clauses 188-209, wherein the amount of component (a) in the mixture is at least 2 ppm, such as, 3, 4, 5, 7.5, 10, 20, 30, 40, 50, 60, 70, 80, 90, 100, 110, 120, 130, 140, 150, 160, 170, 180, 190, 200, 210, 220, 230, 240, 250, 260, 270, 280, 290, or 300 ppm or an amount within a range defined by any two of the aforementioned amounts, preferably 2-40 ppm, 6-75 ppm, 6-100 ppm, or 12-200 ppm.

[0596] Clause 211. The mixture for use of any one of clauses 188-210 further comprising selecting or identifying a subject to receive a composition, which modulates taste perception in a subject, such as alcohol perception, alcohol intensity, alcoholic bitterness, alcoholic bitterness intensity, tongue tingling effect, cooling perception, cooling intensity, the time of onset of cooling, cooling duration, carbonation perception, fizzy sensation, frothy sensation, harshness, spiciness,, spiciness duration, burning sensation, spice tingling sensation, or spiciness intensity, which decreases the carbonation bubble size or increases carbonation bubble amount in a carbonated beverage, or which increases the retro nasal effect in subject.

[0597] Clause 212. The mixture for use of any one of clauses 188-211 further comprising determining or analyzing the alcohol perception, alcohol intensity, alcoholic bitterness, alcoholic bitterness intensity, tongue tingling effect, cooling perception, cooling intensity, the time of onset of cooling, cooling duration, carbonation perception, fizzy sensation, frothy sensation, harshness, spiciness, spiciness duration, burning sensation, spice tingling sensation, spiciness intensity, the reduction of carbonation bubble size or increase of carbonation bubble amount in a carbonated beverage, or the increase of the retro nasal effect or any combination thereof of the subject after consuming said mixture.

[0598] Clause 213. The mixture for use of any one of clauses 188-212, wherein component (a) is dissolved in food grade ethanol.

[0599] Clause 214. The mixture for use of clause 213, wherein the food grade ethanol is at least 1%, such as 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 15, 20, 25, 30, 35, 40, 45, 50, 60, 70, 80, 85, 90, 95, or 100%, or with a range defined by any two of the aforementioned amounts, preferably 80, 90, or 95%.

[0600] Clause 215. A method for modulating a subject's taste perception of alcohol, carbonation, spice, salt, sourness, umami, tingling, numbing, or cooling, or for masking an off-taste of a compound in a subject, the method comprising: providing a subject a mixture that comprises at least two components (a) and (b): (a) a polyisoprenylated benzophenone or analog thereof (for example, a glycosylation molecule of an aglycone, an aglycone of a glycosylated molecule, or a further glycosylated molecule of a glycosylated molecule) or an extract of a plant that comprises a polyisoprenylated benzophenone or an analog thereof, such as a *Garcinia indica* extract or a *Garcinia cambogia* extract; and (b) a composition comprising an alcohol, carbonation, spice, salt, tingling compound, numbing compound, sour compound, umami compound or a cooling compound or a non-alcoholic beverage; wherein component (a) is admixed with component (b); wherein the mixture is preferably provided in a food, beverage, granule, powder or liquid formulation; and optionally, wherein the mixture comprises one or more preservatives or antioxidants, such as a sulphite, sorbic acid, a sorbate compound, benzoic acid, benzoate, propionic acid, propionate, ascorbic acid, ascorbate, citric acid, a tocopherol, a retinol, a polyphenol, a phenolic acid, a flavonoid, lipoic acid, N-acetylcysteine, butylated hydroxyanisole, butylated hydroxytoluene or derivatives thereof, preferably, wherein the one or more preservatives or antioxidants improve the shelf-life, flavor profile, or reduce spoilage of the mixture; and/or optionally, selecting a composition that comprises an alcohol, carbonation, spice, salt, tingling compound, numbing compound, sour compound, umami compound or a cooling compound or a non-alcoholic beverage for receiving an agent that modulates the taste perception of a subject to an alcohol, carbonation, a spice, a salt, tingling, numbing or cooling and providing said selected composition component (a); and/or optionally, evaluating the modulation of a subject's taste perception of alcohol, carbonation, spice, salt, sour, umami, tingling, numbing or cooling after providing the subject the mixture.

[0601] Clause 216. The method of clause 215, wherein the polyisoprenylated benzophenone or an analog thereof is selected from one or more of the following: Aristophenone A, Aristophenone B, Bronianone C, Camboginol C, Cambogin C, Chamuangone, Clusianone, 7-epi-aristophenone, 7-epi-clusianone, Eugeniaphenone, Gambogenone, Garcicowin A, Garcicowin B, Garcicowin C, Garcicowin D, Garcimangosone D, Garcimultiflorone A, Garcimultiflorone B, Garcimultiflorone C, Garcimultiflorone D, Garcimultiflorone E, Garcimultiflorone F, (+) Garcinialiptone A, (−) Garcinialiptone B, (−) Cycloxanthochymol, Garcinialiptone C, Garcinialiptone D, Garcinielliptone FA, Garcinielliptone FB, Garcinol, Garcinol 13-O-methylether, Garciosaphenone A, Guttiferone A, Guttiferone B, Guttiferone C, Guttiferone D, Guttiferone E, Guttiferone F, Guttiferone G, Guttiferone H, Guttiferone I, Guttiferone J, Guttiferone K, Guttiferone L, Guttiferone M, Guttiferone N, Guttiferone O, Guttiferone P, Guttiferone Q, Guttiferone R, Guttiferone S, Isogarcimultiflorone F, Isogarcinol, Isogarcinol 13-O-methylether, Isoxanthochymol, Kolanone, Macurin, Myrtiaphenone A, Myrtiaphenone B, Oblongifolins A, Oblongifolins B, Oblongifolins C, Oblongifolins D, Oblongifolins E, Oblongifolins F, Oblongifolins G, Paucinone A, Paucinone B, Paucinone C, Paucinone D, Pedunculol, Pseudoguttiaphenone A, Semsinones A, Semsinones B, Semsinones C, Xanthochymol, Vismiaphenone C, 13, 14 di-dehydroxyisogarcinol, 13-hydroxygarcimultiflorone B, 18-hydroxygarcimultiflorone D, Cariphenone A, Cariphenone B, Chamone I, Chamone II, Clusianone, Clusiaphenone A, Clusiaphenone B, Coccinone A, Coccinone B, Coccinone C, Coccinone D, Coccinone E, Coccinone F, Coccinone G, Coccinone H, Cudranone, Cudraphenone A, Cudraphenone B, Cudraphenone C, Cudraphenone D, 14-deoxygarcinol, 15, 16 dihydro-16-hydroperoxy plukenetione F, 7-epi-garcinol, 7-epi-isogarcinol, 7-epi nemorosone, 28, 29 epoxy plukenetione A, Garcinielliptone I, Guttiferone K, Hilarianone, 33-hydroperoxy-isoplukenetione, Hyperibone B, Hyperibone K, Hyperibone L, Insigninone, Isovismiaphenone B, Isoxanthochymol, Lanceolatone, Machuone, Methyl hydroxyl nemorosone, Microsphaerins A, Microsphaerins B, Microsphaerins C, Microsphaerins D, Methyl Grandone, Nemorosonal, Nemorosone, Nemorosone II, Ochrocarpinone A, Ochrocarpinone B, Ochrocarpinone C, Pestalone, Plukenetione A, Plukenetione B, Plukenetione C, Plukenetione D acetate, Plukenetione E acetate, Plukenetione F, Plukenetione G, Propolone A, Propolone B, Propolone C, Propolone D, Sampsonione A, Sampsonione B, Sampsonione C, Sampsonione D,

Sampsonione E, Sampsonione F, Sampsonione G, Sampsonione H, Sampsonione N, Sampsonione O, Sampsonione P, Sampsonione Q, Scrobiculatone A, Scrobiculatone B, Spiritone, Tovophenone A, Tovophenone B, Tovophenone C, Vismiaguianone A, Vismiaguianone B, Vismiaguianone C, Vismiaguianone D, Vismiaguianone E, Vismiaphenone A, Vismiaphenone B, Vismiaphenone C, Vismiaphenone D, Vismiaphenone E, Vismiaphenone F, Vismiaphenone G, Wedellianone A, Wedellianone B, Xerophenone A, Xerophenone B, 18-ethyloxy-17-hydroxy-17,18-dihydroscrobiculatone A, or 18-ethyloxy-17-hydroxy-17,18-dihydroscrobiculatone B.

[0602] Clause 217. The method of any one of clauses 215 or 216, wherein the polyisoprenylated benzophenone or analog thereof or the extract of a plant that comprises an polyisoprenylated benzophenone or an analog thereof comprises a glucosylated polyisoprenylated benzophenone or an aglycone of a polyisoprenylated benzophenone.

[0603] Clause 218. The method of any one of clauses 215-217, wherein the composition is an alcoholic or non-alcoholic beverage, a spicey product that comprises a chili, wasabi, horseradish, mustard, ginger, black pepper, cinnamon, pumpkin spice, Szechuan pepper, or allspice, a salt, a carbonated beverage e.g., to reduce the bubble size of the beverage or impart a champagne-like effect, a sour compound, such as acetic acid, citric acid, malic acid, fumaric acid, tartaric acid, phosphoric acid or other acid, an umami compound, such as monosodium glutamate, disodium inosinate, disodium guanylate, seafoods, meats, vegetables, tea, seaweed, mushrooms, eggs, dairy products, or fermented products, a tingling or numbing compound, such as jambu oleoresin or spilanthol, or a cooling compound, such as Menthol, Cyclohexanecarboxamide,N-Ethyl-5-Methyl-2-(1- Methylethyl) (WS-3), N-(Ethoxycarbonylmethyl)-3-p-menthanecarboxamide (WS-5), (1R,2S,5R)-N-(4-Methoxyphenyl)-5-methyl-2-(1- methylethyl)cyclohexanecarboxamide (WS-12), Butanamide, N,2,3-trimethyl-2-(1-methylethyl) (WS-23), or Menthyl Lactate or any combination thereof.

[0604] Clause 219. The method of any one of clauses 215-218, wherein the plant extract comprising a polyisoprenylated benzophenone or an analog thereof is obtained from a plant from any one or more of the following families or genera: Clusiasceae, Guttiferae, Clusia, Garcinia, Vismia, Allanblackia, Moronobea, Symphonia, Hypericum, Tovomita, Tovomiptosis, or Ochrocarpus.

[0605] Clause 220. The method of any one of clauses 215-219, wherein the plant extract comprising a polyisoprenylated benzophenone or an analog thereof is obtained from a plant from any one or more of the following species: *Garcinia aristata, Garcinia xanthochymus, Garcinia multiflora, Garcinia hambroniana, Garcinia cambogia, Garcinia oblongifolia , Garcinia pedunculata, Garcinia mangostana, Garcinia cowa, Garcinia assigu, Garcinia humulis , Garcinia brasiliensis, Garcinia eugeniaefolia , Garcinia subelliptica, Garcinia purpurea, Garcinia indica, Garcinia speciosa, Garcinia yunnanensis, Garcinia livingstonei, Garcinia macrophylla, Garcinia intermedia, Garcinia virgata, Garcinia ovalifolia, Cuban propolis, Garcinia cochinchinensis, Garcinia solomonensis, Garcinia multiflora, Garcinia pyrifera, Garcinia kola, Garcinia myrtifolia, Garcinia pseudoguttifera, Garcinia paucinervis,* or *Garcinia semseii.*

[0606] Clause 221. The method of any one of clauses 215-220, wherein the mixture provides an increased salt perception, increased salt impact, enhanced saltiness, increased metallic taste, increased alcohol perception, increased authentic alcohol taste, increased retro-nasal effect, increased tingling effect, increased alcoholic bitterness, increased herbal off-note taste, increased cooling intensity, increased cooling perception, enhanced spiciness duration, faster onset of spicy sensation, increase spicy intensity, improved chili flavor, increase in salt and sour flavor notes, an increased spiciness sensation in the subject, faster onset of tingling or numbing sensation, increased tingling or numbing perception, increased tingling or numbing intensity, enhanced tingling or numbing sensation, enhanced tingling or numbing impact, decreased harshness, decreased stinging sensation, enhanced umami perception, increased umami impact, enhanced umami duration, increased umami intensity, increased mouth-watering effect, increased smooth mouthfeel effect, enhanced sourness perception, increased sourness intensity, decreased astringency sensation, or a masking of off-tastes, such as jambu off-tastes, herbal off-tastes or bitter off-tastes, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0607] Clause 222. The method of any one of clauses 215-221, wherein the mixture provides a taste perception in the subject of an increase in alcohol perception or alcohol intensity when the mixture is provided to the subject, such as when the mixture is incorporated

in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0608] Clause 223. The method of any one of clauses 215-222, wherein the mixture provides a taste perception in the subject of an increase in alcoholic bitterness or an increase in authentic alcohol taste when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0609] Clause 224. The method of any one of clauses 215-223, wherein the mixture provides a taste perception in the subject of an increase in retro nasal effect or tingling effect when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0610] Clause 225. The method of any one of clauses 215-224, wherein the mixture provides a taste perception in the subject of an increase in spiciness or spice intensity when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0611] Clause 226. The method of any one of clauses 215-225, wherein the mixture provides a taste perception in the subject of an increased spiciness duration or a faster spiciness onset when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0612] Clause 227. The method of any one of clauses 215-226, wherein the mixture provides a taste perception in the subject of an increase in salt and sour flavors or improved chili flavor when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0613] Clause 228. The method of any one of clauses 215-227, wherein the mixture provides a taste perception in the subject of an increase in cooling perception or cooling intensity when the mixture is provided to the subject, such as when the mixture is incorporated

in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0614] Clause 229. The method of any one of clauses 215-228, wherein the mixture provides a taste perception in the subject of a faster onset of coolness or an increased duration of coolness when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0615] Clause 230. The method of any one of clauses 215-229, wherein the mixture provides a taste perception in the subject of an increase in carbonation perception or reduced bubble size or champagne-like effect when the mixture is provided to the subject, such as when the mixture is incorporated in a beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0616] Clause 231. The method of any one of clauses 215-230, wherein the mixture provides a taste perception in the subject of a decrease in harshness or decrease in stinging sensation when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0617] Clause 232. The method of any one of clauses 215-231, wherein the mixture reduces the carbonation bubble size of a beverage when the mixture is incorporated into a beverage, as compared to the carbonation bubble size of the beverage in the absence of component (a).

[0618] Clause 233. The method of any one of clauses 215-232, wherein the mixture increases the amount of carbonation bubbles of a beverage when the mixture is incorporated into a beverage as compared to amount of carbonation bubbles of the beverage in the absence of component (a).

[0619] Clause 234. The method of any one of clauses 215-233, wherein the mixture provides a taste perception in the subject of an increase in numbing or tingling perception or numbing or tingling intensity when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0620] Clause 235. The method of any one of clauses 215-234, wherein the mixture provides a taste perception in the subject of a faster onset of numbing or tingling or an increased duration of numbing or tingling when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0621] Clause 236. The method of any one of clauses 215-235, wherein the mixture provides a taste perception in the subject of an increase in saltiness perception or salt intensity when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0622] Clause 237. The method of any one of clauses 215-236, wherein the mixture provides a taste perception in the subject of an enhanced initial salt impact or enhanced saltiness taste when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0623] Clause 238. The method of any one of clauses 215-237, wherein the mixture provides a taste perception in the subject that masks a bitter off-taste, herbal off-taste, or jambu off-taste when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0624] Clause 239. The method of any one of clauses 215-238, wherein the mixture provides a taste perception in the subject of an enhanced umami perception or increased umami intensity when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0625] Clause 240. The method of any one of clauses 215-239, wherein the mixture provides a taste perception in the subject of an increased umami impact or increased duration of umami sensation when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0626] Clause 241. The method of any one of clauses 215-240, wherein the mixture provides a taste perception in the subject of an increased mouth-watering effect when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0627] Clause 242. The method of any one of clauses 215-241, wherein the mixture provides a perception in the subject of an increased smooth mouthfeel effect when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0628] Clause 243. The method of any one of clauses 215-242, wherein the mixture provides a taste perception in the subject of an enhanced sourness perception of increased sourness intensity when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0629] Clause 244. The method of any one of clauses 215-243, wherein the mixture provides a taste perception in the subject of a reduction of astringency when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0630] Clause 245. The method of any one of clauses 215-244, wherein the food or beverage or granule, powder, or liquid formulation is selected from a carbonated beverage, such as a carbonated fruit beverage, carbonated cola drink or carbonated water, alcoholic beverages, alcohol-free beverages, spices and/or seasonings, such as chili, wasabi, horseradish, mustard, ginger, black pepper, or cinnamon, meat, vegetables, mushrooms, cheese, seafood, dry cereal, oatmeal, granola bars, salt, energy beverages, flavored water, powders for drinks, hard candy, soft candy, taffy, chocolates, sugarless candies, chewing gum, bubble gum, juices, teas, coffees, salsa, gel beads, film strips for breath, gelatin candies, pectin candies, starch candies, lozenges, cough drops, throat lozenges, throat sprays, toothpastes or mouth rinses.

[0631] Clause 246. The method of any one of clauses 215-245, wherein the amount of component (a) in the mixture is at least 0.1 ppm, such as at least 0.2, 0.3, 0.4, 0.5, 0.75, 1,

1.5, 2.5, 3, 4, 5, 7.5, 10, 20, 30, 40, 50, 60, 70, 80, 90, 100, 110, 120, 130, 140, 150, 160, 170, 180, 190, 200, 210, 220, 230, 240, 250, 260, 270, 280, 290, or 300 ppm or an amount within a range defined by any two of the aforementioned amounts, preferably 1-5 ppm, 2.5-5 ppm, 5-300ppm, 20-300ppm, 25-300 ppm, 50-300 ppm, 100-300 ppm, 150-300 ppm, 200-300 ppm, or 1-300 ppm.

[0632] Clause 247. The method of any one of clauses 215-246 further comprising selecting or identifying a subject to receive a composition, which modulates taste perception in a subject, such as salt perception, salt impact, saltiness, metallic taste, alcohol perception, authentic alcohol taste, tingling effect, alcoholic bitterness, cooling intensity, cooling perception, spiciness duration, the time of onset of spicy sensation, spicy intensity, chili flavor, salt or sour flavor, spiciness, the time of onset of tingling or numbing sensation, tingling or numbing perception, tingling or numbing intensity, tingling or numbing sensation, tingling or numbing impact, harshness, stinging sensation, umami perception, umami impact, umami duration, umami intensity, mouth-watering effect, sourness perception, sourness intensity, astringency sensation, which masks off-tastes, such as jambu off-tastes, herbal off-tastes or bitter off-tastes, which modulates the mouthfeel effect in a subject, which decreases the carbonation bubble size or increases the carbonation bubble amount in a carbonated beverage, or which increases the retro nasal effect in a subject.

[0633] Clause 248. The method of any one of clauses 215-247 further comprising determining or analyzing the salt perception, salt impact, saltiness, metallic taste, alcohol perception, authentic alcohol taste, tingling effect, alcoholic bitterness, cooling intensity, cooling perception, spiciness duration, the time of onset of spicy sensation, spicy intensity, chili flavor, salt or sour flavor, spiciness, the time of onset of tingling or numbing sensation, tingling or numbing perception, tingling or numbing intensity, tingling or numbing sensation, tingling or numbing impact, harshness, stinging sensation, umami perception, umami impact, umami duration, umami intensity, mouth-watering effect, sourness perception, sourness intensity, astringency sensation, the masking of off-tastes, such as jambu off-tastes, herbal off-tastes or bitter off-tastes, the mouthfeel, the reduction of carbonation bubble size or increase of carbonation bubble amount in a carbonated beverage, or the increase of the retro nasal effect or any combination thereof of the subject after consuming said mixture.

[0634] Clause 249. The method of any one of clauses 215-248, wherein component (a) is dissolved in food grade ethanol.

[0635] Clause 250. The method of clause 249, wherein the food grade ethanol is at least 1%, such as 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 15, 20, 25, 30, 35, 40, 45, 50, 60, 70, 80, 85, 90, 95, or 100%, or with a range defined by any two of the aforementioned amounts, preferably 80, 90, or 95%.

[0636] Clause 251. A method of making a mixture, which modulates a subject's taste perception of alcohol, carbonation, spice, salt, sourness, umami, tingling, numbing, or cooling, or which masks an off-taste of a compound in a subject, the method comprising: admixing a component (a) with a component (b) to form said mixture: (a) a polyisoprenylated benzophenone or analog thereof (for example, a glycosylation molecule of an aglycone, an aglycone of a glycosylated molecule, or a further glycosylated molecule of a glycosylated molecule) or an extract of a plant that comprises a polyisoprenylated benzophenone or an analog thereof, such as a *Garcinia indica* extract or a *Garcinia cambogia* extract; and (b) a composition comprising an alcohol, carbonation, spice, salt, tingling compound, numbing compound, sour compound, umami compound or a cooling compound or a non-alcoholic beverage; wherein the composition is preferably provided in a food, beverage, granule, powder or liquid formulation; and optionally, wherein the composition comprises one or more preservatives or antioxidants, such as a sulphite, sorbic acid, a sorbate compound, benzoic acid, benzoate, propionic acid, propionate, ascorbic acid, ascorbate, citric acid, a tocopherol, a retinol, a polyphenol, a phenolic acid, a flavonoid, lipoic acid, N-acetylcysteine, butylated hydroxyanisole, butylated hydroxytoluene or derivatives thereof, preferably, wherein the one or more preservatives or antioxidants improve the shelf-life, flavor profile, or reduce spoilage of the mixture.

[0637] Clause 252. The method of clause 251, wherein the polyisoprenylated benzophenone or an analog thereof is selected from one or more of the following: Aristophenone A, Aristophenone B, Bronianone C, Camboginol C, Cambogin C, Chamuangone, Clusianone, 7-epi-aristophenone, 7-epi-clusianone, Eugeniaphenone, Gambogenone, Garcicowin A, Garcicowin B, Garcicowin C, Garcicowin D, Garcimangosone D, Garcimultiflorone A, Garcimultiflorone B, Garcimultiflorone C, Garcimultiflorone D, Garcimultiflorone E, Garcimultiflorone F, (+) Garcinialiptone A, (−) Garcinialiptone B, (−)

Cycloxanthochymol, Garcinialiptone C, Garcinialiptone D, Garcinielliptone FA, Garcinielliptone FB, Garcinol, Garcinol 13-O-methylether, Garciosaphenone A, Guttiferone A, Guttiferone B, Guttiferone C, Guttiferone D, Guttiferone E, Guttiferone F, Guttiferone G, Guttiferone H, Guttiferone I, Guttiferone J, Guttiferone K, Guttiferone L, Guttiferone M, Guttiferone N, Guttiferone O, Guttiferone P, Guttiferone Q, Guttiferone R, Guttiferone S, Isogarcimultiflorone F, Isogarcinol, Isogarcinol 13-O-methylether, Isoxanthochymol, Kolanone, Macurin, Myrtiaphenone A, Myrtiaphenone B, Oblongifolins A, Oblongifolins B, Oblongifolins C, Oblongifolins D, Oblongifolins E, Oblongifolins F, Oblongifolins G, Paucinone A, Paucinone B, Paucinone C, Paucinone D, Pedunculol, Pseudoguttiaphenone A, Semsinones A, Semsinones B, Semsinones C, Xanthochymol, Vismiaphenone C, 13, 14 di-dehydroxyisogarcinol, 13-hydroxygarcimultiflorone B, 18-hydroxygarcimultiflorone D, Cariphenone A, Cariphenone B, Chamone I, Chamone II, Clusianone, Clusiaphenone A, Clusiaphenone B, Coccinone A, Coccinone B, Coccinone C, Coccinone D, Coccinone E, Coccinone F, Coccinone G, Coccinone H, Cudranone, Cudraphenone A, Cudraphenone B, Cudraphenone C, Cudraphenone D, 14-deoxygarcinol, 15, 16 dihydro-16-hydroperoxy plukenetione F, 7-epi-garcinol, 7-epi-isogarcinol, 7-epi nemorosone, 28, 29 epoxy plukenetione A, Garcinielliptone I, Guttiferone K, Hilarianone, 33-hydroperoxy-isoplukenetione, Hyperibone B, Hyperibone K, Hyperibone L, Insigninone, Isovismiaphenone B, Isoxanthochymol, Lanceolatone, Machuone, Methyl hydroxyl nemorosone, Microsphaerins A, Microsphaerins B, Microsphaerins C, Microsphaerins D, Methyl Grandone, Nemorosonal, Nemorosone, Nemorosone II, Ochrocarpinone A, Ochrocarpinone B, Ochrocarpinone C, Pestalone, Plukenetione A, Plukenetione B, Plukenetione C, Plukenetione D acetate, Plukenetione E acetate, Plukenetione F, Plukenetione G, Propolone A, Propolone B, Propolone C, Propolone D, Sampsonione A, Sampsonione B, Sampsonione C, Sampsonione D, Sampsonione E, Sampsonione F, Sampsonione G, Sampsonione H, Sampsonione N, Sampsonione O, Sampsonione P, Sampsonione Q, Scrobiculatone A, Scrobiculatone B, Spiritone, Tovophenone A, Tovophenone B, Tovophenone C, Vismiaguianone A, Vismiaguianone B, Vismiaguianone C, Vismiaguianone D, Vismiaguianone E, Vismiaphenone A, Vismiaphenone B, Vismiaphenone C, Vismiaphenone D, Vismiaphenone E, Vismiaphenone F, Vismiaphenone G, Wedellianone A, Wedellianone B, Xerophenone A,

Xerophenone B, 18-ethyloxy-17-hydroxy-17,18-dihydroscrobiculatone A, or 18-ethyloxy-17-hydroxy-17,18-dihydroscrobiculatone B.

[0638] Clause 253. The method of any one of clauses 251 or 252, wherein the polyisoprenylated benzophenone or analog thereof or the extract of a plant that comprises an polyisoprenylated benzophenone or an analog thereof comprises a glucosylated polyisoprenylated benzophenone or an aglycone of a polyisoprenylated benzophenone.

[0639] Clause 254. The method of any one of clauses 251-253, wherein the composition is an alcoholic or non-alcoholic beverage, a spicey product that comprises a chili, wasabi, horseradish, mustard, ginger, black pepper, cinnamon, pumpkin spice, Szechuan pepper, or allspice, a salt, a carbonated beverage e.g., to reduce the bubble size of the beverage or impart a champagne-like effect, a sour compound, such as acetic acid, citric acid, malic acid, fumaric acid, tartaric acid, phosphoric acid or other acid, an umami compound, such as monosodium glutamate, disodium inosinate, disodium guanylate, seafoods, meats, vegetables, tea, seaweed, mushrooms, eggs, dairy products, or fermented products, a tingling or numbing compound, such as jambu oleoresin or spilanthol, or a cooling compound, such as Menthol, Cyclohexanecarboxamide,N-Ethyl-5-Methyl-2-(1- Methylethyl) (WS-3), N-(Ethoxycarbonylmethyl)-3-p-menthanecarboxamide (WS-5), (1R,2S,5R)-N-(4-Methoxyphenyl)-5-methyl-2-(1- methylethyl)cyclohexanecarboxamide (WS-12), Butanamide, N,2,3-trimethyl-2-(1-methylethyl) (WS-23), or Menthyl Lactate or any combination thereof.

[0640] Clause 255. The method of any one of clauses 251-254, wherein the plant extract comprising a polyisoprenylated benzophenone or an analog is obtained from a plant from any one or more of the following families or genera: Clusiasceae, Guttiferae, Clusia, Garcinia, Vismia, Allanblackia, Moronobea, Symphonia, Hypericum, Tovomita, Tovomiptosis, or Ochrocarpus.

[0641] Clause 256. The method of any one of clauses 251-255, wherein the plant extract comprising amentoflavone is obtained from a plant from any one or more of the following species: *Garcinia aristata, Garcinia xanthochymus, Garcinia multiflora, Garcinia hambroniana, Garcinia cambogia, Garcinia oblongifolia , Garcinia pedunculata, Garcinia mangostana, Garcinia cowa, Garcinia assigu, Garcinia humulis , Garcinia brasiliensis, Garcinia eugeniaefolia , Garcinia subelliptica, Garcinia purpurea, Garcinia indica, Garcinia*

speciosa, Garcinia yunnanensis, Garcinia livingstonei, Garcinia macrophylla, Garcinia intermedia, Garcinia virgata, Garcinia ovalifolia, Cuban propolis, Garcinia cochinchinensis, Garcinia solomonensis, Garcinia multiflora, Garcinia pyrifera, Garcinia kola, Garcinia myrtifolia, Garcinia pseudoguttifera, Garcinia paucinervis, or *Garcinia semseii.*

[0642] Clause 257. The method of any one of clauses 251-256, wherein the mixture provides an increased salt perception, increased salt impact, enhanced saltiness, increased metallic taste, increased alcohol perception, increased authentic alcohol taste, increased retro-nasal effect, increased tingling effect, increased alcoholic bitterness, increased herbal off-note taste, increased cooling intensity, increased cooling perception, enhanced spiciness duration, faster onset of spicy sensation, increase spicy intensity, improved chili flavor, increase in salt and sour flavor notes, an increased spiciness sensation in the subject, faster onset of tingling or numbing sensation, increased tingling or numbing perception, increased tingling or numbing intensity, enhanced tingling or numbing sensation, enhanced tingling or numbing impact, decreased harshness, decreased stinging sensation, enhanced umami perception, increased umami impact, enhanced umami duration, increased umami intensity, increased mouth-watering effect, increased smooth mouthfeel effect, enhanced sourness perception, increased sourness intensity, decreased astringency sensation, or a masking of off-tastes, such as jambu off-tastes, herbal off-tastes or bitter off-tastes, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0643] Clause 258. The method of any one of clauses 251-257, wherein the mixture provides a taste perception in the subject of an increase in alcohol perception or alcohol intensity when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0644] Clause 259. The method of any one of clauses 251-258, wherein the mixture provides a taste perception in the subject of an increase in alcoholic bitterness or authentic alcohol taste when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0645] Clause 260. The method of any one of clauses 251-259, wherein the mixture provides a taste perception in the subject of an increase in retro nasal effect or tingling effect when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0646] Clause 261. The method of any one of clauses 251-260, wherein the mixture provides a taste perception in the subject of an increase in spiciness or spice intensity when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0647] Clause 262. The method of any one of clauses 251-261, wherein the mixture provides a taste perception in the subject of an increased spiciness duration or faster spiciness onset when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0648] Clause 263. The method of any one of clauses 251-262, wherein the mixture provides a taste perception in the subject of an increase in salt and sour flavors or improved chili flavor when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0649] Clause 264. The method of any one of clauses 251-263, wherein the mixture provides a taste perception in the subject of an increase in cooling perception or cooling intensity when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0650] Clause 265. The method of any one of clauses 251-264, wherein the mixture provides a taste perception in the subject of a faster onset of coolness or an increased duration of coolness when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0651] Clause 266. The method of any one of clauses 251-265, wherein the mixture provides a taste perception in the subject of an increase in carbonation perception or reduced bubble size or champagne-like effect when the mixture is provided to the subject, such as when the mixture is incorporated in a beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0652] Clause 267. The method of any one of clauses 251-266, wherein the mixture provides a taste perception in the subject of a decrease in harshness or decrease in stinging sensation when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0653] Clause 268. The method of any one of clauses 251-267, wherein the mixture reduces the carbonation bubble size of a beverage when the mixture is incorporated into a beverage, as compared to the carbonation bubble size of the beverage in the absence of component (a).

[0654] Clause 269. The method of any one of clauses 251-268, wherein the mixture increases the amount of carbonation bubbles of a beverage when the mixture is incorporated into a beverage as compared to amount of carbonation bubbles of the beverage in the absence of component (a).

[0655] Clause 270. The method of any one of clauses 251-269, wherein the mixture provides a taste perception in the subject of an increase in numbing or tingling perception or numbing or tingling intensity when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0656] Clause 271. The method of any one of clauses 251-270, wherein the mixture provides a taste perception in the subject of a faster onset of numbing or tingling or an increased duration of numbing or tingling when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0657] Clause 272. The method of any one of clauses 251-271, wherein the mixture provides a taste perception in the subject of an increase in saltiness perception or salt intensity when the mixture is provided to the subject, such as when the mixture is incorporated in a food

or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0658] Clause 273. The method of any one of clauses 251-272, wherein the mixture provides a taste perception in the subject of an enhanced initial salt impact or enhanced saltiness taste when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0659] Clause 274. The method of any one of clauses 251-273, wherein the mixture provides a taste perception in the subject that masks a bitter off-taste, herbal off-taste or jambu off-taste when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0660] Clause 275. The method of any one of clauses 251-274, wherein the mixture provides a taste perception in the subject of an enhanced umami perception or increased umami intensity when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0661] Clause 276. The method of any one of clauses 251-275, wherein the mixture provides a taste perception in the subject of an increased umami impact or increased duration of umami sensation when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0662] Clause 277. The method of any one of clauses 251-276, wherein the mixture provides a taste perception in the subject of an increased mouth-watering effect when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0663] Clause 278. The method of any one of clauses 251-277, wherein the mixture provides a perception in the subject of an increased smooth mouthfeel effect when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that

is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0664] Clause 279. The method of any one of clauses 251-278, wherein the mixture provides a taste perception in the subject of an enhanced sourness perception of increased sourness intensity when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0665] Clause 280. The method of any one of clauses 251-279, wherein the mixture provides a taste perception in the subject of a reduction of astringency when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0666] Clause 281. The method of any one of clauses 251-280, wherein the food or beverage or granule, powder, or liquid formulation is selected from a carbonated beverage, such as a carbonated fruit beverage, carbonated cola drink or carbonated water, alcoholic beverages, alcohol-free beverages, spices and/or seasonings, such as chili, wasabi, horseradish, mustard, ginger, black pepper, or cinnamon, meat, vegetables, mushrooms, cheese, seafood, dry cereal, oatmeal, granola bars, salt, energy beverages, flavored water, powders for drinks, hard candy, soft candy, taffy, chocolates, sugarless candies, chewing gum, bubble gum, juices, teas, coffees, salsa, gel beads, film strips for breath, gelatin candies, pectin candies, starch candies, lozenges, cough drops, throat lozenges, throat sprays, toothpastes or mouth rinses.

[0667] Clause 282. The method of any one of clauses 251-281, wherein the amount of component (a) in the mixture is at least 2 ppm, such as, 3, 4, 5, 7.5, 10, 20, 30, 40, 50, 60, 70, 80, 90, 100, 110, 120, 130, 140, 150, 160, 170, 180, 190, 200, 210, 220, 230, 240, 250, 260, 270, 280, 290, or 300 ppm or an amount within a range defined by any two of the aforementioned amounts, preferably 1-5 ppm, 2.5-5 ppm, 5-300ppm, 20-300ppm, 25-300 ppm, 50-300 ppm, 100-300 ppm, 150-300 ppm, 200-300 ppm, or 1-300 ppm.

[0668] Clause 283. The method of any one of clause 251-282 further comprising dissolving component (a) in food grade ethanol.

[0669] Clause 284. The method of clause 283, wherein the food grade ethanol is at least 1%, such as 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 15, 20, 25, 30, 35, 40, 45, 50, 60, 70, 80, 85, 90,

95, or 100%, or with a range defined by any two of the aforementioned amounts, preferably 80, 90, or 95%.

[0670] Clause 285. A composition obtained or obtainable by the method of any one of clauses 251-284.

[0671] Clause 286. A mixture used for modulating a subject's taste perception of alcohol, carbonation, spice, salt, sourness, umami, tingling, numbing, or cooling, or for masking an off-taste of a compound in a subject, wherein the mixture comprises at least two components (a) and (b): (a) a polyisoprenylated benzophenone or analog thereof (for example, a glycosylation molecule of an aglycone, an aglycone of a glycosylated molecule, or a further glycosylated molecule of a glycosylated molecule) or an extract of a plant that comprises a polyisoprenylated benzophenone or an analog thereof, such as a *Garcinia indica* extract or a *Garcinia cambogia* extract; and (b) a composition comprising an alcohol, carbonation, spice, salt, tingling compound, numbing compound, sour compound, umami compound or a cooling compound or a non-alcoholic beverage; wherein component (a) is admixed with component (b); preferably, wherein the mixture is provided in a food, beverage, granule, powder or liquid formulation; and optionally, wherein the mixture comprises one or more preservatives or antioxidants, such as a sulphite, sorbic acid, a sorbate compound, benzoic acid, benzoate, propionic acid, propionate, ascorbic acid, ascorbate, citric acid, a tocopherol, a retinol, a polyphenol, a phenolic acid, a flavonoid, lipoic acid, N-acetylcysteine, butylated hydroxyanisole, butylated hydroxytoluene or derivatives thereof, preferably, wherein the one or more preservatives or antioxidants improve the shelf-life, flavor profile, or reduce spoilage of the mixture.

[0672] Clause 287. The mixture for use of clause 286, wherein the polyisoprenylated benzophenone or an analog thereof is selected from one or more of the following: Aristophenone A, Aristophenone B, Bronianone C, Camboginol C, Cambogin C, Chamuangone, Clusianone, 7-epi-aristophenone, 7-epi-clusianone, Eugeniaphenone, Gambogenone, Garcicowin A, Garcicowin B, Garcicowin C, Garcicowin D, Garcimangosone D, Garcimultiflorone A, Garcimultiflorone B, Garcimultiflorone C, Garcimultiflorone D, Garcimultiflorone E, Garcimultiflorone F, (+) Garcinialiptone A, (–) Garcinialiptone B, (–) Cycloxanthochymol, Garcinialiptone C, Garcinialiptone D, Garcinielliptone FA, Garcinielliptone FB, Garcinol, Garcinol 13-O-methylether, Garciosaphenone A, Guttiferone

A, Guttiferone B, Guttiferone C, Guttiferone D, Guttiferone E, Guttiferone F, Guttiferone G, Guttiferone H, Guttiferone I, Guttiferone J, Guttiferone K, Guttiferone L, Guttiferone M, Guttiferone N, Guttiferone O, Guttiferone P, Guttiferone Q, Guttiferone R, Guttiferone S, Isogarcimultiflorone F, Isogarcinol, Isogarcinol 13-O-methylether, Isoxanthochymol, Kolanone, Macurin, Myrtiaphenone A, Myrtiaphenone B, Oblongifolins A, Oblongifolins B, Oblongifolins C, Oblongifolins D, Oblongifolins E, Oblongifolins F, Oblongifolins G, Paucinone A, Paucinone B, Paucinone C, Paucinone D, Pedunculol, Pseudoguttiaphenone A, Semsinones A, Semsinones B, Semsinones C, Xanthochymol, Vismiaphenone C, 13, 14 di-dehydroxyisogarcinol, 13-hydroxygarcimultiflorone B, 18-hydroxygarcimultiflorone D, Cariphenone A, Cariphenone B, Chamone I, Chamone II, Clusianone, Clusiaphenone A, Clusiaphenone B, Coccinone A, Coccinone B, Coccinone C, Coccinone D, Coccinone E, Coccinone F, Coccinone G, Coccinone H, Cudranone, Cudraphenone A, Cudraphenone B, Cudraphenone C, Cudraphenone D, 14-deoxygarcinol, 15, 16 dihydro-16-hydroperoxy plukenetione F, 7-epi-garcinol, 7-epi-isogarcinol, 7-epi nemorosone, 28, 29 epoxy plukenetione A, Garcinielliptone I, Guttiferone K, Hilarianone, 33-hydroperoxy-isoplukenetione, Hyperibone B, Hyperibone K, Hyperibone L, Insigninone, Isovismiaphenone B, Isoxanthochymol, Lanceolatone, Machuone, Methyl hydroxyl nemorosone, Microsphaerins A, Microsphaerins B, Microsphaerins C, Microsphaerins D, Methyl Grandone, Nemorosonal, Nemorosone, Nemorosone II, Ochrocarpinone A, Ochrocarpinone B, Ochrocarpinone C, Pestalone, Plukenetione A, Plukenetione B, Plukenetione C, Plukenetione D acetate, Plukenetione E acetate, Plukenetione F, Plukenetione G, Propolone A, Propolone B, Propolone C, Propolone D, Sampsonione A, Sampsonione B, Sampsonione C, Sampsonione D, Sampsonione E, Sampsonione F, Sampsonione G, Sampsonione H, Sampsonione N, Sampsonione O, Sampsonione P, Sampsonione Q, Scrobiculatone A, Scrobiculatone B, Spiritone, Tovophenone A, Tovophenone B, Tovophenone C, Vismiaguianone A, Vismiaguianone B, Vismiaguianone C, Vismiaguianone D, Vismiaguianone E, Vismiaphenone A, Vismiaphenone B, Vismiaphenone C, Vismiaphenone D, Vismiaphenone E, Vismiaphenone F, Vismiaphenone G, Wedellianone A, Wedellianone B, Xerophenone A, Xerophenone B, 18-ethyloxy-17-hydroxy-17,18-dihydroscrobiculatone A, or 18-ethyloxy-17-hydroxy-17,18-dihydroscrobiculatone B.

[0673] Clause 288. The mixture for use of any one of clauses 286 or 287, wherein the polyisoprenylated benzophenone or analog thereof or the extract of a plant that comprises an polyisoprenylated benzophenone or an analog thereof comprises a glucosylated polyisoprenylated benzophenone or an aglycone of a polyisoprenylated benzophenone.

[0674] Clause 289. The mixture for use of any one of clauses 286-288, wherein the composition is an alcoholic or non-alcoholic beverage, a spicey product that comprises a chili, wasabi, horseradish, mustard, ginger, black pepper, cinnamon, pumpkin spice, Szechuan pepper, or allspice, a salt, a carbonated beverage e.g., to reduce the bubble size of the beverage or impart a champagne-like effect, a sour compound, such as acetic acid, citric acid, malic acid, fumaric acid, tartaric acid, phosphoric acid or other acid, an umami compound, such as monosodium glutamate, disodium inosinate, disodium guanylate, seafoods, meats, vegetables, tea, seaweed, mushrooms, eggs, dairy products, or fermented products, a tingling or numbing compound, such as jambu oleoresin or spilanthol, or a cooling compound, such as Menthol, Cyclohexanecarboxamide,N-Ethyl-5-Methyl-2-(1- Methylethyl) (WS-3), N-(Ethoxycarbonylmethyl)-3-p-menthanecarboxamide (WS-5), (1R,2S,5R)-N-(4-Methoxyphenyl)-5-methyl-2-(1- methylethyl)cyclohexanecarboxamide (WS-12), Butanamide, N,2,3-trimethyl-2-(1-methylethyl) (WS-23), or Menthyl Lactate or any combination thereof.

[0675] Clause 290. The mixture for use of any one of clauses 286-289, wherein the plant extract comprising a polyisoprenylated benzophenone or an analog is obtained from a plant from any one or more of the following families or genera: Clusiasceae, Guttiferae, Clusia, Garcinia, Vismia, Allanblackia, Moronobea, Symphonia, Hypericum, Tovomita, Tovomiptosis, or Ochrocarpus.

[0676] Clause 291. The mixture for use of any one of clauses 286-290, wherein the plant extract comprising amentoflavone is obtained from a plant from any one or more of the following species: *Garcinia aristata, Garcinia xanthochymus, Garcinia multiflora, Garcinia hambroniana, Garcinia cambogia, Garcinia oblongifolia , Garcinia pedunculata, Garcinia mangostana, Garcinia cowa, Garcinia assigu, Garcinia humulis , Garcinia brasiliensis, Garcinia eugeniaefolia , Garcinia subelliptica, Garcinia purpurea, Garcinia indica, Garcinia speciosa, Garcinia yunnanensis, Garcinia livingstonei, Garcinia macrophylla, Garcinia intermedia, Garcinia virgata, Garcinia ovalifolia, Cuban propolis, Garcinia cochinchinensis,*

Garcinia solomonensis, Garcinia multiflora, Garcinia pyrifera, Garcinia kola, Garcinia myrtifolia, Garcinia pseudoguttifera, Garcinia paucinervis, or *Garcinia semseii.*

[0677] Clause 292. The mixture for use of any one of clauses 286-291, wherein the mixture provides an increased salt perception, increased salt impact, enhanced saltiness, increased metallic taste, increased alcohol perception, increased authentic alcohol taste, increased retro-nasal effect, increased tingling effect, increased alcoholic bitterness, increased herbal off-note taste, increased cooling intensity, increased cooling perception, enhanced spiciness duration, faster onset of spicy sensation, increase spicy intensity, improved chili flavor, increase in salt and sour flavor notes, an increased spiciness sensation in the subject, faster onset of tingling or numbing sensation, increased tingling or numbing perception, increased tingling or numbing intensity, enhanced tingling or numbing sensation, enhanced tingling or numbing impact, decreased harshness, decreased stinging sensation, enhanced umami perception, increased umami impact, enhanced umami duration, increased umami intensity, increased mouth-watering effect, increased smooth mouthfeel effect, enhanced sourness perception, increased sourness intensity, decreased astringency sensation, or a masking of off-tastes, such as jambu off-tastes, herbal off-tastes or bitter off-tastes, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0678] Clause 293. The mixture for use of any one of clauses 286-292, wherein the mixture provides a taste perception in the subject of an increase in alcohol perception or alcohol intensity when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0679] Clause 294. The mixture for use of any one of clauses 286-293, wherein the mixture provides a taste perception in the subject of an increase in alcoholic bitterness or authentic alcohol taste when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0680] Clause 295. The mixture for use of any one of clauses 286-294, wherein the mixture provides a taste perception in the subject of an increase in retro nasal effect or tingling

effect when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0681] Clause 296. The mixture for use of any one of clauses 286-295, wherein the mixture provides a taste perception in the subject of an increase in spiciness or spice intensity when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0682] Clause 297. The mixture for use of any one of clauses 286-296, wherein the mixture provides a taste perception in the subject of an increased spiciness duration or faster spiciness onset when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0683] Clause 298. The mixture for use of any one of clauses 286-297, wherein the mixture provides a taste perception in the subject of an increase in salt and sour flavors or improved chili flavor when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0684] Clause 299. The mixture for use of any one of clauses 286-298, wherein the mixture provides a taste perception in the subject of an increase in cooling perception or cooling intensity when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0685] Clause 300. The mixture for use of any one of clauses 286-299, wherein the mixture provides a taste perception in the subject of a faster onset of coolness or an increased duration of coolness when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0686] Clause 301. The mixture for use of any one of clauses 286-300, wherein the mixture provides a taste perception in the subject of an increase in carbonation perception or reduced bubble size or champagne-like effect when the mixture is provided to the subject, such

as when the mixture is incorporated in a beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0687] Clause 302. The mixture for use of any one of clauses 286-301, wherein the mixture provides a taste perception in the subject of a decrease in harshness or decrease in stinging sensation when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0688] Clause 303. The mixture for use of any one of clauses 286-302, wherein the mixture reduces the carbonation bubble size of a food or beverage when the mixture is incorporated into a beverage, as compared to the carbonation bubble size of the beverage in the absence of component (a).

[0689] Clause 304. The mixture for use of any one of clauses 286-303, wherein the mixture increases the amount of carbonation bubbles of a beverage when the mixture is incorporated into a beverage as compared to amount of carbonation bubbles of the beverage in the absence of component (a).

[0690] Clause 305. The mixture for use of any one of clauses 286-304, wherein the mixture provides a taste perception in the subject of an increase in numbing or tingling perception or numbing or tingling intensity when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0691] Clause 306. The mixture for use of any one of clauses 286-305, wherein the mixture provides a taste perception in the subject of a faster onset of numbing or tingling or an increased duration of numbing or tingling when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0692] Clause 307. The mixture for use of any one of clauses 286-306, wherein the mixture provides a taste perception in the subject of an increase in saltiness perception or salt intensity when the mixture is provided to the subject, such as when the mixture is incorporated

in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0693] Clause 308. The mixture for use of any one of clauses 286-307, wherein the mixture provides a taste perception in the subject of an enhanced initial salt impact or enhanced saltiness taste when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0694] Clause 309. The mixture for use of any one of clauses 286-308, wherein the mixture provides a taste perception in the subject that masks a bitter off-taste, herbal off-taste or jambu off-taste when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0695] Clause 310. The mixture of any one of clauses 286-309, wherein the mixture provides a taste perception in the subject of an enhanced umami perception or increased umami intensity when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0696] Clause 311. The mixture of any one of clauses 286-310, wherein the mixture provides a taste perception in the subject of an increased umami impact or increased duration of umami sensation when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0697] Clause 312. The mixture of any one of clauses 286-311, wherein the mixture provides a taste perception in the subject of an increased mouth-watering effect when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0698] Clause 313. The mixture of any one of clauses 286-312, wherein the mixture provides a perception in the subject of an increased smooth mouthfeel effect when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that

is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0699] Clause 314. The mixture of any one of clauses 286-313, wherein the mixture provides a taste perception in the subject of an enhanced sourness perception of increased sourness intensity when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0700] Clause 315. The mixture of any one of clauses 286-314, wherein the mixture provides a taste perception in the subject of a reduction of astringency when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0701] Clause 316. The mixture for use of any one of clauses 286-315, wherein the food or beverage or granule, powder, or liquid formulation is selected from a carbonated beverage, such as a carbonated fruit beverage, carbonated cola drink or carbonated water, alcoholic beverages, alcohol-free beverages, spices and/or seasonings, such as chili, wasabi, horseradish, mustard, ginger, black pepper, or cinnamon, meat, vegetables, mushrooms, cheese, seafood, dry cereal, oatmeal, granola bars, salt, energy beverages, flavored water, powders for drinks, hard candy, soft candy, taffy, chocolates, sugarless candies, chewing gum, bubble gum, juices, teas, coffees, salsa, gel beads, film strips for breath, gelatin candies, pectin candies, starch candies, lozenges, cough drops, throat lozenges, throat sprays, toothpastes or mouth rinses.

[0702] Clause 317. The mixture for use of any one of clauses 286-316, wherein the amount of component (a) in the mixture is at least 2 ppm, such as, 3, 4, 5, 7.5, 10, 20, 30, 40, 50, 60, 70, 80, 90, 100, 110, 120, 130, 140, 150, 160, 170, 180, 190, 200, 210, 220, 230, 240, 250, 260, 270, 280, 290, or 300 ppm or an amount within a range defined by any two of the aforementioned amounts, preferably 1-5 ppm, 2.5-5 ppm, 5-300ppm, 20-300ppm, 25-300 ppm, 50-300 ppm, 100-300 ppm, 150-300 ppm, 200-300 ppm, or 1-300 ppm.

[0703] Clause 318. The mixture for use of any one of clauses 286-317 further comprising selecting or identifying a subject to receive a composition, which modulates taste perception in a subject, such as salt perception, salt impact, saltiness, metallic taste, alcohol

perception, authentic alcohol taste, tingling effect, alcoholic bitterness, cooling intensity, cooling perception, spiciness duration, the time of onset of spicy sensation, spicy intensity, chili flavor, salt or sour flavor, spiciness, the time of onset of tingling or numbing sensation, tingling or numbing perception, tingling or numbing intensity, tingling or numbing sensation, tingling or numbing impact, harshness, stinging sensation, umami perception, umami impact, umami duration, umami intensity, mouth-watering effect, sourness perception, sourness intensity, astringency sensation, which masks off-tastes, such as jambu off-tastes, herbal off-tastes or bitter off-tastes, which modulates the mouthfeel effect in a subject, which decreases the carbonation bubble size or increases the carbonation bubble amount in a carbonated beverage, or which increases the retro nasal effect in a subject.

[0704] Clause 319. The mixture for use of any one of clauses 286-318 further comprising determining or analyzing the salt perception, salt impact, saltiness, metallic taste, alcohol perception, authentic alcohol taste, tingling effect, alcoholic bitterness, cooling intensity, cooling perception, spiciness duration, the time of onset of spicy sensation, spicy intensity, chili flavor, salt or sour flavor, spiciness, the time of onset of tingling or numbing sensation, tingling or numbing perception, tingling or numbing intensity, tingling or numbing sensation, tingling or numbing impact, harshness, stinging sensation, umami perception, umami impact, umami duration, umami intensity, mouth-watering effect, sourness perception, sourness intensity, astringency sensation, the masking of off-tastes, such as jambu off-tastes, herbal off-tastes or bitter off-tastes, the mouthfeel, the reduction of carbonation bubble size or increase of carbonation bubble amount in a carbonated beverage, or the increase of the retro nasal effect or any combination thereof of the subject after consuming said mixture.

[0705] Clause 320. The mixture for use of any one of clauses 286-319, wherein component (a) is dissolved in food grade ethanol.

[0706] Clause 321. The mixture for use of clause 320, wherein the food grade ethanol is at least 1%, such as 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 15, 20, 25, 30, 35, 40, 45, 50, 60, 70, 80, 85, 90, 95, or 100%, or with a range defined by any two of the aforementioned amounts, preferably 80, 90, or 95%.

[0707] Clause 322. A method for modulating a subject's taste perception of fruity flavors, white flavors, brown flavors, pungency, burning, harshness, bitterness, aging, oak, honey, alcohol, syrup, tea, or saffron, the method comprising: providing a subject a mixture

that comprises at least two components (a) and (b): (a) a phenylpropanoid, a phenylethanol derivative, a glycoside or an analog thereof (for example, a glycosylation molecule of an aglycone, an aglycone of a glycosylated molecule, or a further glycosylated molecule of a glycosylated molecule) or an extract of a plant that comprises a phenylpropanoid, a phenylethanol derivative, a glycoside or an analog thereof, such as a *Rhodiola rosea* root extract; and (b) a composition comprising a fruit, vanilla, cocoa, chocolate, coffee, a pungent compound, a burning compound, a harsh compound, a bitter compound, saffron, oak extract, honey, tea, syrup, or an alcohol, wherein component (a) is admixed with component (b); wherein the mixture is preferably provided in a food, beverage, granule, powder or liquid formulation; and optionally, wherein the mixture comprises one or more preservatives or antioxidants, such as a sulphite, sorbic acid, a sorbate compound, benzoic acid, benzoate, propionic acid, propionate, ascorbic acid, ascorbate, citric acid, a tocopherol, a retinol, a polyphenol, a phenolic acid, a flavonoid, lipoic acid, N-acetylcysteine, butylated hydroxyanisole, butylated hydroxytoluene or derivatives thereof, preferably, wherein the one or more preservatives or antioxidants improve the shelf-life, flavor profile, or reduce spoilage of the mixture; and/or optionally, selecting a composition that comprises an compound with a fruit, vanilla, chocolate, coffee, a pungent compound, a burning compound, a harsh compound, a bitter compound, saffron, oak extract, honey, tea, syrup, or an alcohol for receiving an agent that modulates the taste perception of a subject of fruity flavors, white flavors, brown flavors, pungency, burning, harshness, bitterness, aging, oak tastes, or saffron tastes and providing said selected composition component (a); and/or optionally, evaluating the modulation of a subject's taste perception of fruity flavors, white flavors, brown flavors, pungency, burning, harshness, bitterness, aging, oak tastes, or saffron tastes after providing the subject the mixture.

[0708] Clause 323. The method of clause 322, wherein the phenylpropanoid, the phenylethanol derivative, the glycoside or an analog thereof or the extract of a plant that comprises a phenylpropanoid, a phenylethanol derivative, a glycoside or an analog thereof comprises molecules selected from one or more of the following: salidroside (rhodioloside), rosin, rosavin, rosarin, rosiridrin, rhodioniside, and p-tyrosol.

[0709] Clause 324. The method of any one of clauses 322 or 323, wherein the phenylpropanoid, the phenylethanol derivative, the glycoside or an analog thereof or the extract of a plant that comprises a phenylpropanoid, a phenylethanol derivative, a glycoside or

an analog thereof comprises a glucosylated phenylpropanoid, a glucosylated phenylethanol derivative, a glucosylated glycoside, an aglycone of a phenylpropanoid, an aglycone of a phenylethanol derivative, or an aglycone of a glycoside.

[0710] Clause 325. The method of any one of clauses 322-324, wherein the composition is a fruit, such as citrus fruits, tropical fruits, or berries, juices, puree, jam, jelly, sports drinks, fruit flavored beverages, wine, dairy product, plant-based milk, product of plant-based milk, coffee, such as black coffee, milk-based coffee drinks, iced coffee drinks, instant coffee, coffee beans, or any combination thereof, alcoholic or non-alcoholic beverage, such as vodka, brandy, whiskey, or any combination thereof, a pungent compound, such as capsaicin, capsicum, piperine, allyl isothiocyanate, allicin, gingerol, sinigrin, eugenol, sinalbin, safrole, menthol, isothiocyanates, thymol, curcumin, resiniferatoxin, oleocanthal or any combination thereof, a harsh compound, such as quinine, caffeine, nicotine, tannins, catechins, limonene, pinene, amygdalin, saponins, oxalic acid, formic acid, allyl isothiocyanate, dimethyl sulfide, casein peptides, bromelain, capsaicin or any combination thereof, a burning compound, such as capsaicin, dihydrocapsaicin, nordihydrocapsaicin, allyl isothiocyanate, piperine, gingerol, allicin, allyl sulfide, diallyl disulfide, resiniferatoxin, acrolein, cinnamaldehyde, menthol, eugenol, ethanol, acetic acid, oleocanthal, citric acid or any combination thereof, a bitter compound, such as absinthin, aloin, alpha acid, amarogentin, andrographolide, brucine, caffeine, denatonium, eugenin, hesperidin, humulone, isohumulone, Kaempferol 3-O-rutinoside, 6-Methoxymellein, naringin, papaverine, phenylthiocarbamide, propylthiouracil, quassin, quinidine, quinine, salicin, strychnine, sucrose octaacetate, sucrose octapropionate, theobromine, theophylline, vegetables, tea, chocolate, fruits or any combination thereof, honey, vanilla, chocolate, tea, saffron, safranal or syrup, such as maple syrup.

[0711] Clause 326. The method of clause 325, wherein the dairy product, plant-based milk, or product of plant-based milk comprises a milk, such as whole milk, nonfat milk, lactose-free milk, buttermilk, condensed milk, cashew milk, goat milk, rick milk, soy milk, oat milk, almond milk, coconut milk, chocolate milk, a yogurt, cheese, frosting, pudding, chocolate, custard, ice cream, gelato, sherbet, sorbet, frozen yogurt or any combination thereof.

[0712] Clause 327. The method of any one of clauses 322-326, wherein the plant extract that comprises a phenylpropanoid, a phenylethanol derivative, a glycoside or an analog thereof is obtained from a plant from any one or more of the following species: *Rhodiola rosea*,

Rhodiola alterna, *Rhodiola brevipetiolata*, *Rhodiola crenulate*, *Rhodiola kirilowi*, *Rhodiola quadrifida*, *Rhodiola sachalinensis*, *Rhodiola sacra.*, or *Rhodiola iremelica*..

[0713] Clause 328. The method of any one of clauses 322-327, wherein the mixture provides a taste perception in the subject of an enhancement of ripeness or ripeness perception, an enhancement of juiciness or juiciness perception, an enhancement of freshness or freshness perception, an enhancement of fruity flavors or notes, an enhancement of flavor depth, an enhancement in mouthfeel or mouthfeel perception when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0714] Clause 329. The method of any one of clauses 322-328, wherein the mixture provides a taste perception in the subject of an enhancement of cocoa flavors or notes, an enhancement of dark cocoa flavors or notes, an enhancement of vanilla bean flavors or notes, an enhancement of sweetness or sweetness perception, an enhancement of roasted coffee flavors or notes, an enhancement of dark roasted coffee flavors or notes, or an enhancement of creaminess or creaminess perception when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0715] Clause 330. The method of any one of clauses 322-329, wherein the mixture provides a taste perception in the subject of an enhancement of cinnamic notes, an enhancement of brown notes, or an enhancement of honey notes when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0716] Clause 331. The method of any one of clauses 322-330, wherein the mixture provides a taste perception in the subject of a reduction in pungency or pungency perception, a reduction in initial pungency perception, a reduction in burning sensation or burning perception, a reduction in initial burning perception, a delayed onset of burning sensation or burning perception, a reduction in burning sensation duration, a masking of alcohol perception, an enhancement of aged fruit notes, enhancement of brandy flavors or notes, a reduction in

tingling sensation or tingling perception, a reduction in initial tingling perception, a delayed onset of tingling sensation or tingling perception, a reduction in harshness or harshness perception, a reduction in bitterness or bitterness perception, a delayed onset of spice burn or spice burn perception, or a reduction in spice intensity when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0717] Clause 332. The method of any one of clauses 322-331, wherein the mixture provides a taste perception in the subject of an enhancement of aging effect, an enhancement of wood tastes or notes, an enhancement of brown flavors or notes, an enhancement of sweet flavors or notes, an enhancement of caramel flavors or notes, an enhancement of floral flavors or notes, an enhancement of woodiness, an enhancement of hay flavors or notes, an enhancement of saffron taste or an enhancement of astringency or astringency perception when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0718] Clause 333. The method of any one of clauses 322-332, wherein the food or beverage or granule, powder, or liquid formulation is selected from a sugar substitute, water, a carbonated beverage, such as a carbonated fruit beverage, carbonated cola drink or carbonated water, sport beverage, alcoholic beverages, alcohol-free beverages, spices and/or seasonings, such as chili, wasabi, horseradish, mustard, ginger, black pepper, or cinnamon, meat, vegetables, mushrooms, cheese, seafood, salt, energy beverages, flavored water, powders for drinks, dairy products, such as milk, yogurt, cheese, or ice cream, plant based milks, products of plant based milk, puddings, cakes, shakes, malts, brownies, pastries, cookies, cheesecakes, fudge, pies, cobblers, parfaits, mousse, biscuits, custards, frosting, fruits, vegetables, condiments, dry cereal, oatmeal, granola bars, hard candy, soft candy, taffy, chocolates, sugarless candies, chewing gum, bubble gum, juices, teas, coffees, salsa, gel beads, film strips for breath, gelatin candies, pectin candies, starch candies, lozenges, cough drops, throat lozenges, throat sprays, toothpastes or mouth rinses.

[0719] Clause 334. The method of any one of clauses 322-333, wherein the amount of component (a) in the mixture is at least 2 ppm, such as, 3, 4, 5, 7.5, 10, 20, 30, 40, 50, 60,

70, 80, 90, 100, 110, 120, 130, 140, 150, 160, 170, 180, 190, 200, 210, 220, 230, 240, 250, 260, 270, 280, 290, or 300 ppm or an amount within a range defined by any two of the aforementioned amounts, preferably 15-25 ppm, 12.5-40 ppm, 25-50 ppm, 25-60 ppm, 25-75 ppm, 50-90 ppm, 50-150 ppm, 100-150 ppm, 100-200 ppm, 150-200 ppm, 200-250 ppm, or 12-200 ppm.

[0720] Clause 335. The method of any one of clauses 322-334 further comprising selecting or identifying a subject to receive a composition, which modulates a taste perception in a subject, such as fruity flavors, white flavors, brown flavors, pungency, burning, harshness, bitterness, aging, oak tastes, or saffron tastes.

[0721] Clause 336. The method of any one of clauses 322-335 further comprising determining or analyzing the ripeness perception, juiciness perception, freshness perception, flavor depth perception, mouthfeel perception, creaminess perception, pungency perception, initial pungency onset, burning perception, initial burning onset, tingling perception, initial tingling onset, harshness perception, bitterness perception, aging effect perception, initial spice burn onset, spice intensity perception, alcohol perception, astringency perception, or perception of fruity, vanilla bean, cocoa, dark cocoa, roasted coffee, dark roasted coffee, cinnamic, brown, honey, aged fruit, wood, sweet, hay, saffron, caramel, or floral flavor or notes or any combination thereof of the subject after consuming said mixture.

[0722] Clause 337. The method of any one of clauses 322-336, wherein component (a) is dissolved in food grade ethanol.

[0723] Clause 338. The method of clause 337, wherein the food grade ethanol is at least 1%, such as 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 15, 20, 25, 30, 35, 40, 45, 50, 60, 70, 80, 85, 90, 95, or 100%, or with a range defined by any two of the aforementioned amounts, preferably 80, 90, or 95%.

[0724] Clause 339. A method of making a mixture which modulates a subject's taste perception of fruity flavors, white flavors, brown flavors, pungency, burning, harshness, bitterness, aging, oak, honey, alcohol, syrup, tea, or saffron, the method comprising: admixing a component (a) with a component (b) to form said mixture: (a) a phenylpropanoid, a phenylethanol derivative, a glycoside or an analog thereof (for example, a glycosylation molecule of an aglycone, an aglycone of a glycosylated molecule, or a further glycosylated molecule of a glycosylated molecule) or an extract of a plant that comprises a

phenylpropanoid, a phenylethanol derivative, a glycoside or an analog thereof, such as a *Rhodiola rosea* root extract; and (b) a composition comprising a fruit, vanilla, cocoa, chocolate, coffee, a pungent compound, a burning compound, a harsh compound, a bitter compound, saffron, oak extract, honey, tea, syrup, or an alcohol; wherein the composition is preferably provided in a food, beverage, granule, powder or liquid formulation; and optionally, wherein the composition comprises one or more preservatives or antioxidants, such as a sulphite, sorbic acid, a sorbate compound, benzoic acid, benzoate, propionic acid, propionate, ascorbic acid, ascorbate, citric acid, a tocopherol, a retinol, a polyphenol, a phenolic acid, a flavonoid, lipoic acid, N-acetylcysteine, butylated hydroxyanisole, butylated hydroxytoluene or derivatives thereof, preferably, wherein the one or more preservatives or antioxidants improve the shelf-life, flavor profile, or reduce spoilage of the mixture.

[0725] Clause 340. The method of clause 339, wherein the phenylpropanoid, the phenylethanol derivative, the glycoside or an analog thereof or the extract of a plant that comprises a phenylpropanoid, a phenylethanol derivative, a glycoside or an analog thereof comprises molecules selected from one or more of the following: salidroside (rhodioloside), rosin, rosavin, rosarin, rosiridrin, rhodioniside, or p-tyrosol.

[0726] Clause 341. The method of any one of clauses 339 or 340, wherein the phenylpropanoid, the phenylethanol derivative, the glycoside or an analog thereof or the extract of a plant that comprises a phenylpropanoid, a phenylethanol derivative, a glycoside or an analog thereof comprises a glucosylated phenylpropanoid, a glucosylated phenylethanol derivative, a glucosylated glycoside, an aglycone of a phenylpropanoid, an aglycone of a phenylethanol derivative, or an aglycone of a glycoside.

[0727] Clause 342. The method of any one of clauses 339-341, wherein the composition is a fruit, such as citrus fruits, tropical fruits, or berries, juices, puree, jam, jelly, sports drinks, fruit flavored beverages, wine, dairy product, plant-based milk, product of plant-based milk, coffee, such as black coffee, milk-based coffee drinks, iced coffee drinks, instant coffee, coffee beans, or any combination thereof, alcoholic or non-alcoholic beverage, such as vodka, brandy, whiskey, or any combination thereof, a pungent compound, such as capsaicin, capsicum, piperine, allyl isothiocyanate, allicin, gingerol, sinigrin, eugenol, sinalbin, safrole, menthol, isothiocyanates, thymol, curcumin, resiniferatoxin, oleocanthal or any combination thereof, a harsh compound, such as quinine, caffeine, nicotine, tannins, catechins, limonene,

pinene, amygdalin, saponins, oxalic acid, formic acid, allyl isothiocyanate, dimethyl sulfide, casein peptides, bromelain, capsaicin or any combination thereof, a burning compound, such as capsaicin, dihydrocapsaicin, nordihydrocapsaicin, allyl isothiocyanate, piperine, gingerol, allicin, allyl sulfide, diallyl disulfide, resiniferatoxin, acrolein, cinnamaldehyde, menthol, eugenol, ethanol, acetic acid, oleocanthal, citric acid or any combination thereof, a bitter compound, such as absinthin, aloin, alpha acid, amarogentin, andrographolide, brucine, caffeine, denatonium, eugenin, hesperidin, humulone, isohumulone, Kaempferol 3-O-rutinoside, 6-Methoxymellein, naringin, papaverine, phenylthiocarbamide, propylthiouracil, quassin, quinidine, quinine, salicin, strychnine, sucrose octaacetate, sucrose octapropionate, theobromine, theophylline, vegetables, tea, chocolate, fruits or any combination thereof, honey, vanilla, chocolate, tea, saffron, safranal or syrup, such as maple syrup.

[0728] Clause 343. The method of clause 342, wherein the dairy product, plant-based milk, or product of plant-based milk comprises a milk, such as whole milk, nonfat milk, lactose-free milk, buttermilk, condensed milk, cashew milk, goat milk, rick milk, soy milk, oat milk, almond milk, coconut milk, chocolate milk, a yogurt, cheese, frosting, pudding, chocolate, custard, ice cream, gelato, sherbet, sorbet, frozen yogurt or any combination thereof.

[0729] Clause 344. The method of any one of clauses 339-343, wherein the plant extract that comprises a phenylpropanoid, a phenylethanol derivative, a glycoside or an analog thereof is obtained from a plant from any one or more of the following species: *Rhodiola rosea*, *Rhodiola alterna*, *Rhodiola brevipetiolata*, *Rhodiola crenulate*, *Rhodiola kirilowi*, *Rhodiola quadrifida*, *Rhodiola sachalinensis*, *Rhodiola sacra.*, or *Rhodiola iremelica*..

[0730] Clause 345. The method of any one of clauses 339-344, wherein the mixture provides a taste perception in the subject of an enhancement of ripeness or ripeness perception, an enhancement of juiciness or juiciness perception, an enhancement of freshness or freshness perception, an enhancement of fruity flavors or notes, an enhancement of flavor depth, an enhancement in mouthfeel or mouthfeel perception when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0731] Clause 346. The method of any one of clauses 339-345, wherein the mixture provides a taste perception in the subject of an enhancement of cocoa flavors or notes, an

enhancement of dark cocoa flavors or notes, an enhancement of vanilla bean flavors or notes, an enhancement of sweetness or sweetness perception, an enhancement of roasted coffee flavors or notes, an enhancement of dark roasted flavors or notes, or an enhancement of creaminess or creaminess perception when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0732] Clause 347. The method of any one of clauses 339-346, wherein the mixture provides a taste perception in the subject of an enhancement of cinnamic notes, an enhancement of brown notes, or an enhancement of honey notes when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0733] Clause 348. The method of any one of clauses 339-347, wherein the mixture provides a taste perception in the subject of a reduction in pungency or pungency perception, a reduction in initial pungency perception, a reduction in burning sensation or burning perception, a reduction in initial burning perception, a delayed onset of burning sensation or burning perception, a reduction in burning sensation duration, a masking of alcohol perception, an enhancement of aged fruit notes, enhancement of brandy flavors or notes, a reduction in tingling sensation or tingling perception, a reduction in initial tingling perception, a delayed onset of tingling sensation or tingling perception, a reduction in harshness or harshness perception, a reduction in bitterness or bitterness perception, a delayed onset of spice burn or spice burn perception, or a reduction in spice intensity when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0734] Clause 349. The method of any one of clauses 339-348, wherein the mixture provides a taste perception in the subject of an enhancement of aging effect, an enhancement of wood tastes or notes, an enhancement of brown flavors or notes, an enhancement of sweet flavors or notes, an enhancement of caramel flavors or notes, an enhancement of floral flavors or notes, an enhancement of woodiness, an enhancement of hay flavors or notes, an

enhancement of saffron taste or an enhancement of astringency or astringency perception when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0735] Clause 350. The method of any one of clauses 339-349, wherein the food or beverage or granule, powder, or liquid formulation is selected from a sugar substitute, water, a carbonated beverage, such as a carbonated fruit beverage, carbonated cola drink or carbonated water, sport beverage, alcoholic beverages, alcohol-free beverages, spices and/or seasonings, such as chili, wasabi, horseradish, mustard, ginger, black pepper, or cinnamon, meat, vegetables, mushrooms, cheese, seafood, salt, energy beverages, flavored water, powders for drinks, dairy products, such as milk, yogurt, cheese, or ice cream, plant based milks, products of plant based milk, puddings, cakes, shakes, malts, brownies, pastries, cookies, cheesecakes, fudge, pies, cobblers, parfaits, mousse, biscuits, custards, frosting, fruits, vegetables, condiments, dry cereal, oatmeal, granola bars, hard candy, soft candy, taffy, chocolates, sugarless candies, chewing gum, bubble gum, juices, teas, coffees, salsa, gel beads, film strips for breath, gelatin candies, pectin candies, starch candies, lozenges, cough drops, throat lozenges, throat sprays, toothpastes or mouth rinses.

[0736] Clause 351. The method of any one of clauses 339-350, wherein the amount of component (a) in the mixture is at least 2 ppm, such as, 3, 4, 5, 7.5, 10, 20, 30, 40, 50, 60, 70, 80, 90, 100, 110, 120, 130, 140, 150, 160, 170, 180, 190, 200, 210, 220, 230, 240, 250, 260, 270, 280, 290, or 300 ppm or an amount within a range defined by any two of the aforementioned amounts, preferably 15-25 ppm, 12.5-40 ppm, 25-50 ppm, 25-60 ppm, 25-75 ppm, 50-90 ppm, 50-150 ppm, 100-150 ppm, 100-200 ppm, 150-200 ppm, 200-250 ppm, or 12-200 ppm.

[0737] Clause 352. The method of any one of clauses 339-351, wherein component (a) is dissolved in food grade ethanol.

[0738] Clause 353. The method of clause 352, wherein the food grade ethanol is at least 1%, such as 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 15, 20, 25, 30, 35, 40, 45, 50, 60, 70, 80, 85, 90, 95, or 100%, or with a range defined by any two of the aforementioned amounts, preferably 80, 90, or 95%.

[0739] Clause 354. A composition obtained or obtainable by the method of any one of clauses 339-353.

[0740] Clause 355. A mixture used for modulating a subject's taste perception of fruity flavors, white flavors, brown flavors, pungency, burning, harshness, bitterness, aging, oak, honey, alcohol, syrup, tea, or saffron in a subject, wherein the mixture comprises at least two components (a) and (b): (a) a phenylpropanoid, a phenylethanol derivative, a glycoside or an analog thereof (for example, a glycosylation molecule of an aglycone, an aglycone of a glycosylated molecule, or a further glycosylated molecule of a glycosylated molecule) or an extract of a plant that comprises a phenylpropanoid, a phenylethanol derivative or an analog thereof, such as a *Rhodiola rosea* root extract; and (b) a composition comprising a fruit, vanilla, cocoa, chocolate, coffee, a pungent compound, a burning compound, a harsh compound, a bitter compound, saffron, oak extract, honey, tea, syrup, or an alcohol; wherein component (a) is admixed with component (b); preferably, wherein the mixture is provided in a food, beverage, granule, powder or liquid formulation; and optionally, wherein the mixture comprises one or more preservatives or antioxidants, such as a sulphite, sorbic acid, a sorbate compound, benzoic acid, benzoate, propionic acid, propionate, ascorbic acid, ascorbate, citric acid, a tocopherol, a retinol, a polyphenol, a phenolic acid, a flavonoid, lipoic acid, N-acetylcysteine, butylated hydroxyanisole, butylated hydroxytoluene or derivatives thereof, preferably, wherein the one or more preservatives or antioxidants improve the shelf-life, flavor profile, or reduce spoilage of the mixture.

[0741] Clause 356. The mixture for use of clause 355, wherein the phenylpropanoid, the phenylethanol derivative, the glycoside or an analog thereof or an extract of a plant that comprises a phenylpropanoid, a phenylethanol derivative, a glycoside or an analog thereof comprises molecules selected from one or more of the following: salidroside (rhodioloside), rosin, rosavin, rosarin, rosiridrin, rhodioniside, and p-tyrosol.

[0742] Clause 357. The mixture for use of any one of clauses 355 or 356, wherein the phenylpropanoid, the phenylethanol derivative, the glycoside or an analog thereof or the extract of a plant that comprises a phenylpropanoid, a phenylethanol derivative, a glycoside or an analog thereof comprises a glucosylated phenylpropanoid, a glucosylated phenylethanol derivative, a glucosylated glycoside, an aglycone of a phenylpropanoid, an aglycone of a phenylethanol derivative, or an aglycone of a glycoside.

[0743] Clause 358. The method of any one of clauses 355-357, wherein the composition is a fruit, such as citrus fruits, tropical fruits, or berries, juices, puree, jam, jelly, sports drinks, fruit flavored beverages, wine, dairy product, plant-based milk, product of plant-based milk, coffee, such as black coffee, milk-based coffee drinks, iced coffee drinks, instant coffee, coffee beans, or any combination thereof, alcoholic or non-alcoholic beverage, such as vodka, brandy, whiskey, or any combination thereof, a pungent compound, such as capsaicin, capsicum, piperine, allyl isothiocyanate, allicin, gingerol, sinigrin, eugenol, sinalbin, safrole, menthol, isothiocyanates, thymol, curcumin, resiniferatoxin, oleocanthal or any combination thereof, a harsh compound, such as quinine, caffeine, nicotine, tannins, catechins, limonene, pinene, amygdalin, saponins, oxalic acid, formic acid, allyl isothiocyanate, dimethyl sulfide, casein peptides, bromelain, capsaicin or any combination thereof, a burning compound, such as capsaicin, dihydrocapsaicin, nordihydrocapsaicin, allyl isothiocyanate, piperine, gingerol, allicin, allyl sulfide, diallyl disulfide, resiniferatoxin, acrolein, cinnamaldehyde, menthol, eugenol, ethanol, acetic acid, oleocanthal, citric acid or any combination thereof, a bitter compound, such as absinthin, aloin, alpha acid, amarogentin, andrographolide, brucine, caffeine, denatonium, eugenin, hesperidin, humulone, isohumulone, Kaempferol 3-O-rutinoside, 6-Methoxymellein, naringin, papaverine, phenylthiocarbamide, propylthiouracil, quassin, quinidine, quinine, salicin, strychnine, sucrose octaacetate, sucrose octapropionate, theobromine, theophylline, vegetables, tea, chocolate, fruits or any combination thereof, honey, vanilla, chocolate, tea, saffron, safranal or syrup, such as maple syrup.

[0744] Clause 359. The mixture for use of clause 358, wherein the dairy product, plant-based milk, or product of plant-based milk comprises a milk, such as whole milk, nonfat milk, lactose-free milk, buttermilk, condensed milk, cashew milk, goat milk, rick milk, soy milk, oat milk, almond milk, coconut milk, chocolate milk, a yogurt, cheese, frosting, pudding, chocolate, custard, ice cream, gelato, sherbet, sorbet, frozen yogurt or any combination thereof.

[0745] Clause 360. The mixture for use of any one of clauses 355-359, wherein the plant extract that comprises a phenylpropanoid, a phenylethanol derivative, a glycoside or an analog thereof is obtained from a plant from any one or more of the following species: *Rhodiola rosea*, *Rhodiola alterna*, *Rhodiola brevipetiolata*, *Rhodiola crenulate*, *Rhodiola kirilowi*, *Rhodiola quadrifida*, *Rhodiola sachalinensis*, *Rhodiola sacra.*, or *Rhodiola iremelica..*

[0746] Clause 361. The mixture for use of any one of clauses 355-360, wherein the mixture provides a taste perception in the subject of an enhancement of ripeness or ripeness perception, an enhancement of juiciness or juiciness perception, an enhancement of freshness or freshness perception, an enhancement of fruity flavors or notes, an enhancement of flavor depth, an enhancement in mouthfeel or mouthfeel perception when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0747] Clause 362. The mixture for use of any one of clauses 355-361, wherein the mixture provides a taste perception in the subject of an enhancement of cocoa flavors or notes, an enhancement of dark cocoa flavors or notes, an enhancement of vanilla bean flavors or notes, an enhancement of sweetness or sweetness perception, an enhancement of roasted coffee flavors or notes, an enhancement of dark roasted flavors or notes, or an enhancement of creaminess or creaminess perception when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0748] Clause 363. The mixture for use of any one of clauses 355-362, wherein the mixture provides a taste perception in the subject of an enhancement of cinnamic notes, an enhancement of brown notes, or an enhancement of honey notes when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0749] Clause 364. The mixture for use of any one of clauses 355-363, wherein the mixture provides a taste perception in the subject of a reduction in pungency or pungency perception, a reduction in initial pungency perception, a reduction in burning sensation or burning perception, a reduction in initial burning perception, a delayed onset of burning sensation or burning perception, a reduction in burning sensation duration, a masking of alcohol perception, an enhancement of aged fruit notes, enhancement of brandy flavors or notes, a reduction in tingling sensation or tingling perception, a reduction in initial tingling perception, a delayed onset of tingling sensation or tingling perception, a reduction in

harshness or harshness perception, a reduction in bitterness or bitterness perception, a delayed onset of spice burn or spice burn perception, or a reduction in spice intensity when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0750] Clause 365. The mixture for use of any one of clauses 355-364, wherein the mixture provides a taste perception in the subject of an enhancement of aging effect, an enhancement of wood tastes or notes, an enhancement of brown flavors or notes, an enhancement of sweet flavors or notes, an enhancement of caramel flavors or notes, an enhancement of floral flavors or notes, an enhancement of woodiness, an enhancement of hay flavors or notes, an enhancement of saffron taste or an enhancement of astringency or astringency perception when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0751] Clause 366. The mixture for use of any one of clauses 355-365, wherein the food or beverage or granule, powder, or liquid formulation is selected from a sugar substitute, water, a carbonated beverage, such as a carbonated fruit beverage, carbonated cola drink or carbonated water, sport beverage, alcoholic beverages, alcohol-free beverages, spices and/or seasonings, such as chili, wasabi, horseradish, mustard, ginger, black pepper, or cinnamon, meat, vegetables, mushrooms, cheese, seafood, salt, energy beverages, flavored water, powders for drinks, dairy products, such as milk, yogurt, cheese, or ice cream, plant based milks, products of plant based milk, puddings, cakes, shakes, malts, brownies, pastries, cookies, cheesecakes, fudge, pies, cobblers, parfaits, mousse, biscuits, custards, frosting, fruits, vegetables, condiments, dry cereal, oatmeal, granola bars, hard candy, soft candy, taffy, chocolates, sugarless candies, chewing gum, bubble gum, juices, teas, coffees, salsa, gel beads, film strips for breath, gelatin candies, pectin candies, starch candies, lozenges, cough drops, throat lozenges, throat sprays, toothpastes or mouth rinses.

[0752] Clause 367. The mixture for use of any one of clauses 355-366 further comprising selecting or identifying a subject to receive a composition, which modulates a taste perception in a subject, such as fruity flavors, white flavors, brown flavors, pungency, burning, harshness, bitterness, aging, oak tastes, or saffron tastes.

[0753] Clause 368. The mixture for use of any one of clauses 355-367 further comprising determining or analyzing the ripeness perception, juiciness perception, freshness perception, flavor depth perception, mouthfeel perception, creaminess perception, pungency perception, initial pungency onset, burning perception, initial burning onset, tingling perception, initial tingling onset, harshness perception, bitterness perception, aging effect perception, initial spice burn onset, spice intensity perception, alcohol perception, astringency perception, or perception of fruity, vanilla bean, cocoa, dark cocoa, roasted coffee, dark roasted coffee, cinnamic, brown, honey, aged fruit, wood, sweet, hay, saffron, caramel, or floral flavor or notes or any combination thereof of the subject after consuming said mixture.

[0754] Clause 369. The mixture for use of any one of clauses 355-368, wherein the amount of component (a) in the mixture is at least 2 ppm, such as, 3, 4, 5, 7.5, 10, 20, 30, 40, 50, 60, 70, 80, 90, 100, 110, 120, 130, 140, 150, 160, 170, 180, 190, 200, 210, 220, 230, 240, 250, 260, 270, 280, 290, or 300 ppm or an amount within a range defined by any two of the aforementioned amounts, preferably 15-25 ppm, 12.5-40 ppm, 25-50 ppm, 25-60 ppm, 25-75 ppm, 50-90 ppm, 50-150 ppm, 100-150 ppm, 100-200 ppm, 150-200 ppm, 200-250 ppm, or 12-200 ppm.

[0755] Clause 370. The mixture for use of any one of clauses 355-369, wherein component (a) is dissolved in food grade ethanol.

[0756] Clause 371. The mixture for use of clause 370, wherein the food grade ethanol is at least 1%, such as 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 15, 20, 25, 30, 35, 40, 45, 50, 60, 70, 80, 85, 90, 95, or 100%, or with a range defined by any two of the aforementioned amounts, preferably 80, 90, or 95%.

[0757] Clause 372. A method for modulating a subject's taste perception of astringency, spiciness, bitterness, plant protein, cooling, alcohol or sourness or for masking of astringency, bitterness or sourness, the method comprising: providing a subject a mixture that comprises at least two components (a) and (b): (a) a steroidal saponin or an analog thereof (for example, a glycosylation molecule of an aglycone, an aglycone of a glycosylated molecule, or a further glycosylated molecule of a glycosylated molecule) or an extract of a plant that comprises a steroidal saponin or an analog thereof, such as a *Trigonella foenum graecum L.* extract; and (b) a composition comprising an alcohol, a plant protein or plant protein product, a spice, a cooling compound, a spicy compound, an astringent compound, a bitter compound

or a sour compound wherein component (a) is admixed with component (b); wherein the mixture is preferably provided in a food, beverage, granule, powder or liquid formulation; and optionally, wherein the mixture comprises one or more preservatives or antioxidants, such as a sulphite, sorbic acid, a sorbate compound, benzoic acid, benzoate, propionic acid, propionate, ascorbic acid, ascorbate, citric acid, a tocopherol, a retinol, a polyphenol, a phenolic acid, a flavonoid, lipoic acid, N-acetylcysteine, butylated hydroxyanisole, butylated hydroxytoluene or derivatives thereof, preferably, wherein the one or more preservatives or antioxidants improve the shelf-life, flavor profile, or reduce spoilage of the mixture; and/or optionally, selecting a composition that comprises an alcohol, a plant protein or plant protein product, a spice, a cooling compound, a spicy compound, an astringent compound, a bitter compound or a sour compound for receiving an agent that modulates the taste perception of a subject of astringency, spiciness, bitterness, plant protein, cooling, alcohol or sourness or that masks astringency, bitterness or sourness and providing said selected composition component (a); and/or optionally, evaluating the modulation of a subject's taste perception of astringency, spiciness, bitterness, plant protein, cooling, alcohol or sourness or masking of astringency, bitterness or sourness after providing the subject the mixture.

[0758] Clause 373. The method of clause 372, wherein the steroidal saponin or an analog thereof or the extract of a plant that comprises the steroidal saponin or an analog thereof comprises molecules selected from one or more of the following: yamogenin, diosgenin, smilagenin, sarsasapogenin, tigogenin, neotigogenin, gitogenin, yuccagenin, or saponaretin.

[0759] Clause 374. The method of any one of clauses 372 or 373, wherein the steroidal saponin or an analog thereof or the extract of a plant that comprises steroidal saponin or an analog thereof comprises a glucosylated steroidal saponin or an aglycone of a steroidal saponin.

[0760] Clause 375. The method of any one of clauses 372-374, wherein the composition is a fruit, such as citrus fruits, tropical fruits, or berries, juices, puree, jam, jelly, sports drinks, fruit flavored beverages, wine, dairy product, plant-based milk, product of plant-based milk, coffee, such as black coffee, milk-based coffee drinks, iced coffee drinks, instant coffee, coffee beans, or any combination thereof, alcoholic or non-alcoholic beverage, such as vodka, brandy, whiskey, or any combination thereof, a spice or spicy compound, such as a chili, wasabi, horseradish, mustard, ginger, black pepper, cinnamon, pumpkin spice, Szechuan

pepper, or allspice, a salt, a sour compound, such as acetic acid, citric acid, hydrochloric acid, lactic acid, malic acid, nitric acid, fumaric acid, sulfuric acid, tartaric acid, phosphoric acid, other acid or any combination thereof, a bitter compound, such as absinthin, aloin, alpha acid, amarogentin, andrographolide, brucine, caffeine, denatonium, eugenin, hesperidin, humulone, isohumulone, Kaempferol 3-O-rutinoside, 6-Methoxymellein, naringin, papaverine, phenylthiocarbamide, propylthiouracil, quassin, quinidine, quinine, salicin, strychnine, sucrose octaacetate, sucrose octapropionate, theobromine, theophylline, vegetables, tea, chocolate, fruits or any combination thereof, an astringent compound, such as phenolic compounds, tannins, gallic acid, zinc oxide, zinc sulfate, tannic acid, potassium permanganate, silver nitrate, tincture of benzoin, potassium alum, caftaric acid, acacia, yarrow, sage, witch hazel, vinegar, tea, fruits, vegetables, dairy products, herbs, nuts or any combination thereof, a cooling compound, such as Menthol, Cyclohexanecarboxamide,N-Ethyl-5-Methyl-2-(1-Methylethyl) (WS-3), N-(Ethoxycarbonylmethyl)-3-p-menthanecarboxamide (WS-5), (1R,2S,5R)-N-(4-Methoxyphenyl)-5-methyl-2-(1- methylethyl)cyclohexanecarboxamide (WS-12), Butanamide, N,2,3-trimethyl-2-(1-methylethyl) (WS-23), or Menthyl Lactate or any combination thereof honey, vanilla, chocolate, tea, saffron, safranal or syrup, such as maple syrup.

[0761] Clause 376. The method of clause 375, wherein the dairy product, plant-based milk, or product of plant-based milk comprises a milk, such as whole milk, nonfat milk, lactose-free milk, buttermilk, condensed milk, cashew milk, fermented milk, goat milk, rick milk, soy milk, oat milk, almond milk, pea milk, coconut milk, chocolate milk, a yogurt, cheese, frosting, pudding, chocolate, custard, ice cream, gelato, sherbet, sorbet, frozen yogurt or any combination thereof.

[0762] Clause 377. The method of any one of clauses 372-376, wherein the mixture provides a taste perception in the subject of a reduction in bitterness perception, reduction in initial bitterness perception, enhancement of bitterness, masking of bitterness, reduction of sourness perception, reduction of lingering sourness perception, shorter duration of lingering sourness perception, reduction of initial sourness perception, reduction of astringency perception, masking of astringency, enhancement of mildness perception, reduction of beany tastes or flavors, reduction of grittiness perception, reduction in cooling perception, enhancement of spice intensity, increased duration of spiciness perception, enhancement of

sourness perception, delayed onset of spiciness perception when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0763] Clause 378. The method of any one of clauses 372-377, wherein the food or beverage or granule, powder, or liquid formulation is selected from a sugar substitute, water, a carbonated beverage, such as a carbonated fruit beverage, carbonated cola drink or carbonated water, sport beverage, alcoholic beverages, alcohol-free beverages, spices and/or seasonings, such as chili, wasabi, horseradish, mustard, ginger, black pepper, or cinnamon, meat, vegetables, mushrooms, cheese, seafood, salt, energy beverages, flavored water, powders for drinks, dairy products, such as milk, yogurt, cheese, or ice cream, plant based milks, products of plant based milk, puddings, cakes, shakes, malts, brownies, pastries, cookies, cheesecakes, fudge, pies, cobblers, parfaits, mousse, biscuits, custards, frosting, fruits, vegetables, condiments, dry cereal, oatmeal, granola bars, hard candy, soft candy, taffy, chocolates, sugarless candies, chewing gum, bubble gum, juices, teas, coffees, salsa, gel beads, film strips for breath, gelatin candies, pectin candies, starch candies, lozenges, cough drops, throat lozenges, throat sprays, toothpastes or mouth rinses.

[0764] Clause 379. The method of any one of clauses 372-378, wherein the amount of component (a) in the mixture is at least 2 ppm, such as, 3, 4, 5, 7.5, 10, 20, 30, 40, 50, 60, 70, 80, 90, 100, 110, 120, 130, 140, 150, 160, 170, 180, 190, 200, 210, 220, 230, 240, 250, 260, 270, 280, 290, or 300 ppm or an amount within a range defined by any two of the aforementioned amounts, preferably 15-25 ppm, 12.5-40 ppm, 25-50 ppm, 25-60 ppm, 25-75 ppm, 50-90 ppm, 50-150 ppm, 100-150 ppm, 100-200 ppm, 150-200 ppm, 200-250 ppm, or 12-200 ppm.

[0765] Clause 380. The method of any one of clauses 372-379 further comprising selecting or identifying a subject to receive a composition, which modulates a taste perception in a subject, such as astringency, spiciness, bitterness, plant protein, cooling, alcohol or sourness or which masks astringency, bitterness or sourness.

[0766] Clause 381. The method of any one of clauses 372-380 further comprising determining or analyzing the bitterness perception, initial bitterness perception, sourness perception, lingering sourness perception, duration of sourness perception, initial sourness

perception, astringency perception, masking of astringency, mildness perception, perception of beany tastes or flavors, or grittiness perception or any combination thereof of the subject after consuming said mixture.

[0767] Clause 382. The method of any one of clauses 372-381, wherein component (a) is dissolved in food grade ethanol.

[0768] Clause 383. The method of clause 382, wherein the food grade ethanol is at least 1%, such as 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 15, 20, 25, 30, 35, 40, 45, 50, 60, 70, 80, 85, 90, 95, or 100%, or with a range defined by any two of the aforementioned amounts, preferably 80, 90, or 95%.

[0769] Clause 384. A method of making a mixture which modulates a subject's taste perception of astringency, spiciness, bitterness, plant protein, cooling, alcohol or sourness or for masking of astringency, bitterness or sourness, the method comprising: admixing a component (a) with a component (b) to form said mixture: (a) a steroidal saponin or an analog thereof (for example, a glycosylation molecule of an aglycone, an aglycone of a glycosylated molecule, or a further glycosylated molecule of a glycosylated molecule) or an extract of a plant that comprises a steroidal saponin or an analog thereof, such as a *Trigonella foenum graecum L.* extract; and (b) a composition comprising an alcohol, a plant protein or plant protein product, a spice, a cooling compound, a spicy compound, an astringent compound, a bitter compound or a sour compound; wherein the composition is preferably provided in a food, beverage, granule, powder or liquid formulation; and optionally, wherein the composition comprises one or more preservatives or antioxidants, such as a sulphite, sorbic acid, a sorbate compound, benzoic acid, benzoate, propionic acid, propionate, ascorbic acid, ascorbate, citric acid, a tocopherol, a retinol, a polyphenol, a phenolic acid, a flavonoid, lipoic acid, N-acetylcysteine, butylated hydroxyanisole, butylated hydroxytoluene or derivatives thereof, preferably, wherein the one or more preservatives or antioxidants improve the shelf-life, flavor profile, or reduce spoilage of the mixture.

[0770] Clause 385. The method of clause 384, wherein the steroidal saponin or an analog thereof or the extract of a plant that comprises the steroidal saponin or an analog thereof comprises molecules selected from one or more of the following: yamogenin, diosgenin, smilagenin, sarsasapogenin, tigogenin, neotigogenin, gitogenin, yuccagenin, or saponaretin.

[0771] Clause 386. The method of any one of clauses 384 or 385, wherein the steroidal saponin or an analog thereof or the extract of a plant that comprises steroidal saponin or an analog thereof comprises a glucosylated steroidal saponin or an aglycone of a steroidal saponin.

[0772] Clause 387. The method of any one of clauses 384-386, wherein the composition is a fruit, such as citrus fruits, tropical fruits, or berries, juices, puree, jam, jelly, sports drinks, fruit flavored beverages, wine, dairy product, plant-based milk, product of plant-based milk, coffee, such as black coffee, milk-based coffee drinks, iced coffee drinks, instant coffee, coffee beans, or any combination thereof, alcoholic or non-alcoholic beverage, such as vodka, brandy, whiskey, or any combination thereof, a spice or spicy compound, such as a chili, wasabi, horseradish, mustard, ginger, black pepper, cinnamon, pumpkin spice, Szechuan pepper, or allspice, a salt, a sour compound, such as acetic acid, citric acid, hydrochloric acid, lactic acid, malic acid, nitric acid, fumaric acid, sulfuric acid, tartaric acid, phosphoric acid, other acid or any combination thereof, a bitter compound, such as absinthin, aloin, alpha acid, amarogentin, andrographolide, brucine, caffeine, denatonium, eugenin, hesperidin, humulone, isohumulone, Kaempferol 3-O-rutinoside, 6-Methoxymellein, naringin, papaverine, phenylthiocarbamide, propylthiouracil, quassin, quinidine, quinine, salicin, strychnine, sucrose octaacetate, sucrose octapropionate, theobromine, theophylline, vegetables, tea, chocolate, fruits or any combination thereof, an astringent compound, such as phenolic compounds, tannins, gallic acid, zinc oxide, zinc sulfate, tannic acid, potassium permanganate, silver nitrate, tincture of benzoin, potassium alum, caftaric acid, acacia, yarrow, sage, witch hazel, vinegar, tea, fruits, vegetables, dairy products, herbs, nuts or any combination thereof, a cooling compound, such as Menthol, Cyclohexanecarboxamide,N-Ethyl-5-Methyl-2-(1-Methylethyl) (WS-3), N-(Ethoxycarbonylmethyl)-3-p-menthanecarboxamide (WS-5), (1R,2S,5R)-N-(4-Methoxyphenyl)-5-methyl-2-(1- methylethyl)cyclohexanecarboxamide (WS-12), Butanamide, N,2,3-trimethyl-2-(1-methylethyl) (WS-23), or Menthyl Lactate or any combination thereof honey, vanilla, chocolate, tea, saffron, safranal or syrup, such as maple syrup.

[0773] Clause 388. The method of clause 387, wherein the dairy product, plant-based milk, or product of plant-based milk comprises a milk, such as whole milk, nonfat milk, lactose-free milk, buttermilk, condensed milk, cashew milk, fermented milk, goat milk, rick

milk, soy milk, oat milk, almond milk, pea milk, coconut milk, chocolate milk, a yogurt, cheese, frosting, pudding, chocolate, custard, ice cream, gelato, sherbet, sorbet, frozen yogurt or any combination thereof.

[0774] Clause 389. The method of any one of clauses 384-388, wherein the mixture provides a taste perception in the subject of a reduction in bitterness perception, reduction in initial bitterness perception, enhancement of bitterness, masking of bitterness, reduction of sourness perception, reduction of lingering sourness perception, shorter duration of lingering sourness perception, reduction of initial sourness perception, reduction of astringency perception, masking of astringency, enhancement of mildness perception, reduction of beany tastes or flavors, reduction of grittiness perception, reduction in cooling perception, enhancement of spice intensity, increased duration of spiciness perception, enhancement of sourness perception, delayed onset of spiciness perception when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0775] Clause 390. The method of any one of clauses 384-389, wherein the food or beverage or granule, powder, or liquid formulation is selected from a sugar substitute, water, a carbonated beverage, such as a carbonated fruit beverage, carbonated cola drink or carbonated water, sport beverage, alcoholic beverages, alcohol-free beverages, spices and/or seasonings, such as chili, wasabi, horseradish, mustard, ginger, black pepper, or cinnamon, meat, vegetables, mushrooms, cheese, seafood, salt, energy beverages, flavored water, powders for drinks, dairy products, such as milk, yogurt, cheese, or ice cream, plant based milks, products of plant based milk, puddings, cakes, shakes, malts, brownies, pastries, cookies, cheesecakes, fudge, pies, cobblers, parfaits, mousse, biscuits, custards, frosting, fruits, vegetables, condiments, dry cereal, oatmeal, granola bars, hard candy, soft candy, taffy, chocolates, sugarless candies, chewing gum, bubble gum, juices, teas, coffees, salsa, gel beads, film strips for breath, gelatin candies, pectin candies, starch candies, lozenges, cough drops, throat lozenges, throat sprays, toothpastes or mouth rinses.

[0776] Clause 391. The method of any one of clauses 384-390, wherein the amount of component (a) in the mixture is at least 2 ppm, such as, 3, 4, 5, 7.5, 10, 20, 30, 40, 50, 60, 70, 80, 90, 100, 110, 120, 130, 140, 150, 160, 170, 180, 190, 200, 210, 220, 230, 240, 250,

260, 270, 280, 290, or 300 ppm or an amount within a range defined by any two of the aforementioned amounts, preferably 15-25 ppm, 12.5-40 ppm, 25-50 ppm, 25-60 ppm, 25-75 ppm, 50-90 ppm, 50-150 ppm, 100-150 ppm, 100-200 ppm, 150-200 ppm, 200-250 ppm, or 12-200 ppm.

[0777] Clause 392. The method of any one of clauses 384-391, wherein component (a) is dissolved in food grade ethanol.

[0778] Clause 393. The method of clause 392, wherein the food grade ethanol is at least 1%, such as 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 15, 20, 25, 30, 35, 40, 45, 50, 60, 70, 80, 85, 90, 95, or 100%, or with a range defined by any two of the aforementioned amounts, preferably 80, 90, or 95%.

[0779] Clause 394. A composition obtained or obtainable by the method of any one of clauses 384-393.

[0780] Clause 395. A mixture used for modulating a subject's taste perception of astringency, spiciness, bitterness, plant protein, cooling, alcohol or sourness or for masking of astringency, bitterness or sourness in a subject, wherein the mixture comprises at least two components (a) and (b): (a) a steroidal saponin or an analog thereof (for example, a glycosylation molecule of an aglycone, an aglycone of a glycosylated molecule, or a further glycosylated molecule of a glycosylated molecule) or an extract of a plant that comprises a steroidal saponin or an analog thereof, such as a *Trigonella foenum graecum L.* extract; and (b) a composition comprising an alcohol, a plant protein or plant protein product, a spice, a cooling compound, a spicy compound, an astringent compound, a bitter compound or a sour compound; wherein component (a) is admixed with component (b); preferably, wherein the mixture is provided in a food, beverage, granule, powder or liquid formulation; and optionally, wherein the mixture comprises one or more preservatives or antioxidants, such as a sulphite, sorbic acid, a sorbate compound, benzoic acid, benzoate, propionic acid, propionate, ascorbic acid, ascorbate, citric acid, a tocopherol, a retinol, a polyphenol, a phenolic acid, a flavonoid, lipoic acid, N-acetylcysteine, butylated hydroxyanisole, butylated hydroxytoluene or derivatives thereof, preferably, wherein the one or more preservatives or antioxidants improve the shelf-life, flavor profile, or reduce spoilage of the mixture.

[0781] Clause 396. The mixture for use of clause 395, wherein the steroidal saponin or an analog thereof or the extract of a plant that comprises the steroidal saponin or an analog

thereof comprises molecules selected from one or more of the following: yamogenin, diosgenin, smilagenin, sarsasapogenin, tigogenin, neotigogenin, gitogenin, yuccagenin, or saponaretin.

[0782] Clause 397. The mixture for use of any one of clauses 395 or 396, wherein the steroidal saponin or an analog thereof or the extract of a plant that comprises steroidal saponin or an analog thereof comprises a glucosylated steroidal saponin or an aglycone of a steroidal saponin.

[0783] Clause 398. The method of any one of clauses 395-397, wherein the composition is fruit, such as citrus fruits, tropical fruits, or berries, juices, puree, jam, jelly, sports drinks, fruit flavored beverages, wine, dairy product, plant-based milk, product of plant-based milk, coffee, such as black coffee, milk-based coffee drinks, iced coffee drinks, instant coffee, coffee beans, or any combination thereof, alcoholic or non-alcoholic beverage, such as vodka, brandy, whiskey, or any combination thereof, a spice or spicy compound, such as a chili, wasabi, horseradish, mustard, ginger, black pepper, cinnamon, pumpkin spice, Szechuan pepper, or allspice, a salt, a sour compound, such as acetic acid, citric acid, hydrochloric acid, lactic acid, malic acid, nitric acid, fumaric acid, sulfuric acid, tartaric acid, phosphoric acid, other acid or any combination thereof, a bitter compound, such as absinthin, aloin, alpha acid, amarogentin, andrographolide, brucine, caffeine, denatonium, eugenin, hesperidin, humulone, isohumulone, Kaempferol 3-O-rutinoside, 6-Methoxymellein, naringin, papaverine, phenylthiocarbamide, propylthiouracil, quassin, quinidine, quinine, salicin, strychnine, sucrose octaacetate, sucrose octapropionate, theobromine, theophylline, vegetables, tea, chocolate, fruits or any combination thereof, an astringent compound, such as phenolic compounds, tannins, gallic acid, zinc oxide, zinc sulfate, tannic acid, potassium permanganate, silver nitrate, tincture of benzoin, potassium alum, caftaric acid, acacia, yarrow, sage, witch hazel, vinegar, tea, fruits, vegetables, dairy products, herbs, nuts or any combination thereof, a cooling compound, such as Menthol, Cyclohexanecarboxamide,N-Ethyl-5-Methyl-2-(1-Methylethyl) (WS-3), N-(Ethoxycarbonylmethyl)-3-p-menthanecarboxamide (WS-5), (1R,2S,5R)-N-(4-Methoxyphenyl)-5-methyl-2-(1- methylethyl)cyclohexanecarboxamide (WS-12), Butanamide, N,2,3-trimethyl-2-(1-methylethyl) (WS-23), or Menthyl Lactate or any combination thereof honey, vanilla, chocolate, tea, saffron, safranal or syrup, such as maple syrup.

[0784] Clause 399. The mixture for use of clause 398, wherein the dairy product, plant-based milk, or product of plant-based milk comprises a milk, such as whole milk, nonfat milk, lactose-free milk, buttermilk, condensed milk, cashew milk, fermented milk, goat milk, rick milk, soy milk, oat milk, almond milk, pea milk, coconut milk, chocolate milk, a yogurt, cheese, frosting, pudding, chocolate, custard, ice cream, gelato, sherbet, sorbet, frozen yogurt or any combination thereof.

[0785] Clause 400. The mixture for use of any one of clauses 395-399, wherein the mixture provides a taste perception in the subject of a reduction in bitterness perception, reduction in initial bitterness perception, enhancement of bitterness, masking of bitterness, reduction of sourness perception, reduction of lingering sourness perception, shorter duration of lingering sourness perception, reduction of initial sourness perception, reduction of astringency perception, masking of astringency, enhancement of mildness perception, reduction of beany tastes or flavors, reduction of grittiness perception, reduction in cooling perception, enhancement of spice intensity, increased duration of spiciness perception, enhancement of sourness perception, delayed onset of spiciness perception when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0786] Clause 401. The mixture for use of any one of clauses 395-400, wherein the food or beverage or granule, powder, or liquid formulation is selected from a sugar substitute, water, a carbonated beverage, such as a carbonated fruit beverage, carbonated cola drink or carbonated water, sport beverage, alcoholic beverages, alcohol-free beverages, spices and/or seasonings, such as chili, wasabi, horseradish, mustard, ginger, black pepper, or cinnamon, meat, vegetables, mushrooms, cheese, seafood, salt, energy beverages, flavored water, powders for drinks, dairy products, such as milk, yogurt, cheese, or ice cream, plant based milks, products of plant based milk, puddings, cakes, shakes, malts, brownies, pastries, cookies, cheesecakes, fudge, pies, cobblers, parfaits, mousse, biscuits, custards, frosting, fruits, vegetables, condiments, dry cereal, oatmeal, granola bars, hard candy, soft candy, taffy, chocolates, sugarless candies, chewing gum, bubble gum, juices, teas, coffees, salsa, gel beads, film strips for breath, gelatin candies, pectin candies, starch candies, lozenges, cough drops, throat lozenges, throat sprays, toothpastes or mouth rinses.

[0787] Clause 402. The mixture for use of any one of clauses 395-401, wherein the amount of component (a) in the mixture is at least 2 ppm, such as, 3, 4, 5, 7.5, 10, 20, 30, 40, 50, 60, 70, 80, 90, 100, 110, 120, 130, 140, 150, 160, 170, 180, 190, 200, 210, 220, 230, 240, 250, 260, 270, 280, 290, or 300 ppm or an amount within a range defined by any two of the aforementioned amounts, preferably 15-25 ppm, 12.5-40 ppm, 25-50 ppm, 25-60 ppm, 25-75 ppm, 50-90 ppm, 50-150 ppm, 100-150 ppm, 100-200 ppm, 150-200 ppm, 200-250 ppm, or 12-200 ppm.

[0788] Clause 403. The mixture for use of any one of clauses 395-402, wherein component (a) is dissolved in food grade ethanol.

[0789] Clause 404. The mixture for use of clause 403, wherein the food grade ethanol is at least 1%, such as 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 15, 20, 25, 30, 35, 40, 45, 50, 60, 70, 80, 85, 90, 95, or 100%, or with a range defined by any two of the aforementioned amounts, preferably 80, 90, or 95%.

BRIEF DESCRIPTION OF THE DRAWINGS

[0790] The foregoing and other features of the disclosure will become more fully apparent from the following description and appended claims, taken in conjunction with the accompanying drawings. Understanding that these drawings depict only several embodiments in accordance with the disclosure and are not to be considered limiting of its scope, the disclosure will be described with additional specificity and detail through use of the accompanying drawings.

[0791] Figures 1A-1D show the carbonation bubble profiles of a carbonated water alone and the same carbonated water after mixture with a *Selaginella tamariscina* extract.

[0792] Figures 2A-2D show the carbonation bubble profiles of a beer alone and the same beer after mixture with a *Selaginella tamariscina* extract.

[0793] Figure 3A shows a top view of carbonation bubble profiles of carbonated water alone and the same carbonated water after mixture with a *Garcinia indica* extract.

[0794] Figure 3B shows a side view of carbonation bubble profiles of carbonated water alone and the same carbonated water after mixture with a *Garcinia indica* extract.

DETAILED DESCRIPTION

A. Compounds for Modulating Tastes

[0795] Described herein are compositions and methods of using said compositions derived from any number of plant extracts for use in taste modulation, including compositions which effectively enhance sweetness, enhance alcohol taste, enhance alcohol perception, increase alcohol intensity, increase alcoholic bitterness, enhance alcoholic bitterness intensity, increase tongue tingling effect, enhance mouthfeel, modulate the onset of taste sensation, reduce bitterness or bitterness perception, mask bitter tastes or bitterness, reduce initial bitterness, enhance bitterness perception, reduce sourness or sourness perception, mask sour tastes or sourness, reduce initial sourness perception or lingering sourness perception, reduce duration of lingering sourness perception, enhance sourness perception, reduce astringency or astringency perception, mask astringency, increase salt perception, increase salt impact, enhance saltiness, increase metallic taste, increase retro-nasal effect, improve chili flavor, increase salt and sour flavor notes, increase tingling or numbing perception, increase tingling or numbing intensity, enhance tingling or numbing sensation, decrease stinging sensation, enhance cooling perception, increase cooling intensity, shorten onset of cooling, increase cooling duration, increase carbonation perception, increase fizzy sensation, enhance frothy sensation, increase harshness, enhance spiciness, increase spiciness duration, increase burning sensation, increase spice tingling sensation, enhance spiciness intensity, enhance umami perception, increase umami impact, enhance umami duration, increase umami intensity, increase mouth-watering effect, increase smooth mouthfeel effect, enhance sourness perception, increase sourness intensity, decrease astringency sensation, enhance ripeness or ripeness perception, enhance juiciness or juiciness perception, enhance freshness or freshness perception, enhance fruity flavors or notes, enhance flavor depth, enhance cocoa flavors or notes, enhance dark cocoa flavors or notes, enhance vanilla bean flavors or notes, enhance roasted coffee flavors or notes, enhance dark roasted coffee flavors or notes, enhance creaminess or creaminess perception, enhance cinnamic flavors or notes, enhance brown flavors or notes, enhance honey flavors or notes, reduce pungency or pungency perception, reduce initial pungency perception, reduce burning sensation or burning perception, reduce initial burning sensation, delay onset of burning sensation or burning perception, mask alcohol perception, enhance aged fruit flavors or notes, enhance brandy flavors or notes, reduce

tingling sensation or tingling perception, reduce initial tingling perception, delay onset of tingling sensation or tingling perception, reduce harshness or harshness perception, delay onset of spice burn or spice burn perception, reduce spice intensity, enhance aging effect, enhance wood tastes or notes, enhances sweet flavors or notes, enhance caramel flavors or notes, enhance floral flavors or notes, enhance hay flavors or notes, enhance saffron flavor or notes, enhance mildness, reduce beany tastes or flavors, reduce grittiness perception, increase the carbonation bubble amount or decrease the carbonation bubble size of a carbonated beverage or which effectively mask off tastes, such as jambu off-tastes, herbal off-tastes or bitter off-tastes. The plant extracts and compounds described herein may be dissolved in any commercially available solvent safe for human or animal consumption, including sucrose solutions, and food grade ethanol solutions (e.g., 95% food grade ethanol solutions).

[0796] The compositions disclosed herein may be nutraceutical or dietary in nature and are preferably prepared by combining a disclosed plant extract with an appropriate composition containing an alcohol, carbonation, a spice, a cooling compound, a non-alcoholic beverage, a sweetener, a bitter compound, a sour compound, a harsh compound, a burning compound, a pungent compound, a dairy product, a plant portion or product of plant protein, or a compound with an off-taste, such as a food or beverage, or in the absence of a composition, such as in a granule or liquid.

[0797] A "natural sweetener" as used herein refers to, for example, but is not limited to, sucrose, fructose, glucose, high fructose corn syrup, Stevia rebaudiana compositions including pure components of Reb A, stevioside, and rebaudioside D (Reb D), xylose, arabinose, or rhamnose, as well as sugar alcohols such as inositol or any combination thereof. An "artificial sweetener" as used herein refers to, for example, but is not limited to, spartame, sucralose, neotame, acesulfame potassium, saccharin, or combinations or derivatives thereof, including any combinations of the aforementioned natural or artificial sweeteners.

[0798] A "flavoring" is a preparation that provides a consumable with a particular taste and/or smell. A flavoring with modifying properties may further be described. Flavorings may be added to the consumable to reduce off-notes and/or improve overall profile. Flavorings with modifying properties of the present invention include, for example, but not limited to, a stevia composition including stevioside, steviolbioside Reb A, rebaudioside B (Reb B), rebaudioside C (Reb C), Reb D, rebaudioside E (Reb E), rebaudioside F (Reb F), dulcoside A,

dulcoside B, mbusoside, alpha- glucosyl stevia, fructosyl stevia, galactosyl stevia, beta-glucosyl stevia, siamenoside, mogroside IV, mogroside V, Luo Han Guo, monatin, glycyrrhizic acid, thaumatin, a salt thereof, a glycosylated derivative thereof and a combination thereof. Additional flavorings, which may be present in some embodiments include, for example, but are not limited to, curculin, monellin, mabinlin, brazzein, hernandulcin, phyllodulcin, glycyphyllin, phloridzin, trilobtain, baiyunoside, osladin, polypodoside A, pterocaryoside A, pterocaryoside B, mukurozioside, phlomisoside I, periandrin I, abmsoside A, cyclocarioside I or any combination thereof.

[0799] The term "a sweetness modifier" as used herein refers to a sweetener including a natural sweetener and an artificial sweetener or a flavoring with modifying properties set forth in the above. The term "sweetness" or "sweetness intensity" refers to the relative strength of sweet sensation as observed or experienced by an individual, e.g., a human, or a degree or amount of sweetness detected by a taster, for example on the scale from 0 (none) to 8 (very strong) used in sensory evaluations according to the procedure described in American Society for Testing Materials, Special Technical Publication-434:"Manual on Sensory Testing Methods," ASTM International, West Conshohocken, PA. (1996).

[0800] An "alcohol" refers to ethanol (CH_3CH_2OH) or to a consumable or beverage that contains a digestible alcohol such as ethanol (alcoholic beverage or alcoholic consumable), which include, for example, but not limited to, a distilled beverage, a wine, a beer or an alcohol-based fruit such as a cider, an alcoholic chocolate or candy. In some embodiments, an alcoholic beverage or consumable may contain ethanol in an amount greater than about 0.1 percent by volume. In some embodiments, an alcoholic beverage may contain ethanol in an amount between 1 percent and 50 percent by volume.

[0801] An "non-alcoholic beverage" as used herein refers to a non-alcoholic version of an alcoholic beverage or consumable as defined above, which include, but not limited to, an alcohol-free distilled beverage or an alcohol-free beer. In some embodiments, a non-alcoholic beverage provides an alcohol perception to a consumer, similar to the perception provided by an alcoholic beverage. In some embodiments, a non-alcoholic beverage preferably contains ethanol in amount of about 0.0 percent by volume or, desirably less than 3% alcohol, such as less than 2% or 1% alcohol.

[0802] "Carbonation" as used herein refers to carbon dioxide (CO_2), typically incorporated into a consumable or beverage, in the form of a carbonated beverage. Carbonated beverages include, but are not limited to, carbonated fruit beverages, carbonated cola drinks, carbonated water, sodas, coffees, seltzer, sparkling wine, energy beverages, juices, teas, beers, or Champagnes. In some embodiments, carbonated beverages include carbonation in the amount of up to about 10 grams per liter of the beverage. In some embodiments, carbonated beverages include carbonation in an amount between 2-8 grams per liter of beverage.

[0803] A "spice" as used herein refers a plant derived substance that provides a consumable with a particular flavor, aroma, color and/or preservation. Spices of the present invention include, for example, but are not limited to, peppers, chili, wasabi, horseradish, mustard, ginger, black pepper, cinnamon, pumpkin spice, Szechuan pepper, allspice, or any combination thereof. In some embodiments, a spice may contain allyl isothiocyanate (AITC) or piperine.

[0804] A "cooling compound" or "cooling agent" as described herein refers to a substance that produces a cooling sensation when consumed. Cooling compounds may include natural cooling compounds and synthetic cooling compounds. Natural cooling compounds may include, but are not limited to, menthol, mints, oils derived from plants in the mint family, and camphor. Synthetic cooling compounds may include, but are not limited to, Cyclohexanecarboxamide,N-Ethyl-5-Methyl-2-(1- Methylethyl) (WS-3), N-(Ethoxycarbonylmethyl)-3-p-menthanecarboxamide (WS-5), (1R,2S,5R)-N-(4-Methoxyphenyl)-5-methyl-2-(1- methylethyl)cyclohexanecarboxamide (WS-12), Butanamide, N,2,3-trimethyl-2-(1-methylethyl) (WS-23), or Menthyl Lactate.

[0805] A "tingling or numbing compound" or "tingling or numbing agent" as described herein refers to a substance that produces a tingling sensation, a numbing sensation and/or a trigeminal sensation when consumed. Tingling or numbing compounds may include, but are not limited to spilanthol, jambu oleoresin, or *Spilanthes acmella*.

[0806] An "astringent compound" as described herein refers to a substance that produces a astringent sensation when consumed. Astringent compound may include, but are not limited to phenolic compounds, tannins, gallic acid, zinc oxide, zinc sulfate, tannic acid, potassium permanganate, silver nitrate, tincture of benzoin, potassium alum, caftaric acid,

acacia, yarrow, sage, witch hazel, vinegar, tea, fruits, vegetables, dairy products, herbs, nuts or any combination thereof.

[0807] A "sour compound" as described herein refers to a substance that produces a sour sensation when consumed. Sour compounds may include, but are not limited to acetic acid, citric acid, hydrochloric acid, lactic acid, malic acid, nitric acid, fumaric acid, sulfuric acid, tartaric acid, phosphoric acid, or other acids.

[0808] A "bitter compound" as described herein refers to a substance that produces a bitter sensation when consumed. Bitter compounds may include, but are not limited to absinthin, aloin, alpha acid, amarogentin, andrographolide, brucine, caffeine, denatonium, eugenin, hesperidin, humulone, isohumulone, kaempferol 3-O-rutinoside, 6-Methoxymellein, naringin, papaverine, phenylthiocarbamide, propylthiouracil, quassin, quinidine, quinine, salicin, strychnine, sucrose octaacetate, sucrose octapropionate, theobromine, theophylline, vegetables, tea, chocolate, or fruits.

[0809] A "pungent compound" as described herein refers to a substance that produces a pungent sensation when consumed. Pungent compounds may include, but are not limited to, capsaicin, capsicum, piperine, allyl isothiocyanate, allicin, gingerol, sinigrin, eugenol, sinalbin, safrole, menthol, isothiocyanates, thymol, curcumin, resiniferatoxin, oleocanthal, mustard, chili peppers, horseradish, ginger, black pepper, garlic, or onions.

[0810] A "burning compound" as described herein refers to a substance that produces a burning sensation when consumed. Burning compounds may include, but are not limited to, capsaicin, dihydrocapsaicin, nordihydrocapsaicin, allyl isothiocyanate, piperine, gingerol, allicin, allyl sulfide, diallyl disulfide, resiniferatoxin, acrolein, cinnamaldehyde, menthol, eugenol, ethanol, acetic acid, oleocanthal, citric acid, spices, ajoene, or shogaol.

[0811] A "harsh compound" as described herein refers to a substance that produces a harsh sensation or a harsh taste, such as a taste that is excessively strong, unpleasant, or irritating to the palate. Harsh tastes may include sharp tastes, bitter tastes, astringent tastes, or chemically intense tastes. Harsh compounds may include, but are not limited to, quinine, caffeine, nicotine, tannins, catechins, limonene, pinene, amygdalin, saponins, oxalic acid, formic acid, allyl isothiocyanate, dimethyl sulfide, casein peptides, bromelain, or capsaicin.

[0812] An "umami compound" as described herein refers to a substance that produces an umami or savory sensation when consumed. Umami compounds may include, but

are not limited to a monosodium glutamate, disodium inosinate, disodium guanylate, seafoods, meats, vegetables, tea, seaweed, mushrooms, eggs, dairy products, or fermented products.

[0813] A "salt" as described herein refers to substances or minerals that include sodium chloride (NaCl). Salts may include, but are not limited to, table salt, kitchen salt, sea salt, kosher salt, flake salt, pink salt, black salt, red salt, mountain salt, bringing salts, or flavored salts.

[0814] A "spicy compound" as described herein refers to a substance that produces a spicy sensation when consumed. Spicy compounds may include, but are not limited to, capsaicin, capsicum, piperine, shogaol, allyl isothiocyanate, cinnameldahyde, hydroxy-alpha-sanshool, spices, allicin, gingerol, sinigrin, eugenol, sinalbin, safrole, sulforaphane, chili peppers, horseradish, ginger, black pepper, garlic, or onions.

[0815] An "off-taste" as described herein refers to an undesirable or abnormal flavor or taste perceived in a food, beverage, or other consumable product. An off-taste can render the product unpalatable, unpleasant, or unsuitable for consumption, thereby affecting its quality and market acceptance. Off-tastes may include, but are not limited to rancid tastes, sour tastes, metallic tastes, bitter tastes, musty or moldy tastes, chemical or plastic-like tastes, medicinal tastes, soapy tastes, burnt tastes, stale tastes, fishy tastes, astringent tastes, overly sweet tastes, salty tastes, earthy tastes, sulfuric tastes, bland or flat tastes, green or unripe tastes, rubbery tastes, starchy or pasty tastes, fermented tastes, or herbal tastes.

[0816] A "bright flavor" as described herein refers to flavors or sensations that may include but are not limited to citrusy notes, light sensations or flavors, lively sensations or flavors, fresh sensations or flavors, crisp sensations or flavors, clean sensations or flavors, vibrant sensations or flavors, acidic sensations or flavors, tangy sensations or flavors, or zesty sensations or flavors.

[0817] The term "sweetness" or "sweetness intensity" refers to the relative strength of sweet sensation as observed or experienced by an individual, e.g., a human, or a degree or amount of sweetness detected by a taster, for example on the scale from 0 (none) to 8 (very strong) used in sensory evaluations according to the procedure described in American Society for Testing Materials, Special Technical Publication-434:"Manual on Sensory Testing Methods," ASTM International, West Conshohocken, PA. (1996).

[0818] The term "alcoholic perception" or "alcoholic intensity" refers to the relative strength of alcohol sensation or taste as observed or experienced observed or experienced by an individual, e.g., a human, or a degree or amount of alcohol sensation detected by a taster, for example on the scale from 0 (none) to 8 (very strong) used in sensory evaluations according to the procedure described in American Society for Testing Materials, Special Technical Publication-434:"Manual on Sensory Testing Methods," ASTM International, West Conshohocken, PA. (1996).

[0819] The term "alcoholic bitterness" refers to the relative bitterness of alcohol as observed or experienced by an individual, e.g., a human, or a degree or amount of bitterness detected by a taster, for example on the scale from 0 (none) to 8 (very strong) used in sensory evaluations according to the procedure described in American Society for Testing Materials, Special Technical Publication-434:"Manual on Sensory Testing Methods," ASTM International, West Conshohocken, PA. (1996). In some embodiments, alcoholic bitterness may be measured on the International Bitterness Units scale (IBU), for example on a scale from 0-1000 IBU.

[0820] The term "retro nasal effect" as used herein refers to the relative perception of odors emanating from the oral cavity during eating and drinking as observed or experienced by an individual, e.g., a human, or a degree or amount of odors detected by a taster.

[0821] The term "tongue tingling effect" refers to the relative tingling sensation experienced by an individual, e.g., a human, or a degree or amount of tingling detected by a taster, for example on the scale from 0 (none) to 8 (very strong) used in sensory evaluations according to the procedure described in American Society for Testing Materials, Special Technical Publication-434:"Manual on Sensory Testing Methods," ASTM International, West Conshohocken, PA. (1996).

[0822] The term "spiciness" or "spice intensity" as used herein refers to the relative strength of spice sensation as observed or experienced by an individual, e.g., a human, or a degree or amount of spiciness detected by a taster, for example on the scale from 0 (none) to 8 (very strong) used in sensory evaluations according to the procedure described in American Society for Testing Materials, Special Technical Publication-434:"Manual on Sensory Testing Methods," ASTM International, West Conshohocken, PA. (1996).

[0823] The term "cooling perception" or "cooling intensity" as used herein refers to the relative strength of cooling sensation as observed or experienced by an individual, e.g., a human, or a degree or amount of cooling detected by a taster, for example on the scale from 0 (none) to 8 (very strong) used in sensory evaluations according to the procedure described in American Society for Testing Materials, Special Technical Publication-434:"Manual on Sensory Testing Methods," ASTM International, West Conshohocken, PA. (1996).

[0824] The term "carbonation perception" as used herein refers to the relative strength of carbonation sensation as observed or experienced by an individual, e.g., a human, or a degree or amount of carbonation detected by a taster, for example on the scale from 0 (none) to 8 (very strong) used in sensory evaluations according to the procedure described in American Society for Testing Materials, Special Technical Publication-434:"Manual on Sensory Testing Methods," ASTM International, West Conshohocken, PA. (1996).

[0825] The term "salt perception" or "salt intensity" as used herein refers to the relative strength of salt sensation or taste as observed or experienced by an individual, e.g., a human, or a degree or amount of saltiness detected by a taster, for example on the scale from 0 (none) to 8 (very strong) used in sensory evaluations according to the procedure described in American Society for Testing Materials, Special Technical Publication-434:"Manual on Sensory Testing Methods," ASTM International, West Conshohocken, PA. (1996).

[0826] The term "tingling perception" or "tingling intensity" refers to the relative strength of tingling sensation as observed or experienced by an individual, e.g., a human, or a degree or amount of tingling detected by a taster, for example on the scale from 0 (none) to 8 (very strong) used in sensory evaluations according to the procedure described in American Society for Testing Materials, Special Technical Publication-434:"Manual on Sensory Testing Methods," ASTM International, West Conshohocken, PA. (1996).

[0827] The term "numbing perception" or "numbing intensity" refers to the relative strength of numbing sensation as observed or experienced by an individual, e.g., a human, or a degree or amount of numbing detected by a taster, for example on the scale from 0 (none) to 8 (very strong) used in sensory evaluations according to the procedure described in American Society for Testing Materials, Special Technical Publication-434:"Manual on Sensory Testing Methods," ASTM International, West Conshohocken, PA. (1996).

[0828] The term "umami perception" or "umami intensity" refers to the relative strength of umami sensation as observed or experienced by an individual, e.g., a human, or a degree or amount of umami sensation detected by a taster, for example on the scale from 0 (none) to 8 (very strong) used in sensory evaluations according to the procedure described in American Society for Testing Materials, Special Technical Publication-434:"Manual on Sensory Testing Methods," ASTM International, West Conshohocken, PA. (1996).

[0829] The term "sourness perception" or "sourness intensity" or "acidity perception" or "acidity intensity" refers to the relative strength of sourness or acidic sensation as observed or experienced by an individual, e.g., a human, or a degree or amount of sourness or acidity detected by a taster, for example on the scale from 0 (none) to 8 (very strong) used in sensory evaluations according to the procedure described in American Society for Testing Materials, Special Technical Publication-434:"Manual on Sensory Testing Methods," ASTM International, West Conshohocken, PA. (1996).

[0830] The term "bitterness perception" or "bitterness intensity" refers to the relative strength of bitterness sensation as observed or experienced by an individual, e.g., a human, or a degree or amount of bitterness detected by a taster, for example on the scale from 0 (none) to 8 (very strong) used in sensory evaluations according to the procedure described in American Society for Testing Materials, Special Technical Publication-434:"Manual on Sensory Testing Methods," ASTM International, West Conshohocken, PA. (1996).

[0831] The term "astringency perception" or "astringency intensity" refers to the relative strength of astringency sensation as observed or experienced by an individual, e.g., a human, or a degree or amount of astringency detected by a taster, for example on the scale from 0 (none) to 8 (very strong) used in sensory evaluations according to the procedure described in American Society for Testing Materials, Special Technical Publication-434:"Manual on Sensory Testing Methods," ASTM International, West Conshohocken, PA. (1996).

[0832] The term "brightness" or "brightness intensity" refers to the relative strength of bright sensations or bright flavors as observed or experienced by an individual, e.g., a human, or a degree or amount of brightness detected by a taster, for example on the scale from 0 (none) to 8 (very strong) used in sensory evaluations according to the procedure described in American Society for Testing Materials, Special Technical Publication-

434:"Manual on Sensory Testing Methods," ASTM International, West Conshohocken, PA. (1996).

[0833] The term "juiciness" or "juiciness perception" refers to the relative strength of juicy sensation as observed or experienced by an individual, e.g., a human, or a degree or amount of juiciness detected by a taster, for example on the scale from 0 (none) to 8 (very strong) used in sensory evaluations according to the procedure described in American Society for Testing Materials, Special Technical Publication-434:"Manual on Sensory Testing Methods," ASTM International, West Conshohocken, PA. (1996).

[0834] The term "ripeness" or "ripeness perception" refers to the relative strength of ripe sensations as observed or experienced by an individual, e.g., a human, or a degree or amount of ripeness detected by a taster, for example on the scale from 0 (none) to 8 (very strong) used in sensory evaluations according to the procedure described in American Society for Testing Materials, Special Technical Publication-434:"Manual on Sensory Testing Methods," ASTM International, West Conshohocken, PA. (1996).

[0835] The term "freshness" or "freshness perception" refers to the relative strength of fresh sensations as observed or experienced by an individual, e.g., a human, or a degree or amount of freshness detected by a taster, for example on the scale from 0 (none) to 8 (very strong) used in sensory evaluations according to the procedure described in American Society for Testing Materials, Special Technical Publication-434:"Manual on Sensory Testing Methods," ASTM International, West Conshohocken, PA. (1996).

[0836] The term "creaminess" or "creaminess perception" refers to the relative strength of creamy sensations as observed or experienced by an individual, e.g., a human, or a degree or amount of creaminess detected by a taster, for example on the scale from 0 (none) to 8 (very strong) used in sensory evaluations according to the procedure described in American Society for Testing Materials, Special Technical Publication-434:"Manual on Sensory Testing Methods," ASTM International, West Conshohocken, PA. (1996).

[0837] The term "mouthfeel" as used herein refers to the physical sensations in the mouth produced by a food or beverage. Mouthfeel includes sensations observed or experienced by an individual, e.g., a human, such as, but not limited to, crispness, crunchiness, smoothness, grittiness, chewiness, thinness, thickness, creaminess, juiciness, fluffiness, tenderness, or stickiness. The term "mouthfeel perception" as used herein refers to the relative strength of

mouthfeel sensation as observed or experienced by an individual, e.g., a human, or a degree or amount of mouthfeel detected by a taster.

[0838] The term "pungency" or "pungency perception" refers to the relative strength of pungent sensation as observed or experienced by an individual, e.g., a human, or a degree or amount of pungency detected by a taster, for example on the scale from 0 (none) to 8 (very strong) used in sensory evaluations according to the procedure described in American Society for Testing Materials, Special Technical Publication-434:"Manual on Sensory Testing Methods," ASTM International, West Conshohocken, PA. (1996).

[0839] The term "burning" or "burning perception" refers to the relative strength of burning sensation as observed or experienced by an individual, e.g., a human, or a degree or amount of burning detected by a taster, for example on the scale from 0 (none) to 8 (very strong) used in sensory evaluations according to the procedure described in American Society for Testing Materials, Special Technical Publication-434:"Manual on Sensory Testing Methods," ASTM International, West Conshohocken, PA. (1996).

[0840] The term "harshness" or "harshness perception" refers to the relative strength of harsh sensation as observed or experienced by an individual, e.g., a human, or a degree or amount of harshness detected by a taster, for example on the scale from 0 (none) to 8 (very strong) used in sensory evaluations according to the procedure described in American Society for Testing Materials, Special Technical Publication-434:"Manual on Sensory Testing Methods," ASTM International, West Conshohocken, PA. (1996).

[0841] The term "aging effect" as used herein refers to changes in the physical, chemical, and/or sensory properties of a food or beverage over time. Aging effects includes changes such as, but not limited to, flavor development, texture changes, microbial and/or enzymatic activity, change in aromatic compounds, or oxidation.

[0842] The term "olfactory effective amount" refers to the amount of an extract, such as an *Silybum marianum* extract, *Asparagus racemous* rhizome extract, *Smilax china* extract, *Rehmannia glutinosa* root extract, *Selaginella tamariscina* extract, *Garcia indica* extract, *Garcinia cambogia* extract, *Rhodiola rosea* root or rhizome extract, *Trigonella foenum graecum L.* extract or related compounds, or to the amount of a compound from an extract, such as flavonolignans, steroidal saponins, iridoid glycosides, amentoflavone or other bioflavonoids, polyisoprenylated benzophenone, phenylpropanoids, phenylethanol derivate, or

glycosides from *Silybum marianum* extract, *Asparagus racemous* extract, *Smilax china* extract, *Rehmannia glutinosa* extract, *Selaginella tamariscina* extract, *Garcia indica* extract, *Garcinia cambogia* extract, *Rhodiola rosea* root or rhizome extract or other sources, or a related compound thereof used in a combination with composition containing an alcohol, carbonation, a spice, a salt, a tingling compound, a numbing compound, an umami compound, a cooling compound a sweetness modifier, a bitter compound, a sour compound, a fruit, vanilla, cocoa, chocolate, coffee, a pungent compound, a burning compound, a harsh compound, saffron, oak extract, honey, tea, syrup or a compound with an off-taste, wherein the extract or compound from an extract enhances the alcohol perception of the alcohol, the spiciness of the spice, the saltiness perception of the salt, the tingling perception of the tingling compound, the numbing perception of the numbing compound, the cooling perception of the cooling compound, the umami perception of the umami compound, the sourness perception of the sour compound, the tastes or perception of fruit, vanilla, cocoa, coffee, saffron, oak extract, honey, tea or syrup, the pungency perception of a pungent compound, the burning sensation or burning perception of the burning compound, the harshness perception of the harsh compound, the carbonation effect of the carbonation, or the sweetness of the sweetness modifier, reduces the bitterness of a bitter compound, the sourness of a sour compound, or the astringency of a astringent compound, or masks off-tastes. The olfactory effective amount may vary depending on many factors including other ingredients, their relative amounts and the olfactory effect that is desired. Any amount of extract or compound from an extract that provides the desired degree of taste modulation can be used. In certain embodiments, the olfactory effective amount ranges from about 1 ppb to about 1000 ppm by weight, preferably from about 2 ppb to about 100 ppm by weight and more preferably from about 5 ppb to about 10 ppm by weight. When used in the form of a botanical extract, the olfactory effective amount ranges from about 100 ppb to about 1000 ppm by weight, preferably from about 1 to about 500 ppm by weight and more preferably from about 5 to about 200 ppm.

[0843] The term "consumable" may include, for example, any food product (e.g., beverages, foodstuffs, ingredients, etc.), a sweetener (including natural and artificial sweeteners), a pharmaceutical composition, a nutraceutical composition, a dietary supplement, a dental hygiene composition, and/or a cosmetic product. The consumable may further contain or otherwise comprise any number of flavorings.

[0844] In some embodiments, a consumable is a food product, beverage, granule powder, or liquid formulation including, for example, but not limited to, a sugar substitute, water, a carbonated beverage, such as a carbonated fruit beverage, carbonated cola drink or carbonated water, sport beverage, alcoholic beverages, alcohol-free beverages, spices and/or seasonings, such as chili, wasabi, horseradish, mustard, ginger, black pepper, or cinnamon, meat, vegetables, mushrooms, cheese, seafood, salt, energy beverages, flavored water, powders for drinks, dairy products, such as milk, yogurt, cheese, or ice cream, plant based milks, products of plant based milk, puddings, cakes, shakes, malts, brownies, pastries, cookies, cheesecakes, fudge, pies, cobblers, parfaits, mousse, biscuits, custards, frosting, fruits, vegetables, condiments, dry cereal, oatmeal, granola bars, hard candy, soft candy, taffy, chocolates, sugarless candies, chewing gum, bubble gum, juices, teas, coffees, salsa, gel beads, film strips for breath, gelatin candies, pectin candies, starch candies, lozenges, cough drops, throat lozenges, throat sprays, toothpastes or mouth rinses.

[0845] In some embodiments, a consumable is a food product, beverage, granule powder, or liquid formulation including, fruits, vegetables, juices, meat products, egg products, fruit concentrates, fruit derivatives, animal derivatives including gelatins and gelatin-like products, milk products such as yogurt, ice cream, sour cream and sherbet, icings, syrups including molasses, corn, wheat, rye, soybean, oat, rice and barley products, nut meats and nut products, cakes, cookies, confectionaries such as candies, gums, fruit flavored drops, and chocolates, chewing gums, mints, creams, pies and breads. In some embodiments, a consumable also includes prepared packaged products, such as granulated flavor mixes, which upon reconstitution with water provide non- carbonated drinks, instant pudding mixes, instant coffee and tea, coffee whiteners, malted milk mixes, pet foods, livestock feed, tobacco, and materials for baking applications, such as powdered baking mixes for the preparation of breads, cookies, cakes, pancakes, donuts and the like. A consumable also includes diet or low-calorie food and beverages containing little or no sucrose. Consumables further include condiments such as herbs, spices and seasonings, flavor enhancers (e.g., monosodium glutamate), dietetic sweeteners or liquid sweeteners.

[0846] A "pharmaceutical composition," "cosmeceutical composition" or "nutraceutical composition" refers to a formulation set forth in this disclosure and a medium generally accepted in the art for the delivery of the formulation to mammals, such as humans

or animals, such feed animals, such as pigs, cattle, or chickens, and domestic animals such as cats, dogs or horses. For example, a pharmaceutical composition of the present disclosure may be formulated or used as a stand-alone composition, or as a component in a prescription drug, an over-the-counter (OTC) medicine, a botanical drug, an herbal medicine, a homeopathic agent, functional food, or any other form of health care product reviewed and approved by a government agency. Exemplary nutraceutical compositions of the present disclosure may be formulated or used as a stand-alone composition, or as a nutritional or bioactive component in food, a novel food, a functional food, a beverage, a bar, a food flavor, a food additive, a medical food, a dietary supplement, or an herbal product. A medium generally accepted in the art includes all pharmaceutically or nutraceutically acceptable carriers, diluents or excipients therefore.

B. Compositions containing *Silybum marianum* Extracts

[0847] Herein are described compositions and uses of compositions comprising *Silybum marianum* (Milk Thistle) seed extracts, derivatives thereof, and other flavonolignans, which effectively enhance sweetness, mouthfeel, onset of taste sensation, and mask off-tastes of certain sweeteners such as Stevia extract, Reb A, Reb M, and allulose. The disclosed methods are useful for the effective lowering of natural or artificial sweetener concentrations in a consumable for instance, while retaining or enhancing aspects of taste and/or taste modulation.

[0848] *Silybum marianum* extracts or sylimarin in an isolated form has no sweetness. However, extracts and derivatives thereof, when added to compositions containing a sweetener or sweetener agent, were found to enhance the sweetness intensity and mouthfeel, thereby allowing for a lower or reduced amount of the sweetener agent when admixed with the extract. Moreover, the addition of *Silybum marianum* extracts or sylimarin or analogs thereof (for example, a glycosylation molecule of an aglycone, an aglycone of a glycosylated molecule, or a further glycosylated molecule of a glycosylated molecule) to compositions were found to mask off-tastes of certain sweeteners, including stevia extract, Reb A, Reb M, and allulose. In the present disclosure, *Silybum marianum* extracts or sylimarin may be available commercially, and can also be isolated and purified from a botanical extract derived from particular species and varieties, including *Silybum marianum (L) Gaertn*, *Silybum eburneum*

Coss. & Dur, *Silybum marianum (L.) Gaertn. var.marianum*, *Silybum marianum (L.) Gaertn. var.albiflorum*, *Iryanthera grandis* (Myristicaccae), *Iryanthera sagotiana, Iryanthera lancifolia*, or any plants comprising Sylimarin and/or Sylimarin components, including hybrids and progeny from any of the aforementioned species. For example, a botanical extract as described from the disclosure herein may be from about 0.01% to about 95%, from about 0.05% to about 50% or from about 0.1% to about 10%. Compositions may contain up to 99 wt% of a particular plant extract, preferably a combination of plant extracts, wherein an equal amount of each plant extract is used. Some compositions may contain, for example, between at least 0.05 wt% - 99 wt% of an extract. Unless otherwise specified, percentages (% s) are by weight. Table 1 illustrates a representative *Silybum marianum* extract composition, including flavonolignans such as isosilychristin B, silychristin A, silychristin B, silydianin, silybin A, silybin B, isosilybin A, isosilybin B, and 2,3-Dehydrosilybin-der1, and derivatives thereof. It can be appreciated that component sylimarin compounds may be present in varying amounts from any particular milk thistle or plant derived extract.

Table 1: Silybum marianum extract composition

CAS No.	Characterizing Constituent	Minimum% Presence	Maximum % presence	Mean % Presence
NA	Silymarin derivative	0.19	1.1	0.6 ± 0.64
77182-66-2	Isosilychristin B	0.8	1.17	1.0 ± 0.26
33889-69-9	Silychristin A	0.9	1.85	1.4 ± 0.67
879325-58-3	Silychristin B	12.2	15.60	13.9 ± 2.4
29782-68-1	Silydianin	0.1	0.15	0.1 ± 0.04
22888-70-6	Silybin A	26.93	30.1	28.5 ± 2.24
65666-07-1	Silybin B	27.33	30.3	28.8 ± 2.10
NA	Silymarin derivative	0.07	0.4	0.2 ± 0.23
142796-21-2	Isosilybin A	3.4	4.2	3.8 ± 0.57
142796-22-3	Isosilybin B	2.4	2.71	2.6 ± 0.22
25166-14-7	2,3-Dehydrosilybin-der1	0.50	0.7	0.5 ± 0.6
NA	Silymarin derivative	0.1	0.88	0.5 ± 0.55

	Total Flavonolignans	80.7	81.9	81.9 ± 0.06

[0849] Several embodiments described herein relate to methods for modulating a taste perception in a subject, such as sweetness and/or mouthfeel, or for masking the off-taste of a compound in a subject. In some aspects, the methods include: providing a subject a mixture comprising a first composition that comprises a sweetener admixed with a second composition comprising one or more flavonolignans, such as silibinin, silychristin, silydianin, dehydrosilybin, deoxysilycistin, deoxysilydianin, silandrin, silybinome, silyhermin or neosilyhermin, preferably, wherein the mixture is provided in a food or beverage or granule, powder or liquid and, optionally, wherein the mixture comprises one or more preservatives, such as a sulphite, sorbic acid, a sorbate compound, benzoic acid, benzoate, propionic acid, propionate, ascorbic acid, ascorbate, or citric acid or derivatives thereof, which improve, for example, the shelf-life or flavor profile of the mixture or food or beverage or granule.

[0850] In some embodiments, the methods described herein relate to modulating a taste perception in a subject, such as sweetness and/or mouthfeel, or for masking the off-taste of a compound in a subject, wherein the methods are practiced by providing a subject a mixture comprising a first composition that comprises a sweetener admixed with a second composition comprising one or more extracts derived from any species or variety of milk thistle, wherein the mixture is provided in a food or beverage or granule, powder or liquid formulation and, optionally, wherein the mixture includes one or more preservatives, such as a sulphite, sorbic acid, a sorbate compound, benzoic acid, benzoate, propionic acid, propionate, ascorbic acid, ascorbate, or citric acid or derivatives thereof, which improve, for example, the shelf-life or flavor profile of the mixture or food or beverage or granule.

[0851] Some embodiments relate to a method, wherein the one or more flavonolignans comprises one or more of: isosilychristin B, silychristin A, silychristin B, silydianin, silybin A, silybin B, isosilybin A, isosilybin B, or 2,3-Dehydrosilybin-der1 or a derivative thereof. In some methods, the sweetener comprises one or more of: a sugar, acesulfame potassium, advantame, alitame, aspartame, cyclamate, erythritol, isomalt, maltitol, lactitol, mannitol, neotame, saccharin, sucralose, sorbitol, xylitol, glycerol, thaumatin, glycyrrhizin, stevioside, luo han guo, stevia or a derivative thereof. In some embodiments, the second composition comprises: (a) an extract of *Silybum marianum* or sylimarin, such as an

extract from *Silybum marianum (L) Gaertn* or *Silybum eburneum Coss. & Dur.*, preferably an extract from *Silybum marianum (L.) Gaertn. var.marianum*, or *Silybum marianum (L.) Gaertn. var.albiflorum*; (b) an extract of *Iryanthera grandis* (Myristicaceae), *Iryanthera sagotiana*, or *Iryanthera lancifolia*; and/or (c) an extract from a plant including Sylimarin and/or one or more of its components.

[0852] In some embodiments, the one or more flavonolignans comprises a glucosylated flavonoligan or an aglycone of a flavonoligans.

[0853] In some embodiments, the mixture provides a sugar like or sugary mouthfeel sensation in the subject or a sensation of an increase in viscosity when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when the sweetener is provided to the subject in the absence of the second composition. In some embodiments, the mixture provides a taste perception in the subject of an increase in sweetness or sweetness intensity when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when the sweetener is provided to the subject in the absence of the second composition. In some embodiments, the mixture provides a taste perception in the subject of a faster onset of sweetness when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when the sweetener is provided to the subject in the absence of the second composition. In some embodiments, the mixture provides a taste perception in the subject that masks a sour taste, lingering sweetness, metallic taste, or a bitter taste when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when the sweetener is provided to the subject in the absence of the second composition.

[0854] In some of the methods described herein, the food or beverage or granule, powder, or liquid formulation is selected from a sugar substitute, carbonated fruit beverage, sport beverage, carbonated cola drink, wine cooler, cordial, flavored water, powders for drinks, hard candy, soft candy, taffy, chocolates, sugarless candies, chewing gum, bubble gum, condiments, spices and/or seasonings, dry cereal, oatmeal, granola bars, alcoholic beverages, energy beverages, juices, teas, coffees, salsa, gel beads, film strips for breath, gelatin candies,

pectin candies, starch candies, lozenges, cough drops, throat lozenges, throat sprays, toothpastes or mouth rinses.

[0855] In some of the embodiments described herein, the amount of the one or more flavonolignans or the amount of the second composition in the mixture is at least 0.5 ppm, such as 0.5, 1, 2, 3, 4, 5, 6, 7, 7.5 10, 20, 30, 40, 50, 60, 70, 80, 90, 100, 110, 120, 130, 140, 150, 160, 170, 180, 190, 200, 210, 220, 230, 240, 250, 260, 270, 280, 290, or 300 ppm or within a range defined by any two of the aforementioned amounts, preferably 7.5-150 ppm, 50-100 ppm, 50-200 ppm, or 50-300 ppm.

[0856] In some embodiments, the methods described herein further comprise selecting or identifying a subject to receive a composition, which modulates taste perception in a subject, such as sweetness, onset of sweetness, sugar like or sugary mouthfeel sensation, or which masks the off-taste of a compound, such as sourness, bitterness, lingering sweetness, or a metallic taste. In some embodiments, the methods described herein further comprise determining or analyzing the sweetness, sugar like or sugary mouthfeel sensation, the time of onset of sweetness, sweetness intensity, the masking of a sour, bitter, or metallic taste, or the masking of a lingering of sweetness or any combination thereof of the subject after consuming said mixture.

[0857] Some embodiments described herein relate to methods of making a composition, which modulates a taste perception of a subject, such as sweetness and/or mouthfeel, or which masks the off-taste of a compound, wherein the methods are practiced by: admixing a first component comprising a sweetener with a second component comprising one or more flavonolignans, such as silibinin, silychristin, silydianin, dehydrosilybin, deoxysilycistin, deoxysilydianin, silandrin, silybinome, silyhermin or neosilyhermin, so as to prepare said composition, preferably, wherein the composition is incorporated into a food or beverage or granule, powder or liquid formulation and, optionally, wherein the composition includes one or more preservatives, such as a sulphite, sorbic acid, a sorbate compound, benzoic acid, benzoate, propionic acid, propionate, ascorbic acid, ascorbate, or citric acid or derivatives thereof, which improve, for example, the shelf-life or flavor profile of the mixture or food or beverage or granule.

[0858] Some embodiments relate to methods of making a composition, which modulates a taste perception of a subject, such as sweetness and/or mouthfeel, or which masks

the off-taste of a compound, wherein said methods are practiced by: admixing a first component comprising a sweetener with a second component comprising one or more extracts derived from any species or variety of milk thistle, so as to prepare said composition, preferably, wherein the composition is incorporated into a food or beverage or granule, powder or liquid formulation and, optionally, wherein the composition includes one or more preservatives, such as a sulphite, sorbic acid, a sorbate compound, benzoic acid, benzoate, propionic acid, propionate, ascorbic acid, ascorbate, or citric acid or derivatives thereof, which improve, for example, the shelf-life or flavor profile of the mixture or food or beverage or granule.

[0859] In some embodiments of the method of making, the one or more flavonolignans comprise a glucosylated flavonoligan or an aglycones of a flavonoligan.

[0860] In some embodiments, the methods described herein relate to the use of a composition comprising one or more flavonolignans for modulating a taste perception in a subject, such as sweetness and/or mouthfeel, or for masking the off-taste of a compound in a subject.

[0861] In some embodiments, the methods described herein relate to any of the aforementioned embodiments, wherein the one or more flavonolignans comprises one or more of: isosilychristin B, silychristin A, silychristin B, silydianin, silybin A, silybin B, isosilybin A, isosilybin B, or 2,3-Dehydrosilybin-der1 or a derivative thereof. In some embodiments, the methods described herein relate to any of the aforementioned embodiments, wherein the sweetener comprises one or more of: a sugar, acesulfame potassium, advantame, alitame, aspartame, cyclamate, erythritol, isomalt, maltitol, lactitol, mannitol, neotame, saccharin, sucralose, sorbitol, xylitol, glycerol, thaumatin, glycyrrhizin, stevioside, luo han guo, stevia or a derivative thereof. In some embodiments, the methods described herein relate to any of the aforementioned embodiments, wherein the second component comprises: (a) an extract of *Silybum marianum* or sylimarin, such as an extract from *Silybum marianum (L) Gaertn* or *Silybum eburneum Coss. & Dur.*, preferably an extract from *Silybum marianum (L.) Gaertn. var.marianum*, or *Silybum marianum (L.) Gaertn. var.albiflorum*; (b) an extract of *Iryanthera grandis* (Myristicaceae), *Iryanthera sagotiana*, or *Iryanthera lancifolia*; and/or (c) an extract from a plant including Sylimarin and/or one or more of its components.

[0862] In some embodiments of the method of use, the one or more flavonolignans comprise a glucosylated flavonoligan or an aglycones of a flavonoligan.

[0863] In some embodiments, the methods described herein relate to any of the aforementioned embodiments, wherein the composition provides a sugar like or sugary mouthfeel sensation in the subject or sensation of an increase in viscosity when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when the sweetener is provided to the subject in the absence of the second composition. In some embodiments, the methods described herein relate to any of the aforementioned embodiments, wherein the composition provides a taste perception in the subject of an increase in sweetness, a faster onset of sweetness, or a sugar like or a sugary mouthfeel sensation when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when the sweetener is provided to the subject in the absence of the second composition. In some embodiments, the methods described herein relate to any of the aforementioned embodiments, wherein the composition provides a taste perception in the subject that masks a lingering sweetness, a sourness, or a metallic or a bitter taste when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when the sweetener is provided to the subject in the absence of the second composition. In some embodiments, the methods described herein relate to any of the aforementioned embodiments, wherein the food or beverage or granule, powder, or liquid formulation is selected from a sugar substitute, carbonated fruit beverage, sport beverage, carbonated cola drink, wine cooler, cordial, flavored water, powders for drinks, hard candy, soft candy, taffy, chocolates, sugarless candies, chewing gum, bubble gum, condiments, spices and/or seasonings, dry cereal, oatmeal, granola bars, alcoholic beverages, energy beverages, juices, teas, coffees, salsa, gel beads, film strips for breath, gelatin candies, pectin candies, starch candies, lozenges, cough drops, throat lozenges, throat sprays, toothpastes or mouth rinses. In some embodiments, the methods described herein relate to any of the aforementioned embodiments, wherein the amount of the one or more flavonolignans or the amount of the second component in the mixture is at least 0.5 ppm, such as 0.5, 1, 2, 3, 4, 5, 6, 7, 7.5 10, 20, 30, 40, 50, 60, 70, 80, 90, 100, 110, 120, 130, 140, 150, 160, 170, 180, 190, 200, 210, 220, 230, 240, 250, 260, 270, 280, 290, or 300 ppm or within a

range defined by any two of the aforementioned amounts, preferably 7.5-150 ppm, 50-100 ppm, 50-200 ppm, or 50-300 ppm.

[0864] In some embodiments, the methods described herein relate to any of the aforementioned embodiments, wherein the subject is provided a mixture comprising a first composition comprising a sweetener admixed with a second composition comprising the one or more flavonolignans, such as silibinin, silychristin, silydianin, dehydrosilybin, deoxysilycistin, deoxysilydianin, silandrin, silybinome, silyhermin or neosilyhermin, preferably, wherein the mixture is provided in a food or beverage or granule, powder or liquid formulation and, optionally, wherein the mixture includes one or more preservatives, such as a sulphite, sorbic acid, a sorbate compound, benzoic acid, benzoate, propionic acid, propionate, ascorbic acid, ascorbate, or citric acid or derivatives thereof, which improve, for example, the shelf-life or flavor profile of the mixture or food or beverage or granule.

[0865] In some embodiments, the methods described herein relate to any of the aforementioned embodiments, wherein the subject is provided a mixture including a first composition comprising a sweetener admixed with a second composition comprising one or more extracts derived from any species or variety of milk thistle, preferably, wherein the mixture is provided in a food or beverage or granule, powder or liquid formulation and, optionally, wherein the mixture includes one or more preservatives, such as a sulphite, sorbic acid, a sorbate compound, benzoic acid, benzoate, propionic acid, propionate, ascorbic acid, ascorbate, or citric acid or derivatives thereof, which improve, for example, the shelf-life or flavor profile of the mixture or food or beverage or granule.

[0866] In some embodiments, the methods described herein relate to a use further comprising selecting or identifying a subject to receive a composition, which modulates taste perception in a subject, such as sweetness, onset of sweetness, sugar like or sugary mouthfeel sensation, or which masks the off-taste of a compound, such as bitterness, lingering sweetness, or a metallic taste.

[0867] In some embodiments, the methods described herein relate to a use further comprising determining or analyzing the sweetness, sugar like or sugary mouthfeel sensation, the time of onset of sweetness, sweetness intensity, the masking of a sour, bitter, or metallic taste, or the masking of a lingering of sweetness or any combination thereof of the subject after consuming said mixture.

[0868] In some embodiments, the methods described herein relate to a use, wherein the composition is dissolved in food grade ethanol. The use, wherein the food grade ethanol is at least 50%, such as 50, 60, 70, 80, 85, 90, 95, or 100%, or with a range defined by any two of the aforementioned amounts, preferably 80, 90, or 95%.

C. Composistions containing *Asparagus racemous* rhizome extract, *Smilax china* extract, steroidal saponins from *Asparagus racemous*, *Smilax china*, or other sources

[0869] Described herein are compositions and uses of compositions comprising *Asparagus racemous* rhizome extract, *Trigonella foenum graecum L.* extract, *Smilax china* extract, steroidal saponins or analogs thereof (for example, a glycosylation molecule of an aglycone, an aglycone of a glycosylated molecule, or a further glycosylated molecule of a glycosylated molecule) from *Asparagus racemous*, *Trigonella foenum graecum Smilax china*, or other sources which effectively modulate tastes of alcohol, spice, carbonation, or a cooling compound, reduce bitterness or bitterness perception, mask bitter tastes or bitterness, reduce sourness or sourness perception, mask sour tastes or sourness, reduce initial sourness perception or lingering sourness perception, reduce astringency or astringency perception, mask astringency, or which effectively mask off tastes.

[0870] When *Asparagus racemous* rhizome extract, *Trigonella foenum graecum L.* extract, *Smilax china* extract, or steroidal saponins and derivatives thereof are added to compositions containing a bitter compound, sour compound, or compound with an off-taste compound, they are found to masked cook tastes, mask metallic tastes, enhance beer flavor, enhance alcohol flavor, enhance retro-nasal effect, increase bitterness perception, enhance alcohol perception, enhance spice intensity, increase sour perception, enhance cooling intensity, provide faster onset of cooling sensation, increase duration of taste, reduce stinging taste, reduce the astringency perception, astringency intensity, bitterness perception, bitterness intensity, sourness perception, sourness intensity, or to mask off-tastes of an astringent compound, bitter compound, sour compound, or compound with an off-taste admixed with the extract or steroidal saponin or increases the amount of carbonation bubbles or reduces the carbonation bubble size of a beverage when the mixture is provided to the subject, such as when the mixture is incorporated in a beverage.

[0871] In the present disclosure, *Asparagus racemous* rhizome extract, *Trigonella foenum graecum L.* extract, *Smilax china* extract, or steroidal saponins may be available

commercially, and can also be isolated and purified from a botanical extract derived from particular families, including, but not limited to, Asparagaceae, Amaryllidaceae, Dioscoreaceae, Liliaceae, Costaceae, Melanthiaceae, Plantaginaceae, Fabaceae, Asteraceae, Asparagus, Tupistra, Anemarrhena, Sansevieria, Polygonatum, Nolina, Convallaria, Ophipogon, Hosta, Ornithogalum, Ruscus, Agapanthus, Dioscorea, Fritillaria, Lilium, Costus, Paris, Digitalis, Trigonella, Smilax, or Vernonia, and from particular species or varieties, including, but not limited to, *Smilax riparia*, *Smilax lanceaefolia*, *Smilax nipponica*, *Smilax nigrescens*, *Smilax officinalis*, *Smilax aspera subsp. Mauritanica*, *Smilax aristolochiifolia*, *Smilax ornate*, *Smilax glabra*, *Smilax china*, *Smilax menispermoides*, *Smilax lebrunii*, *Smilax stans*, *Smilax bockii*, *Smilax excelsa*, *Smilax microphylla*, *Smilax scobinicaulis*, *Smilax sieboldii*, *Smilax krausiana*, *Smilax medica*, *Asparagus acutifolius*, *Asparagus aethiopicus*, *Asparagus africanus*, *Asparagus asparagoides*, *Asparagus burchellii*, *Asparagus cochinchinensis*, *Asparagus declinatus*, *Asparagus capensis*, *Asparagus curillus*, *Asparagus densiflorus*, *Asparagus exuvialis*, *Asparagus falcatus*, *Asparagus fallax*, *Asparagus flagellaris*, *Asparagus horridus*, *Asparagus krebsianus*, *Asparagus laricinus*, *Asparagus lignosus*, *Asparagus macowanii*, *Asparagus mariae*, *Asparagus maritimus*, *Asparagus mucronatus*, *Asparagus multiflorus*, *Asparagus nesiotes*, *Asparagus officinalis*, *Asparagus ovatus*, *Asparagus pastorianus*, *Asparagus persicus*, *Asparagus racemosus*, *Asparagus retrofractus*, *Asparagus rubicundus*, *Asparagus scandens*, *Asparagus schoberioides*, *Asparagus scoparius*, *Asparagus setaceus*, *Asparagus striatus*, *Asparagus suaveolens*, *Asparagus tenuifolius*, *Asparagus umbellatus*, *Asparagus vaginellatus*, *Trigonella foenum graecum* or *Asparagus virgatus*, or any plants comprising steroidal saponins and/or steroidal saponin components, including hybrids and progeny from any of the aforementioned species. For example, a botanical extract as described from the disclosure herein may be from 0.01% to 95%, from 0.05% to 50% or from 0.1% to 10%. Compositions may contain up to 99 wt% of a particular plant extract, preferably a combination of plant extracts, wherein an equal amount of each plant extract is used. Some compositions may contain, for example, between at least 0.05 wt% - 99 wt% of an extract. Unless otherwise specified, percentages (% s) are by weight.

[0872] In some embodiments, the plant extract or plant that includes an amentoflavone useful in the embodiments described herein includes flavonoids selected from one of the following: the steroidal saponin or extract of a plant that comprises a steroidal

saponin or an analog thereof comprises saponins selected from one or more of the following: Shatavarin I, Shatavarin VIII, Protodioscin, Shatavarin IV, Shatarvain IX, Asparagoside A, Asparenydiol, Asparacosin A, Asparoside B, Sarsasapogenin, Schidigera saponin D5, Shatavarin VI, Immunoside, Shatavarin VII, Shatavarin X, Aspoligonin A, Prosapogenin A, Methyl gracillin, Methyl protodioscin, Neotigogenin-3-*O*-*α*-l-rhamnopyranosyl-(1 → 6)-*β*-d-glucopyranoside, Neotigogenin-3-*O*-*β*-d-glucopyranosyl-(1 → 4)-*O*-[*α*-l-rhamnopyranosyl-(1 → 6)]-*β*-d-glucopyranoside, Neotigogenin-3-*O*-*β*-d-glucopyranoside, Smilanippin A, Neotigogenin-3-*O*-*β*-d-glucopyranosyl-(1 → 4)-*O*-[*α*-l-arabinopyranosyl-(1 → 6)]-*β*-d-glucopyranoside, Sarsasapogenin-3-*O*-*β*-d-glucopyranosyl-(1 → 4)-[*α*-l-arabinopyranosyl-(1 → 6)]-*β*-d-glucopyranoside, (25S)-5*β*-Spirostane-3*β*-ol-3-*O*-*α*-l-rhamnopyranosyl-(1 → 2)-*β*-d-glucopyranosyl-(1 → 2)-*β*-d-glucopyranoside, Curillin G, Parillin, (25*S*)-Spirostan-6*β*-ol-3-*O*-*β*-d-glucopyranosyl-(1 → 4)-*O*-[*α*-l-arabinopyranosyl-(1 → 6)]-*β*-d-glucopyranoside, Trinervuloside C, Diosgenin-3-*O*-*α*-l-rhamnopyranoside, Dioscin, Diosgenin-3-*O*-[*α*-l-rhamnopyranosyl-(1 → 4)]-*β*-d-glucopyranoside, Diosgenin-3-*O*-[*α*-l-rhamnopyranosyl-(1 → 2)]-*β*-d-glucopyranoside, (25*R*)-Spirostan-5-en-3-*O*-*α*-l-rhamnopyranosyl-(1 → 2)-[*α*-l-rhamnopyranosyl-(1 → 4)-*α*-l-rhamnopyranosyl-(1 → 4)]-*O*-*β*-d-glucopyranoside, Gracillin, Parisyunnanoside C, Parisyunnanoside D, Parisyunnanoside E, Paris D, Paris H, (25*R*)-Spirost-5-en-3*β*,17*α*,27-triol-3-*O*-*α*-l-rhamnopyranosyl-(1 → 2)-[*α*-l-rhamnopyranosyl-(1 → 4)]-*β*-d-glucopyranoside, (25*S*)-Spirostan-5-en-3*β*,17*α*,27-triol-3-*O*-*α*-l-arabinopyranosyl-(1 → 6)-*β*-d-glucopyranoside, (25*S*)-Spirostan-5-en-3*β*,17*α*,27-triol-3-*O*-*β*-d-glucopyranosyl-(1 → 4)-[*α*-l-arabinopyranosyl-(1 → 6)]-*β*-d-glucopyranoside, (25*S*)-spirost-5-ene-3*β*,17*α*,27-triol-3-*O*-*α*-l-rhamnopyranosyl-(1 → 4)-*β*-d-glucopyranoside, (25*S*)-Spirost-5-en-3*β*,17*α*,27-triol-3-*O*-*β*-d-galactopyranoside, (25*S*)-Spirostan-5-en-3*β*,27-diol-3-*O*-*α*-l-arabinopyranosyl-(1 → 6)-*β*-d-glucopyranoside, Isonarthogenin3-*O*-*α*-l-rhamnopyranosyl-(1 → 2)-*O*-[*α*-l-rhamnopyranosyl-(1 → 4)]-*β*-d-glucopyranoside, Smilscobinoside A, Sieboldiin A, Sieboldiin B, Sieboldogenin, (25*R*)-5*α*-Spirostan-3*β*-ol-6-one-3-*O*-[*α*-l-arabinopyranosyl-(1 → 4)]-*β*-d-glucopyranoside, Smilaxin A, Smilaxin B, Parisvietnaside A, Smilaxin C, (25*R*)-5*α*-Spirostan-3*β*,6*β*-diol-3-*O*-*β*-d-glucopyranosyl-(1 → 4)-[*α*-l-arabinopyranosyl-(1 → 6)]-*β*-d-glucopyranoside, Smilscobinoside B, (25*R*)-5*α*-Spirostan-3*β*,17*α*,27-triol-3-*O*-*β*-d-glucopyranosyl-(1 → 4)-[*α*-l-arabinopyranosyl-(1 → 6)]-*β*-d-glucopyranosie, (25*R*)-5*β*Spirostan-3*β*-ol-3-*O*-*β*-d-glucopyranosyl-(1 → 6)-[*β*-d-

glucopyranosyl-(1 → 4)]-*β*-d-glucopyranoside, (25*R*)-5*β*-Spirostan-3*β*-ol-3-*O*-*β*-d-glucopyranosyl-(1 → 6)-[*β*-d-glucopyranosyl-(1 → 2)]-[*β*-d-glucopyranosyl-(1 → 4)]-*β*-d-glucopyranoside, Disporoside A, (25*R*)-5*β*-Spirostan-3*β*-ol-3-*O*-*β*-d-glucopyranosyl-(1 → 6)-*β*-d-glucopyranoside, (25*R*)-5*β*-Spirostan-3*β*-ol-3-*O*-*β*-d-glucopyranosyl-(1 → 6)-[*β*-d-glucopyranosyl-(1 → 2)]-[*α*-l-rhamnopyranosyl-(l → 4)]-*β*-d-glucopyranoside, Smilagenin 3-*O*-*β*-d-glucopyranoside, Methylprotodioscin, 26-*O*-*β*-d-Glucopyranosyl-(25*R*)-furostan-5-en-3*β*,26-diol-22-methoxy-3-*O*-*α*-l-rhamnopyranosyl-(l → 2)-*β*-d-glucopyranoside, 26-*O*-*β*-d-Glucopyranosyl-22*α*-*O*-methyl-(25*R*)-furost-5-en-3*β*,26-diol-3-*O*-*α*-l-rhamnopyranosyl-(l → 4)-*α*-l-rhamnopyranosyl-(l → 4)-[*α*-l-rhamnopyranosyl-(l → 2)]-*β*-d-glucopyranoside, Protodiosgenin-3-*O*-*α*-l-rhamnopyranosyl-(1 → 4)-*α*-l-rhamnopyranosyl(1 → 4)-[*α*-l-rhamnopyranosyl(1 → 2)]-*β*-d-glucopyranoside, 26-*O*-*β*-d-Glucopyranosyl-22*α*-hydroxy-(25*R*)-furost-5-en-3*β*,26-diol-3-*O*-[4-*O*-acetyl-*α*-l-rhamnopyranosyl]-(l → 2)-[*α*-l-rhamnopyranosyl-(l → 4)]-*β*-d-glucopyranoside, 26-*O*-*β*-d-Glucopyranosyl-22*α*-hydroxy-(25*R*)-furost-5-en-3*β*,26-diol-3-*O*-[2-*O*-acetyl-*α*-l-rhamnopyranosyl]-(l → 2)-[*α*-l-rhamnopyranosyl-(l → 4)]-*β*-d-glucopyranoside, 26-*O*-*β*-d-Glucopyranosyl-22*α*-hydroxy-(25*R*)-furost-5-en-3*β*,26-diol-3-*O*-[3-*O*-acetyl-*α*-l-rhamnopyranosyl]-(l → 2)-[*α*-l-rhamnopyranosyl-(l → 4)]-*β*-d-glucopyranoside, 26-*O*-*β*-d-Glucopyranosyl-(25*R*)-furostan-5-en-3*β*,17*α*-diol-3-*O*-*α*-l-rhamnopyranosyl-(l → 2)-*α*-l-rhamnopyranoside, Protogracillin, Parisaponin I, Parisyunnanoside A, Pseudoprotodioscin, 26-*O*-*β*-d-Glucopyranosyl-(25*R*)-furostan-5,20(22)-dien-3*β*,26-diol-3-*O*-*α*-l-rhamnopyranosyl-(l → 2)-*β*-d-glucopyranoside, 15-Hydroxypseudoprotodioscin, 15-Methoxypseudoprotodioscin, 23-Oxopseudoprotodioscin, 26-*O*-*β*-d-Glucopyranosyl-(25*S*)-5-furosa-20(22)-en-3*β*,26-diol-3-*O*-*α*-l-rhamnopyranosyl-(l → 2)-*O*-[*α*-l-rhamnopyranosyl-(l → 6)]-*β*-d-glucopyranoside, Pseudoproto-pb, 26-*O*-*β*-d-Glucopyranosyl-(25*R*)-5*α*-furostan-3β,22,26-triol-6-one-3-*O*-*α*-l-arabinopyranosyl-(1 → 6)-*β*-d-glucopyranoside, 26-*O*-*β*-d-Glucopyranosyl-(25*R*)-5*α*-furostan-3*β*,22,26-triol-6-one-3-*O*-*β*-d-glucopyranosyl-(1 → 4)-[*α*-l-arabinopyranosyl-(1 → 6)]-*β*-d-glucopyranoside, 26-*O*-*β*-d-Glucopyranosyl-(25*R*)-5*α*-furostan-3*β*,26-diol-22-methoxyl-6-one-3-*O*-*α*-l-arabinopyranosyl-(1 → 6)-*β*-d-glucopyranoside, 26-*O*-*β*-d-Glucopyranosyl-(25*R*)-5*α*-furostan-3*β*,26-diol-22-methoxyl-6-one, 26-*O*-*β*-d-Glucopyranosyl-(25*S*)-5*β*-furostan-3*β*,26-diol-22*α*-methoxy-3-*O*-*β*-d-glucopyranosyl-(1 → 6)-[*β*-d-glucopyranosyl-(1 → 2)]-[*β*-d-glucopyranosyl-(1 → 4)]-*β*-d-glucopyranoside,

(25*S*)-26-*O*-*β*-d-glucopyranosyl-3*β*,5*β*,22*α*-furostan-3,22,26-triol-3-*O*-*α*-l-rhamnopyranosyl-(1 → 2)-*O*-*β*-d-glucopyranosyl-(1 → 2)-*O*-*β*-d-glucopyranoside, Asparagoside E, Asparoside A, Asparoside B, 26-*O*-*β*-d-Glucopyranosyl-(25*S*)-5*β*-furostan-3*β*,22*α*-diol-3-*O*-*α*-l-arabinopyranosyl-(1 → 6)-[*β*-d-glucopyranosyl-(1 → 4)]-*β*-d-glucopyranoside, 26-*O*-*β*-d-Glucopyranosyl-(25*S*)-5*α*-furostan-3*β*,22*α*-diol-3-*O*-*α*-l-arabinopyranosyl-(1 → 6)-[*β*-d-glucopyranosyl-(1 → 4)]-*β*-d-glucopyranoside, 26-*O*-*β*-d-Glucopyranosyl-(25*S*)-5*α*-furostan-3*β*,6*β*,22*α*-tetraol-3-*O*-*α*-l-arabinopyranosyl-(1 → 6)-[*β*-d-glucopyranosyl-(1 → 4)]-*β*-d-glucopyranoside, Sarsaparilloside B, Sarsaparilloside C, Sarsaparilloside, $\Delta^{20(22)}$-Sarsaparilloside, Riparoside A, Smilaxchinoside A, (25*R*)-Smilaxchinoside A, Smilaxchinoside B, Smilaxchinoside C, Dioscoreside E, (25*R*)-5*α*-Furostan-3*β*,26-diol-20(22)-en-6-one-26-*O*-*β*-d-glucopyranoside, (23*R*,25*R*)-5*α*-Furostan-3*β*,23,26-triol-20(22)-en-6-one-26-*O*-*β*-d-glucopyranoside, 26-*O*-*β*-d-Glucopyranosyl-(25*R*)-5*α*-furostan-3*β*,26-diol-20(22)-en-6-one-3-*O*-*α*-l-arabinopyranosyl-(1 → 6)-*β*-d-glucopyranoside, (25*S*)-5*β*-Furostan-1*β*,2*β*,3*β*,5*β*,22*α*,26-hexaol-26-*O*-*β*-d-glucopyranoside, 26-*O*-*β*-d-Glucopyranosyl-(25*S*)-5*β*-furostan-1*β*,3*β*,22*α*,26-tetraol-1-*O*-*β*-d-glucopyranoside, Trinervuloside A, Riparoside B, Timosaponin J, Timosaponin K, Trinervuloside B, Pregna-5,16-diene-3*β*-ol-20-one-3-*O*-*α*-l-rhamnopyranosyl-(1 → 2)-*O*-[*α*-l-rhamnopyranosyl-(1 → 4)]-*β*-d-glucopyranoside, Pregna-5,16-diene-3*β*-ol-20-one-3-*O*-*α*-l-rhamnopyranosyl-(1 → 4)-*α*-l-rhamnopyranosyl-(1 → 4)-[*α*-l-rhamnopyranosyl-(1 → 2)]-*β*-d-glucopyranoside, Pregna-5,16-diene-3*β*-ol-20-one-3-*O*-*α*-l-rhamnopyranosyl-(1 → 2)-[*α*-l-rhamnopyranosyl-(1 → 4)]-*α*-l-rhamnopyranosyl-(1 → 2)-*β*-d-glucopyranoside, Pallidfloside D, Anguivioside XV, Yamogenin, Diosgenin, Smilagenin, Sarsasapogenin, Tigogenin, Neotigogenin, Gitogenin, Yuccagenin, Saponaretin or Smilaxchinoside D.

[0873] Several embodiments described herein relate to a method for modulating a subject's taste perception of alcohol, spice, cooling, carbonation, astringency, bitterness, or sourness or for masking off-tastes, the method including: providing a subject a mixture that includes at least two components (a) and (b): (a) a steroidal saponin or analog thereof (for example, a glycosylation molecule of an aglycone, an aglycone of a glycosylated molecule, or a further glycosylated molecule of a glycosylated molecule) or an extract of a plant that includes a steroidal saponin or an analog thereof, such as an *Asparagus racemosus* rhizome extract, a *Trigonella foenum graecum L.* extract or a *Smilax china* extract; and (b) a

composition including an alcohol, a spice, a cooling compound, carbonation, an astringent compound, a bitter compound, a sour compound, or a compound with an off-taste; wherein component (a) is admixed with component (b); wherein the mixture is preferably provided in a food, beverage, granule, powder or liquid formulation; and optionally, wherein the mixture includes one or more preservatives or antioxidants, such as a sulphite, sorbic acid, a sorbate compound, benzoic acid, benzoate, propionic acid, propionate, ascorbic acid, ascorbate, citric acid, a tocopherol, a retinol, a polyphenol, a phenolic acid, a flavonoid, lipoic acid, N-acetylcysteine, butylated hydroxyanisole, butylated hydroxytoluene or derivatives thereof, preferably, wherein the one or more preservatives or antioxidants improve the shelf-life, flavor profile, or reduce spoilage of the mixture; and/or optionally, selecting a composition that includes an alcohol, a spice, a cooling compound, carbonation, an astringent compound, a bitter compound, a sour compound, or a compound with an off-taste for receiving an agent that modulates the taste perception of a subject of astringency, bitterness, or sourness or masks off-tastes and providing said selected composition component (a); and/or optionally, evaluating the modulation of a subject's taste perception of alcohol, spice, cooling, carbonation, astringency, bitterness, or sourness or evaluating the masking of off-tastes after providing the subject the mixture.

[0874] In some of the aforementioned methods, the steroidal saponin has one of the following sapogenin structures: spirostane, isospirostane, furostane, pregnane, or cholestane.

[0875] In some of the aforementioned methods, the steroidal saponin or extract of a plant that includes a steroidal saponin or an analog thereof includes saponins selected from one or more of the following: Shatavarin I, Shatavarin VIII, Protodioscin, Shatavarin IV, Shatarvain IX, Asparagoside A, Asparenydiol, Asparacosin A, Asparoside B, Sarsasapogenin, Schidigera saponin D5, Shatavarin VI, Immunoside, Shatavarin VII, Shatavarin X, Aspoligonin A, Prosapogenin A, Methyl gracillin, Methyl protodioscin, Neotigogenin-3-O-α-l-rhamnopyranosyl-(1 → 6)-β-d-glucopyranoside, Neotigogenin-3-O-β-d-glucopyranosyl-(1 → 4)-O-[α-l-rhamnopyranosyl-(1 → 6)]-β-d-glucopyranoside, Neotigogenin-3-O-β-d-glucopyranoside, Smilanippin A, Neotigogenin-3-O-β-d-glucopyranosyl-(1 → 4)-O-[α-l-arabinopyranosyl-(1 → 6)]-β-d-glucopyranoside, Sarsasapogenin-3-O-β-d-glucopyranosyl-(1 → 4)-[α-l-arabinopyranosyl- (1 → 6)]-β-d-glucopyranoside, (25S)-5β-Spirostane-3β-ol-3-O-α-l-rhamnopyranosyl-(1 → 2)-β-d-glucopyranosyl-(1 → 2)-β-d-glucopyranoside, Curillin G,

Parillin, (25S)-Spirostan-6β-ol-3-O-β-d-glucopyranosyl-(1 → 4)-O-[α-l-arabinopyranosyl-(1 → 6)]-β-d-glucopyranoside, Trinervuloside C, Diosgenin-3-O-α-l-rhamnopyranoside, Dioscin, Diosgenin-3-O-[α-l-rhamnopyranosyl-(1 → 4)]-β-d-glucopyranoside, Diosgenin-3-O-[α-l-rhamnopyranosyl-(1 → 2)]-β-d-glucopyranoside, (25R)-Spirostan-5-en-3-O-α-l-rhamnopyranosyl-(1 → 2)-[α-l-rhamnopyranosyl-(1 → 4)-α-l-rhamnopyranosyl-(1 → 4)]-O-β-d-glucopyranoside, Gracillin, Parisyunnanoside C, Parisyunnanoside D, Parisyunnanoside E, Paris D, Paris H, (25R)-Spirost-5-en-3β,17α,27-triol-3-O-α-l-rhamnopyranosyl-(1 → 2)-[α-l-rhamnopyranosyl-(1 → 4)]-β-d-glucopyranoside, (25S)-Spirostan-5-en-3β,17α,27-triol-3-O-α-l-arabinopyranosyl-(1 → 6)-β-d-glucopyranoside, (25S)-Spirostan-5-en-3β,17α,27-triol-3-O-β-d-glucopyranosyl-(1 → 4)-[α-l-arabinopyranosyl-(1 → 6)]-β-d-glucopyranoside, (25S)-spirost-5-ene-3β,17α,27-triol-3-O-α-l-rhamnopyranosyl-(1 → 4)-β-d-glucopyranoside, (25S)-Spirost-5-en-3β,17α,27-triol-3-O-β-d-galactopyranoside, (25S)-Spirostan-5-en-3β,27-diol-3-O-α-l-arabinopyranosyl-(1 → 6)-β-d- glucopyranoside, Isonarthogenin3-O-α-l-rhamnopyranosyl-(1 → 2)-O-[α-l-rhamnopyranosyl-(1 → 4)]-β-d-glucopyranoside, Smilscobinoside A, Sieboldiin A, Sieboldiin B, Sieboldogenin, (25R)-5α-Spirostan-3β-ol-6-one-3-O-[α-l-arabinopyranosyl-(1 → 4)]-β-d-glucopyranoside, Smilaxin A, Smilaxin B, Parisvietnaside A, Smilaxin C, (25R)-5α-Spirostan-3β,6β-diol-3-O-β-d-glucopyranosyl-(1 → 4)-[α-l-arabinopyranosyl-(1 → 6)]-β-d-glucopyranoside, Smilscobinoside B, (25R)-5α-Spirostan-3β,17α,27-triol-3-O-β-d-glucopyranosyl-(1 → 4)-[α-l-arabinopyranosyl-(1 → 6)]-β-d-glucopyranosie, (25R)-5βSpirostan-3β-ol-3-O-β-d-glucopyranosyl-(1 → 6)-[β-d-glucopyranosyl-(1 → 4)]-β-d-glucopyranoside, (25R)-5β-Spirostan-3β-ol-3-O-β-d-glucopyranosyl-(1 → 6)-[β-d-glucopyranosyl-(1 → 2)]-[β-d-glucopyranosyl-(1 → 4)]-β-d-glucopyranoside, Disporoside A, (25R)-5β-Spirostan-3β-ol-3-O-β-d-glucopyranosyl-(1 → 6)-β-d-glucopyranoside, (25R)-5β-Spirostan-3β-ol-3-O-β-d-glucopyranosyl-(1 → 6)-[β-d-glucopyranosyl-(1 → 2)]-[α-l-rhamnopyranosyl-(1 → 4)]-β-d-glucopyranoside, Smilagenin 3-O-β-d-glucopyranoside, Methylprotodioscin, 26-O-β-d-Glucopyranosyl-(25R)-furostan-5-en-3β,26-diol-22-methoxy-3-O-α-l-rhamnopyranosyl-(1 → 2)-β-d-glucopyranoside, 26-O-β-d-Glucopyranosyl-22α-O-methyl-(25R)-furost-5-en-3β,26-diol-3-O-α-l-rhamnopyranosyl-(1 → 4)-α-l-rhamnopyranosyl-(1 → 4)-[α-l-rhamnopyranosyl-(1 → 2)]-β-d-glucopyranoside, Protodiosgenin-3-O-α-l-rhamnopyranosyl-(1 → 4)-α-l-rhamnopyranosyl(1 → 4)-[α-l-rhamnopyranosyl(1 → 2)]-β-d-glucopyranoside, 26-O-β-d-Glucopyranosyl-22α-hydroxy-

(25R)-furost-5-en-3β,26-diol-3-O-[4-O-acetyl-α-l-rhamnopyranosyl]-(1 → 2)-[α-l-rhamnopyranosyl-(1 → 4)]-β-d-glucopyranoside, 26-O-β-d-Glucopyranosyl-22α-hydroxy-(25R)-furost-5-en-3β,26-diol-3-O-[2-O-acetyl-α-l-rhamnopyranosyl]-(1 → 2)-[α-l-rhamnopyranosyl-(1 → 4)]-β-d-glucopyranoside, 26-O-β-d-Glucopyranosyl-22α-hydroxy-(25R)-furost-5-en-3β,26-diol-3-O-[3-O-acetyl-α-l-rhamnopyranosyl]-(1 → 2)-[α-l-rhamnopyranosyl-(1 → 4)]-β-d-glucopyranoside, 26-O-β-d-Glucopyranosyl-(25R)-furostan-5-en-3β,17α-diol-3-O-α-l-rhamnopyranosyl-(1 → 2)-α-l-rhamnopyranoside, Protogracillin, Parisaponin I, Parisyunnanoside A, Pseudoprotodioscin, 26-O-β-d-Glucopyranosyl-(25R)-furostan-5,20(22)-dien-3β,26-diol-3-O-α-l-rhamnopyranosyl-(1 → 2)-β-d-glucopyranoside, 15-Hydroxypseudoprotodioscin, 15-Methoxypseudoprotodioscin, 23-Oxopseudoprotodioscin, 26-O-β-d-Glucopyranosyl-(25S)-5-furosa-20(22)-en-3β,26-diol-3-O-α-l-rhamnopyranosyl-(1 → 2)-O-[α-l-rhamnopyranosyl-(1 → 6)]-β-d-glucopyranoside, Pseudoproto-pb, 26-O-β-d-Glucopyranosyl-(25R)-5α-furostan-3β,22,26-triol-6-one-3-O-α-l-arabinopyranosyl-(1 → 6)-β-d-glucopyranoside, 26-O-β-d-Glucopyranosyl-(25R)-5α-furostan-3β,22,26-triol-6-one-3-O-β-d-glucopyranosyl-(1 → 4)-[α-l-arabinopyranosyl-(1 → 6)]-β-d-glucopyranoside, 26-O-β-d-Glucopyranosyl-(25R)-5α-furostan-3β,26-diol-22-methoxyl-6-one-3-O-α-l-arabinopyranosyl-(1 → 6)-β-d-glucopyranoside, 26-O-β-d-Glucopyranosyl-(25R)-5α-furostan-3β,26-diol-22-methoxyl-6-one, 26-O-β-d-Glucopyranosyl-(25S)-5β-furostan-3β,26-diol-22α-methoxy-3-O-β-d-glucopyranosyl-(1 → 6)-[β-d-glucopyranosyl-(1 → 2)]-[β-d-glucopyranosyl-(1 → 4)]-β-d-glucopyranoside, (25S)-26-O-β-d-glucopyranosyl-3β,5β,22α-furostan-3,22,26-triol-3-O-α-l-rhamnopyranosyl-(1 → 2)-O-β-d-glucopyranosyl-(1 → 2)-O-β-d-glucopyranoside, Asparagoside E, Asparoside A, Asparoside B, 26-O-β-d-Glucopyranosyl-(25S)-5β-furostan-3β,22α-diol-3-O-α-l-arabinopyranosyl-(1 → 6)-[β-d-glucopyranosyl-(1 → 4)]-β-d-glucopyranoside, 26-O-β-d-Glucopyranosyl-(25S)-5α-furostan-3β,22α-diol-3-O-α-l-arabinopyranosyl-(1 → 6)-[β-d-glucopyranosyl-(1 → 4)]-β-d-glucopyranoside, 26-O-β-d-Glucopyranosyl-(25S)-5α-furostan-3β,6β,22α-tetraol-3-O-α-l-arabinopyranosyl-(1 → 6)-[β-d-glucopyranosyl-(1 → 4)]-β-d-glucopyranoside, Sarsaparilloside B, Sarsaparilloside C, Sarsaparilloside, Δ20(22)-Sarsaparilloside, Riparoside A, Smilaxchinoside A, (25R)-Smilaxchinoside A, Smilaxchinoside B, Smilaxchinoside C, Dioscoreside E, (25R)-5α-Furostan-3β,26-diol-20(22)-en-6-one-26-O-β-d-glucopyranoside, (23R,25R)-5α-Furostan-3β,23,26-triol-20(22)-

en-6-one-26-O-β-d-glucopyranoside, 26-O-β-d-Glucopyranosyl-(25R)-5α-furostan-3β,26-diol-20(22)-en-6-one-3-O-α-l-arabinopyranosyl-(1 → 6)-β-d-glucopyranoside, (25S)-5β-Furostan-1β,2β,3β,5β,22α,26-hexaol-26-O-β-d-glucopyranoside, 26-O-β-d-Glucopyranosyl-(25S)-5β-furostan-1β,3β,22α,26-tetraol-1-O-β-d-glucopyranoside, Trinervuloside A, Riparoside B, Timosaponin J, Timosaponin K, Trinervuloside B, Pregna-5,16-diene-3β-ol-20-one-3-O-α-l-rhamnopyranosyl-(1 → 2)-O-[α-l-rhamnopyranosyl-(1 → 4)]-β-d-glucopyranoside, Pregna-5,16-diene-3β-ol-20-one-3-O-α-l-rhamnopyranosyl-(1 → 4)-α-l-rhamnopyranosyl-(1 → 4)-[α-l-rhamnopyranosyl-(1 → 2)]-β-d-glucopyranoside, Pregna-5,16-diene-3β-ol-20-one-3-O-α-l-rhamnopyranosyl-(1 → 2)-[α-l-rhamnopyranosyl-(1 → 4)]-α-l-rhamnopyranosyl-(1 → 2)-β-d-glucopyranoside, Pallidfloside D, Anguivioside XV, Yamogenin, Diosgenin, Smilagenin, Sarsasapogenin, Tigogenin, Neotigogenin, Gitogenin, Yuccagenin, Saponaretin or Smilaxchinoside D.

[0876] In some of the aforementioned methods, the steroidal saponin or analog thereof or extract of a plant that comprises a steroidal saponin or an analog thereof comprises a glucosylated steroidal saponins or an aglycone of a steroidal sanponin.

[0877] In some of the aforementioned methods, the composition is an alcoholic or non-alcoholic beverage, a carbonated beverage, a spice or spicy compound, such as a chili, wasabi, horseradish, mustard, ginger, black pepper, cinnamon, pumpkin spice, Szechuan pepper, allspice or any combination thereof, an astringent compound, such as phenolic compounds, tannins, gallic acid, zinc oxide, zinc sulfate, tannic acid, potassium permanganate, silver nitrate, tincture of benzoin, potassium alum, caftaric acid, acacia, yarrow, sage, witch hazel, vinegar, tea, fruits, vegetables, dairy products, herbs, nuts or any combination thereof, a bitter compound, such as Absinthin, Aloin, Alpha acid, Amarogentin, Andrographolide, Brucine, Caffeine, Denatonium, Eugenin, Hesperidin, Humulone, Isohumulone, Kaempferol 3-O-rutinoside, 6-Methoxymellein, Naringin, Papaverine, Phenylthiocarbamide, Propylthiouracil, Quassin, Quinidine, Quinine, Salicin, Strychnine, Sucrose octaacetate, Sucrose octapropionate, Theobromine, Theophylline, vegetables, tea, chocolate, fruits or any combination thereof, a sour compound, such as acetic acid, citric acid, hydrochloric acid, lactic acid, malic acid, nitric acid, fumaric acid, sulfuric acid, tartaric acid, phosphoric acid, other acid or any combination thereof, a cooling compound, such as Menthol, Cyclohexanecarboxamide,N-Ethyl-5-Methyl-2-(1- Methylethyl) (WS-3), N-

(Ethoxycarbonylmethyl)-3-p-menthanecarboxamide (WS-5), (1R,2S,5R)-N-(4-Methoxyphenyl)-5-methyl-2-(1-methylethyl)cyclohexanecarboxamide (WS-12), Butanamide, N,2,3-trimethyl-2-(1-methylethyl) (WS-23), or Menthyl Lactate or any combination thereof, a compound with an off-taste, such as plant-based milks or products of plant-based milks, dairy products, fruits, juices, proteins, plant protein, whole grain products or any combination thereof.

[0878] In some of the aforementioned methods, the dairy product, plant-based milk, or product of plant-based milk includes a milk, such as whole milk, nonfat milk, lactose-free milk, buttermilk, condensed milk, cashew milk, goat milk, rick milk, soy milk, oat milk, almond milk, coconut milk, a yogurt, cheese, frosting, pudding, chocolate, custard, ice cream, gelato, sherbet, sorbet, frozen yogurt or any combination thereof.

[0879] In some of the aforementioned methods, the plant extract including a steroidal saponin is obtained from a plant from any one or more of the following families or genera: Asparagaceae, Amaryllidaceae, Dioscoreaceae, Liliaceae, Costaceae, Melanthiaceae, Plantaginaceae, Fabaceae, Asteraceae, Asparagus, Tupistra, Anemarrhena, Sansevieria, Polygonatum, Nolina, Convallaria, Ophipogon, Hosta, Ornithogalum, Ruscus, Agapanthus, Dioscorea, Fritillaria, Lilium, Costus, Paris, Digitalis, Trigonella, Smilax, or Vernonia.

[0880] In some of the aforementioned methods, the plant extract including a steroidal saponin is obtained from a plant from any one or more of the following species: *Smilax riparia*, *Smilax lanceaefolia*, *Smilax nipponica*, *Smilax nigrescens*, *Smilax officinalis*, *Smilax aspera subsp. Mauritanica*, *Smilax aristolochiifolia*, *Smilax ornate*, *Smilax glabra*, *Smilax china*, *Smilax menispermoides*, *Smilax lebrunii*, *Smilax stans*, *Smilax bockii*, *Smilax excelsa*, *Smilax microphylla*, *Smilax scobinicaulis*, *Smilax sieboldii*, *Smilax krausiana*, *Smilax medica*, *Asparagus acutifolius*, *Asparagus aethiopicus*, *Asparagus africanus*, *Asparagus asparagoides*, *Asparagus burchellii*, *Asparagus cochinchinensis*, *Asparagus declinatus*, *Asparagus capensis*, *Asparagus curillus*, *Asparagus densiflorus*, *Asparagus exuvialis*, *Asparagus falcatus*, *Asparagus fallax*, *Asparagus flagellaris*, *Asparagus horridus*, *Asparagus krebsianus*, *Asparagus laricinus*, *Asparagus lignosus*, *Asparagus macowanii*, *Asparagus mariae*, *Asparagus maritimus*, *Asparagus mucronatus*, *Asparagus multiflorus*, *Asparagus nesiotes*, *Asparagus officinalis*, *Asparagus ovatus*, *Asparagus pastorianus*, *Asparagus persicus*, *Asparagus racemosus*, *Asparagus retrofractus*, *Asparagus rubicundus*, *Asparagus*

scandens, *Asparagus schoberioides*, *Asparagus scoparius*, *Asparagus setaceus*, *Asparagus striatus*, *Asparagus suaveolens*, *Asparagus tenuifolius*, *Asparagus umbellatus*, *Asparagus vaginellatus*, *Trigonella foenum graecum* or *Asparagus virgatus*.

[0881] In some of the aforementioned methods, the mixture provides a taste perception in the subject of a reduction in bitterness or bitterness perception, a masking of bitter tastes or bitterness, a reduction in sourness or sourness perception, a masking of sour tastes or sourness, a reduction in initial sourness perception or lingering sourness perception, a reduction in astringency or astringency perception, a masking of astringency, or a masking of off tastes when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0882] In some of the aforementioned methods, the mixture provides a taste perception in the subject of masked cooked tastes, masked metallic tastes, enhanced beer flavor, enhanced alcohol flavor, enhanced retro-nasal effect, increased bitterness perception, enhanced alcohol perception, enhanced spice intensity, increased sour perception, enhanced cooling intensity, faster onset of cooling sensation, increased duration of taste, or reduced stinging taste when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0883] In some of the aforementioned methods, the mixture increases the amount of carbonation bubbles or reduces the carbonation bubble size of a beverage when the mixture is provided to the subject, such as when the mixture is incorporated in a beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0884] In some of the aforementioned methods, the food or beverage or granule, powder, or liquid formulation is selected from water, a carbonated beverage, such as a carbonated fruit beverage, carbonated cola drink or carbonated water, alcoholic beverages, alcohol-free beverages, spices and/or seasonings, such as chili, wasabi, horseradish, mustard, ginger, black pepper, or cinnamon, energy beverages, flavored water, powders for drinks, dairy products, such as milk, yogurt, cheese, or ice cream, plant based milks, products of plant based milk, puddings, cakes, shakes, malts, brownies, pastries, cookies, cheesecakes, fudge, pies,

cobblers, parfaits, mousse, biscuits, custards, frosting, fruits, vegetables, hard candy, soft candy, taffy, chocolates, sugarless candies, chewing gum, bubble gum, juices, teas, coffees, salsa, gel beads, film strips for breath, gelatin candies, pectin candies, starch candies, lozenges, cough drops, throat lozenges, throat sprays, toothpastes or mouth rinses.

[0885] In some of the aforementioned methods, the amount of component (a) in the mixture is at least 2 ppm, such as, 3, 4, 5, 7.5, 10, 20, 30, 40, 50, 60, 70, 80, 90, 100, 110, 120, 130, 140, 150, 160, 170, 180, 190, 200, 210, 220, 230, 240, 250, 260, 270, 280, 290, or 300 ppm or an amount within a range defined by any two of the aforementioned amounts, preferably 2-40 ppm, 6-75 ppm, 6-100 ppm, or 12-200 ppm.

[0886] In some embodiments, the aforementioned methods further include selecting or identifying a subject to receive a composition, which modulates a taste perception in a subject, such as alcohol, spice, cooling carbonation, bitterness, sourness, or astringency, or which masks off-tastes in a subject, such as bitter or sour tastes.

[0887] In some embodiments, the aforementioned methods further include determining or analyzing the alcohol perception, bitterness perception, bitterness intensity, the masking of bitterness, the sourness perception, sourness intensity, the masking of sourness, astringency perception, astringency intensity, the masking of astringency, or the masking of off-tastes or any combination thereof of the subject after consuming said mixture or determining or analyzing the increase of carbonation bubbles, the reduction of carbonation bubble size of a carbonated beverage after providing composition component (a).

[0888] In some of the aforementioned methods, component (a) is dissolved in food grade ethanol.

[0889] In some of the aforementioned methods, the food grade ethanol is at least 1%, such as 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 15, 20, 25, 30, 35, 40, 45, 50, 60, 70, 80, 85, 90, 95, or 100%, or with a range defined by any two of the aforementioned amounts, preferably 80, 90, or 95%.

[0890] Additional embodiments described herein relate to methods of making a mixture which modulates a subject's taste perception of alcohol, spice, cooling, carbonation, astringency, bitterness, or sourness or which masks off-tastes, the method including the method including: admixing a component (a) with a component (b) to form said mixture: (a) a steroidal saponin or analog thereof (for example, a glycosylation molecule of an aglycone, an aglycone

of a glycosylated molecule, or a further glycosylated molecule of a glycosylated molecule) or an extract of a plant that includes a steroidal saponin or an analog thereof, such as an *Asparagus racemosus* rhizome extract, a *Trigonella foenum graecum L.* extract or a *Smilax china* extract; and (b) a composition including an alcohol, a spice, a cooling compound, carbonation, an astringent compound, a bitter compound, a sour compound, or a compound with an off-taste; wherein component (a) is admixed with component (b); wherein the mixture is preferably provided in a food, beverage, granule, powder or liquid formulation; and optionally, wherein the composition includes one or more preservatives or antioxidants, such as a sulphite, sorbic acid, a sorbate compound, benzoic acid, benzoate, propionic acid, propionate, ascorbic acid, ascorbate, citric acid, a tocopherol, a retinol, a polyphenol, a phenolic acid, a flavonoid, lipoic acid, N-acetylcysteine, butylated hydroxyanisole, butylated hydroxytoluene or derivatives thereof, preferably, wherein the one or more preservatives or antioxidants improve the shelf-life, flavor profile, or reduce spoilage of the mixture.

[0891] In some embodiments of the aforementioned methods of making, the steroidal saponin has one of the following sapogenin structures: spirostane, isospirostane, furostane, pregnane, or cholestane.

[0892] In some embodiments of the aforementioned methods of making, the steroidal saponin or extract of a plant that includes a steroidal saponin or an analog thereof includes saponins selected from one or more of the following: Shatavarin I, Shatavarin VIII, Protodioscin, Shatavarin IV, Shatarvain IX, Asparagoside A, Asparenydiol, Asparacosin A, Asparoside B, Sarsasapogenin, Schidigera saponin D5, Shatavarin VI, Immunoside, Shatavarin VII, Shatavarin X, Aspoligonin A, Prosapogenin A, Methyl gracillin, Methyl protodioscin, Neotigogenin-3-O-α-l-rhamnopyranosyl-(1 → 6)-β-d-glucopyranoside, Neotigogenin-3-O-β-d-glucopyranosyl-(1 → 4)-O-[α-l-rhamnopyranosyl-(1 → 6)]-β-d-glucopyranoside, Neotigogenin-3-O-β-d-glucopyranoside, Smilanippin A, Neotigogenin-3-O-β-d-glucopyranosyl-(1 → 4)-O-[α-l-arabinopyranosyl-(1 → 6)]-β-d-glucopyranoside, Sarsasapogenin-3-O-β-d-glucopyranosyl-(1 → 4)-[α-l-arabinopyranosyl- (1 → 6)]-β-d-glucopyranoside, (25S)-5β-Spirostane-3β-ol-3-O-α-l-rhamnopyranosyl-(1 → 2)-β-d-glucopyranosyl-(1 → 2)-β-d-glucopyranoside, Curillin G, Parillin, (25S)-Spirostan-6β-ol-3-O-β-d-glucopyranosyl-(1 → 4)-O-[α-l-arabinopyranosyl-(1 → 6)]-β-d-glucopyranoside, Trinervuloside C, Diosgenin-3-O-α-l-rhamnopyranoside, Dioscin, Diosgenin-3-O-[α-l-

rhamnopyranosyl-(1 → 4)]-β-d-glucopyranoside, Diosgenin-3-O-[α-l-rhamnopyranosyl-(1 → 2)]-β-d-glucopyranoside, (25R)-Spirostan-5-en-3-O-α-l-rhamnopyranosyl-(1 → 2)-[α-l-rhamnopyranosyl-(1 → 4)-α-l-rhamnopyranosyl-(1 → 4)]-O-β-d-glucopyranoside, Gracillin, Parisyunnanoside C, Parisyunnanoside D, Parisyunnanoside E, Paris D, Paris H, (25R)-Spirost-5-en-3β,17α,27-triol-3-O-α-l-rhamnopyranosyl-(1 → 2)-[α-l-rhamnopyranosyl-(1 → 4)]-β-d-glucopyranoside, (25S)-Spirostan-5-en-3β,17α,27-triol-3-O-α-l-arabinopyranosyl-(1 → 6)-β-d-glucopyranoside, (25S)-Spirostan-5-en-3β,17α,27-triol-3-O-β-d-glucopyranosyl-(1 → 4)-[α-l-arabinopyranosyl-(1 → 6)]-β-d-glucopyranoside, (25S)-spirost-5-ene-3β,17α,27-triol-3-O-α-l-rhamnopyranosyl-(1 → 4)-β-d-glucopyranoside, (25S)-Spirost-5-en-3β,17α,27-triol-3-O-β-d-galactopyranoside, (25S)-Spirostan-5-en-3β,27-diol-3-O-α-l-arabinopyranosyl-(1 → 6)-β-d- glucopyranoside, Isonarthogenin3-O-α-l-rhamnopyranosyl-(1 → 2)-O-[α-l-rhamnopyranosyl-(1 → 4)]-β-d-glucopyranoside, Smilscobinoside A, Sieboldiin A, Sieboldiin B, Sieboldogenin, (25R)-5α-Spirostan-3β-ol-6-one-3-O-[α-l-arabinopyranosyl-(1 → 4)]-β-d-glucopyranoside, Smilaxin A, Smilaxin B, Parisvietnaside A, Smilaxin C, (25R)-5α-Spirostan-3β,6β-diol-3-O-β-d-glucopyranosyl-(1 → 4)-[α-l-arabinopyranosyl-(1 → 6)]-β-d-glucopyranoside, Smilscobinoside B, (25R)-5α-Spirostan-3β,17α,27-triol-3-O-β-d-glucopyranosyl-(1 → 4)-[α-l-arabinopyranosyl-(1 → 6)]-β-d-glucopyranosie, (25R)-5βSpirostan-3β-ol-3-O-β-d-glucopyranosyl-(1 → 6)-[β-d-glucopyranosyl-(1 → 4)]-β-d-glucopyranoside, (25R)-5β-Spirostan-3β-ol-3-O-β-d-glucopyranosyl-(1 → 6)-[β-d-glucopyranosyl-(1 → 2)]-[β-d-glucopyranosyl-(1 → 4)]-β-d-glucopyranoside, Disporoside A, (25R)-5β-Spirostan-3β-ol-3-O-β-d-glucopyranosyl-(1 → 6)-β-d-glucopyranoside, (25R)-5β-Spirostan-3β-ol-3-O-β-d-glucopyranosyl-(1 → 6)-[β-d-glucopyranosyl-(1 → 2)]-[α-l-rhamnopyranosyl-(1 → 4)]-β-d-glucopyranoside, Smilagenin 3-O-β-d-glucopyranoside, Methylprotodioscin, 26-O-β-d-Glucopyranosyl-(25R)-furostan-5-en-3β,26-diol-22-methoxy-3-O-α-l-rhamnopyranosyl-(1 → 2)-β-d-glucopyranoside, 26-O-β-d-Glucopyranosyl-22α-O-methyl-(25R)-furost-5-en-3β,26-diol-3-O-α-l-rhamnopyranosyl-(1 → 4)-α-l-rhamnopyranosyl-(1 → 4)-[α-l-rhamnopyranosyl-(1 → 2)]-β-d-glucopyranoside, Protodiosgenin-3-O-α-l-rhamnopyranosyl-(1 → 4)-α-l-rhamnopyranosyl(1 → 4)-[α-l-rhamnopyranosyl(1 → 2)]-β-d-glucopyranoside, 26-O-β-d-Glucopyranosyl-22α-hydroxy-(25R)-furost-5-en-3β,26-diol-3-O-[4-O-acetyl-α-l-rhamnopyranosyl]-(1 → 2)-[α-l-rhamnopyranosyl-(1 → 4)]-β-d-glucopyranoside, 26-O-β-d-Glucopyranosyl-22α-hydroxy-

(25R)-furost-5-en-3β,26-diol-3-O-[2-O-acetyl-α-l-rhamnopyranosyl]-(l → 2)-[α-l-rhamnopyranosyl-(l → 4)]-β-d-glucopyranoside, 26-O-β-d-Glucopyranosyl-22α-hydroxy-(25R)-furost-5-en-3β,26-diol-3-O-[3-O-acetyl-α-l-rhamnopyranosyl]-(l → 2)-[α-l-rhamnopyranosyl-(l → 4)]-β-d-glucopyranoside, 26-O-β-d-Glucopyranosyl-(25R)-furostan-5-en-3β,17α-diol-3-O-α-l-rhamnopyranosyl-(l → 2)-α-l-rhamnopyranoside, Protogracillin, Parisaponin I, Parisyunnanoside A, Pseudoprotodioscin, 26-O-β-d-Glucopyranosyl-(25R)-furostan-5,20(22)-dien-3β,26-diol-3-O-α-l-rhamnopyranosyl-(l → 2)-β-d-glucopyranoside, 15-Hydroxypseudoprotodioscin, 15-Methoxypseudoprotodioscin, 23-Oxopseudoprotodioscin, 26-O-β-d-Glucopyranosyl-(25S)-5-furosa-20(22)-en-3β,26-diol-3-O-α-l-rhamnopyranosyl-(l → 2)-O-[α-l-rhamnopyranosyl-(l → 6)]-β-d-glucopyranoside, Pseudoproto-pb, 26-O-β-d-Glucopyranosyl-(25R)-5α-furostan-3β,22,26-triol-6-one-3-O-α-l-arabinopyranosyl-(1 → 6)-β-d-glucopyranoside, 26-O-β-d-Glucopyranosyl-(25R)-5α-furostan-3β,22,26-triol-6-one-3-O-β-d-glucopyranosyl-(1 → 4)-[α-l-arabinopyranosyl-(1 → 6)]-β-d-glucopyranoside, 26-O-β-d-Glucopyranosyl-(25R)-5α-furostan-3β,26-diol-22-methoxyl-6-one-3-O-α-l-arabinopyranosyl-(1 → 6)-β-d-glucopyranoside, 26-O-β-d-Glucopyranosyl-(25R)-5α-furostan-3β,26-diol-22-methoxyl-6-one, 26-O-β-d-Glucopyranosyl-(25S)-5β-furostan-3β,26-diol-22α-methoxy-3-O-β-d-glucopyranosyl-(1 → 6)-[β-d-glucopyranosyl-(1 → 2)]-[β-d-glucopyranosyl-(1 → 4)]-β-d-glucopyranoside, (25S)-26-O-β-d-glucopyranosyl-3β,5β,22α-furostan-3,22,26-triol-3-O-α-l-rhamnopyranosyl-(l → 2)-O-β-d-glucopyranosyl-(l → 2)-O-β-d-glucopyranoside, Asparagoside E, Asparoside A, Asparoside B, 26-O-β-d-Glucopyranosyl-(25S)-5β-furostan-3β,22α-diol-3-O-α-l-arabinopyranosyl-(l → 6)-[β-d-glucopyranosyl-(1 → 4)]-β-d-glucopyranoside, 26-O-β-d-Glucopyranosyl-(25S)-5α-furostan-3β,22α-diol-3-O-α-l-arabinopyranosyl-(l → 6)-[β-d-glucopyranosyl-(1 → 4)]-β-d-glucopyranoside, 26-O-β-d-Glucopyranosyl-(25S)-5α-furostan-3β,6β,22α-tetraol-3-O-α-l-arabinopyranosyl-(l → 6)-[β-d-glucopyranosyl-(1 → 4)]-β-d-glucopyranoside, Sarsaparilloside B, Sarsaparilloside C, Sarsaparilloside, Δ20(22)-Sarsaparilloside, Riparoside A, Smilaxchinoside A, (25R)-Smilaxchinoside A, Smilaxchinoside B, Smilaxchinoside C, Dioscoreside E, (25R)-5α-Furostan-3β,26-diol-20(22)-en-6-one-26-O-β-d-glucopyranoside, (23R,25R)-5α-Furostan-3β,23,26-triol-20(22)-en-6-one-26-O-β-d-glucopyranoside, 26-O-β-d-Glucopyranosyl-(25R)-5α-furostan-3β,26-diol-20(22)-en-6-one-3-O-α-l-arabinopyranosyl-(1 → 6)-β-d-glucopyranoside, (25S)-5β-

Furostan-1β,2β,3β,5β,22α,26-hexaol-26-O-β-d-glucopyranoside, 26-O-β-d-Glucopyranosyl-(25S)-5β-furostan-1β,3β,22α,26-tetraol-1-O-β-d-glucopyranoside, Trinervuloside A, Riparoside B, Timosaponin J, Timosaponin K, Trinervuloside B, Pregna-5,16-diene-3β-ol-20-one-3-O-α-l-rhamnopyranosyl-(1 → 2)-O-[α-l-rhamnopyranosyl-(1 → 4)]-β-d-glucopyranoside, Pregna-5,16-diene-3β-ol-20-one-3-O-α-l-rhamnopyranosyl-(1 → 4)-α-l-rhamnopyranosyl-(1 → 4)-[α-l-rhamnopyranosyl-(1 → 2)]-β-d-glucopyranoside, Pregna-5,16-diene-3β-ol-20-one-3-O-α-l-rhamnopyranosyl-(1 → 2)-[α-l-rhamnopyranosyl-(1 → 4)]-α-l-rhamnopyranosyl-(1 → 2)-β-d-glucopyranoside, Pallidfloside D, Anguivioside XV, Yamogenin, Diosgenin, Smilagenin, Sarsasapogenin, Tigogenin, Neotigogenin, Gitogenin, Yuccagenin, Saponaretin or Smilaxchinoside D.

In some embodiments of the aforementioned methods of making, the steroidal saponin or analog thereof or extract of a plant that comprises a steroidal saponin or an analog thereof comprises a glucosylated steroidal saponins or an aglycone of a steroidal saponin.

[0893] In some embodiments of the aforementioned methods of making, the composition is an alcoholic or non-alcoholic beverage, a carbonated beverage, a spice or spicy compound, such as a chili, wasabi, horseradish, mustard, ginger, black pepper, cinnamon, pumpkin spice, Szechuan pepper, allspice or any combination thereof, an astringent compound, such as phenolic compounds, tannins, gallic acid, zinc oxide, zinc sulfate, tannic acid, potassium permanganate, silver nitrate, tincture of benzoin, potassium alum, caftaric acid, acacia, yarrow, sage, witch hazel, vinegar, tea, fruits, vegetables, dairy products, herbs, nuts or any combination thereof, a bitter compound, such as Absinthin, Aloin, Alpha acid, Amarogentin, Andrographolide, Brucine, Caffeine, Denatonium, Eugenin, Hesperidin, Humulone, Isohumulone, Kaempferol 3-O-rutinoside, 6-Methoxymellein, Naringin, Papaverine, Phenylthiocarbamide, Propylthiouracil, Quassin, Quinidine, Quinine, Salicin, Strychnine, Sucrose octaacetate, Sucrose octapropionate, Theobromine, Theophylline, vegetables, tea, chocolate, fruits or any combination thereof, a sour compound, such as acetic acid, citric acid, hydrochloric acid, lactic acid, malic acid, nitric acid, fumaric acid, sulfuric acid, tartaric acid, phosphoric acid, other acid or any combination thereof, a cooling compound, such as Menthol, Cyclohexanecarboxamide,N-Ethyl-5-Methyl-2-(1- Methylethyl) (WS-3), N-(Ethoxycarbonylmethyl)-3-p-menthanecarboxamide (WS-5), (1R,2S,5R)-N-(4-Methoxyphenyl)-5-methyl-2-(1- methylethyl)cyclohexanecarboxamide (WS-12),

Butanamide, N,2,3-trimethyl-2-(1-methylethyl) (WS-23), or Menthyl Lactate or any combination thereof, a compound with an off-taste, such as plant-based milks or products of plant-based milks, dairy products, fruits, juices, proteins, plant protein, whole grain products or any combination thereof.

[0894] In some embodiments of the aforementioned methods of making, the dairy product, plant-based milk, or product of plant-based milk includes a milk, such as whole milk, nonfat milk, lactose-free milk, buttermilk, condensed milk, cashew milk, goat milk, rick milk, soy milk, oat milk, almond milk, coconut milk, a yogurt, cheese, frosting, pudding, chocolate, custard, ice cream, gelato, sherbet, sorbet, frozen yogurt or any combination thereof.

[0895] In some embodiments of the aforementioned methods of making, the plant extract including a steroidal saponin is obtained from a plant from any one or more of the following families or genera: Asparagaceae, Amaryllidaceae, Dioscoreaceae, Liliaceae, Costaceae, Melanthiaceae, Plantaginaceae, Fabaceae, Asteraceae, Asparagus, Tupistra, Anemarrhena, Sansevieria, Polygonatum, Nolina, Convallaria, Ophipogon, Hosta, Ornithogalum, Ruscus, Agapanthus, Dioscorea, Fritillaria, Lilium, Costus, Paris, Digitalis, Trigonella, Smilax, or Vernonia.

[0896] In some embodiments of the aforementioned methods of making, the plant extract including a steroidal saponin is obtained from a plant from any one or more of the following species: *Smilax riparia*, *Smilax lanceaefolia*, *Smilax nipponica*, *Smilax nigrescens*, *Smilax officinalis*, *Smilax aspera subsp. Mauritanica*, *Smilax aristolochiifolia*, *Smilax ornate*, *Smilax glabra*, *Smilax china*, *Smilax menispermoides*, *Smilax lebrunii*, *Smilax stans*, *Smilax bockii*, *Smilax excelsa*, *Smilax microphylla*, *Smilax scobinicaulis*, *Smilax sieboldii*, *Smilax krausiana*, *Smilax medica*, *Asparagus acutifolius*, *Asparagus aethiopicus*, *Asparagus africanus*, *Asparagus asparagoides*, *Asparagus burchellii*, *Asparagus cochinchinensis*, *Asparagus declinatus*, *Asparagus capensis*, *Asparagus curillus*, *Asparagus densiflorus*, *Asparagus exuvialis*, *Asparagus falcatus*, *Asparagus fallax*, *Asparagus flagellaris*, *Asparagus horridus*, *Asparagus krebsianus*, *Asparagus laricinus*, *Asparagus lignosus*, *Asparagus macowanii*, *Asparagus mariae*, *Asparagus maritimus*, *Asparagus mucronatus*, *Asparagus multiflorus*, *Asparagus nesiotes*, *Asparagus officinalis*, *Asparagus ovatus*, *Asparagus pastorianus*, *Asparagus persicus*, *Asparagus racemosus*, *Asparagus retrofractus*, *Asparagus rubicundus*, *Asparagus scandens*, *Asparagus schoberioides*, *Asparagus scoparius*, *Asparagus*

setaceus, *Asparagus striatus*, *Asparagus suaveolens*, *Asparagus tenuifolius*, *Asparagus umbellatus*, *Asparagus vaginellatus*, *Trigonella foenum graecum* or *Asparagus virgatus*.

[0897] In some embodiments of the aforementioned methods of making, the mixture provides a taste perception in the subject of a reduction in bitterness or bitterness perception, a masking of bitter tastes or bitterness, a reduction in sourness or sourness perception, a masking of sour tastes or sourness, a reduction in initial sourness perception or lingering sourness perception, a reduction in astringency or astringency perception, a masking of astringency, or a masking of off tastes when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0898] In some embodiments of the aforementioned methods of making, the mixture provides a taste perception in the subject of masked cooked tastes, masked metallic tastes, enhanced beer flavor, enhanced alcohol flavor, enhanced retro-nasal effect, increased bitterness perception, enhanced alcohol perception, enhanced spice intensity, increased sour perception, enhanced cooling intensity, faster onset of cooling sensation, increased duration of taste, or reduced stinging taste when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0899] In some embodiments of the aforementioned methods of making, the mixture increases the amount of carbonation bubbles or reduces the carbonation bubble size of a beverage when the mixture is provided to the subject, such as when the mixture is incorporated in a beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0900] In some embodiments of the aforementioned methods of making, the food or beverage or granule, powder, or liquid formulation is selected from water, a carbonated beverage, such as a carbonated fruit beverage, carbonated cola drink or carbonated water, alcoholic beverages, alcohol-free beverages, spices and/or seasonings, such as chili, wasabi, horseradish, mustard, ginger, black pepper, or cinnamon, energy beverages, flavored water, powders for drinks, dairy products, such as milk, yogurt, cheese, or ice cream, plant based milks, products of plant based milk, puddings, cakes, shakes, malts, brownies, pastries,

cookies, cheesecakes, fudge, pies, cobblers, parfaits, mousse, biscuits, custards, frosting, fruits, vegetables, hard candy, soft candy, taffy, chocolates, sugarless candies, chewing gum, bubble gum, juices, teas, coffees, salsa, gel beads, film strips for breath, gelatin candies, pectin candies, starch candies, lozenges, cough drops, throat lozenges, throat sprays, toothpastes or mouth rinses.

[0901] In some embodiments of the aforementioned methods of making, the amount of component (a) in the mixture is at least 2 ppm, such as, 3, 4, 5, 7.5, 10, 20, 30, 40, 50, 60, 70, 80, 90, 100, 110, 120, 130, 140, 150, 160, 170, 180, 190, 200, 210, 220, 230, 240, 250, 260, 270, 280, 290, or 300 ppm or an amount within a range defined by any two of the aforementioned amounts, preferably 2-40 ppm, 6-75 ppm, 6-100 ppm, or 12-200 ppm.

[0902] In some embodiments of the aforementioned methods of making, component (a) is dissolved in food grade ethanol.

[0903] In some embodiments of the aforementioned methods of making, the food grade ethanol is at least 1%, such as 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 15, 20, 25, 30, 35, 40, 45, 50, 60, 70, 80, 85, 90, 95, or 100%, or with a range defined by any two of the aforementioned amounts, preferably 80, 90, or 95%.

[0904] Additional embodiments further include a composition obtained or obtainable by any one or more of the methods mentioned above.

[0905] More embodiments relate to a mixture used for modulating a subject's taste perception of alcohol, spice, cooling, carbonation, astringency, bitterness or sourness or for masking off-tastes, wherein the mixture includes at least two components (a) and (b): (a) a steroidal saponin or analog thereof (for example, a glycosylation molecule of an aglycone, an aglycone of a glycosylated molecule, or a further glycosylated molecule of a glycosylated molecule) or an extract of a plant that includes a steroidal saponin or an analog thereof, such as an *Asparagus racemosus* rhizome extract, a *Trigonella foenum graecum L.* extract or a *Smilax china* extract; and (b) a composition including an alcohol, a spice, a cooling compound, carbonation, an astringent compound, a bitter compound, a sour compound, or a compound with an off-taste; wherein component (a) is admixed with component (b); preferably, wherein the mixture is provided in a food, beverage, granule, powder or liquid formulation; and optionally, wherein the mixture includes one or more preservatives or antioxidants, such as a sulphite, sorbic acid, a sorbate compound, benzoic acid, benzoate, propionic acid, propionate,

ascorbic acid, ascorbate, citric acid, a tocopherol, a retinol, a polyphenol, a phenolic acid, a flavonoid, lipoic acid, N-acetylcysteine, butylated hydroxyanisole, butylated hydroxytoluene or derivatives thereof, preferably, wherein the one or more preservatives or antioxidants improve the shelf-life, flavor profile, or reduce spoilage of the mixture.

[0906] In some embodiments of the aforementioned mixtures for use, the steroidal saponin has one of the following sapogenin structures: spirostane, isospirostane, furostane, pregnane, or cholestane.

[0907] In some embodiments of the aforementioned mixtures for use, the steroidal saponin or extract of a plant that includes a steroidal saponin or an analog thereof includes saponins selected from one or more of the following: Shatavarin I, Shatavarin VIII, Protodioscin, Shatavarin IV, Shatarvain IX, Asparagoside A, Asparenydiol, Asparacosin A, Asparoside B, Sarsasapogenin, Schidigera saponin D5, Shatavarin VI, Immunoside, Shatavarin VII, Shatavarin X, Aspoligonin A, Prosapogenin A, Methyl gracillin, Methyl protodioscin, Neotigogenin-3-O-α-l-rhamnopyranosyl-(1 → 6)-β-d-glucopyranoside, Neotigogenin-3-O-β-d-glucopyranosyl-(1 → 4)-O-[α-l-rhamnopyranosyl-(1 → 6)]-β-d-glucopyranoside, Neotigogenin-3-O-β-d-glucopyranoside, Smilanippin A, Neotigogenin-3-O-β-d-glucopyranosyl-(1 → 4)-O-[α-l-arabinopyranosyl-(1 → 6)]-β-d-glucopyranoside, Sarsasapogenin-3-O-β-d-glucopyranosyl-(1 → 4)-[α-l-arabinopyranosyl- (1 → 6)]-β-d-glucopyranoside, (25S)-5β-Spirostane-3β-ol-3-O-α-l-rhamnopyranosyl-(1 → 2)-β-d-glucopyranosyl-(1 → 2)-β-d-glucopyranoside, Curillin G, Parillin, (25S)-Spirostan-6β-ol-3-O-β-d-glucopyranosyl-(1 → 4)-O-[α-l-arabinopyranosyl-(1 → 6)]-β-d-glucopyranoside, Trinervuloside C, Diosgenin-3-O-α-l-rhamnopyranoside, Dioscin, Diosgenin-3-O-[α-l-rhamnopyranosyl-(1 → 4)]-β-d-glucopyranoside, Diosgenin-3-O-[α-l-rhamnopyranosyl-(1 → 2)]-β-d-glucopyranoside, (25R)-Spirostan-5-en-3-O-α-l-rhamnopyranosyl-(1 → 2)-[α-l-rhamnopyranosyl-(1 → 4)-α-l-rhamnopyranosyl-(1 → 4)]-O-β-d-glucopyranoside, Gracillin, Parisyunnanoside C, Parisyunnanoside D, Parisyunnanoside E, Paris D, Paris H, (25R)-Spirost-5-en-3β,17α,27-triol-3-O-α-l-rhamnopyranosyl-(1 → 2)-[α-l-rhamnopyranosyl-(1 → 4)]-β-d-glucopyranoside, (25S)-Spirostan-5-en-3β,17α,27-triol-3-O-α-l-arabinopyranosyl-(1 → 6)-β-d-glucopyranoside, (25S)-Spirostan-5-en-3β,17α,27-triol-3-O-β-d-glucopyranosyl-(1 → 4)-[α-l-arabinopyranosyl-(1 → 6)]-β-d-glucopyranoside, (25S)-spirost-5-ene-3β,17α,27-triol-3-O-α-l-rhamnopyranosyl-(1 → 4)-β-d-glucopyranoside, (25S)-Spirost-5-en-3β,17α,27-

triol-3-O-β-d-galactopyranoside, (25S)-Spirostan-5-en-3β,27-diol-3-O-α-l-arabinopyranosyl-(1 → 6)-β-d- glucopyranoside, Isonarthogenin3-O-α-l-rhamnopyranosyl-(1 → 2)-O-[α-l-rhamnopyranosyl-(1 → 4)]-β-d-glucopyranoside, Smilscobinoside A, Sieboldiin A, Sieboldiin B, Sieboldogenin, (25R)-5α-Spirostan-3β-ol-6-one-3-O-[α-l-arabinopyranosyl-(1 → 4)]-β-d-glucopyranoside, Smilaxin A, Smilaxin B, Parisvietnaside A, Smilaxin C, (25R)-5α-Spirostan-3β,6β-diol-3-O-β-d-glucopyranosyl-(1 → 4)-[α-l-arabinopyranosyl-(1 → 6)]-β-d-glucopyranoside, Smilscobinoside B, (25R)-5α-Spirostan-3β,17α,27-triol-3-O-β-d-glucopyranosyl-(1 → 4)-[α-l-arabinopyranosyl-(1 → 6)]-β-d-glucopyranosie, (25R)-5βSpirostan-3β-ol-3-O-β-d-glucopyranosyl-(1 → 6)-[β-d-glucopyranosyl-(1 → 4)]-β-d-glucopyranoside, (25R)-5β-Spirostan-3β-ol-3-O-β-d-glucopyranosyl-(1 → 6)-[β-d-glucopyranosyl-(1 → 2)]-[β-d-glucopyranosyl-(1 → 4)]-β-d-glucopyranoside, Disporoside A, (25R)-5β-Spirostan-3β-ol-3-O-β-d-glucopyranosyl-(1 → 6)-β-d-glucopyranoside, (25R)-5β-Spirostan-3β-ol-3-O-β-d-glucopyranosyl-(1 → 6)-[β-d-glucopyranosyl-(1 → 2)]-[α-l-rhamnopyranosyl-(1 → 4)]-β-d-glucopyranoside, Smilagenin 3-O-β-d-glucopyranoside, Methylprotodioscin, 26-O-β-d-Glucopyranosyl-(25R)-furostan-5-en-3β,26-diol-22-methoxy-3-O-α-l-rhamnopyranosyl-(1 → 2)-β-d-glucopyranoside, 26-O-β-d-Glucopyranosyl-22α-O-methyl-(25R)-furost-5-en-3β,26-diol-3-O-α-l-rhamnopyranosyl-(1 → 4)-α-l-rhamnopyranosyl-(1 → 4)-[α-l-rhamnopyranosyl-(1 → 2)]-β-d-glucopyranoside, Protodiosgenin-3-O-α-l-rhamnopyranosyl-(1 → 4)-α-l-rhamnopyranosyl(1 → 4)-[α-l-rhamnopyranosyl(1 → 2)]-β-d-glucopyranoside, 26-O-β-d-Glucopyranosyl-22α-hydroxy-(25R)-furost-5-en-3β,26-diol-3-O-[4-O-acetyl-α-l-rhamnopyranosyl]-(1 → 2)-[α-l-rhamnopyranosyl-(1 → 4)]-β-d-glucopyranoside, 26-O-β-d-Glucopyranosyl-22α-hydroxy-(25R)-furost-5-en-3β,26-diol-3-O-[2-O-acetyl-α-l-rhamnopyranosyl]-(1 → 2)-[α-l-rhamnopyranosyl-(1 → 4)]-β-d-glucopyranoside, 26-O-β-d-Glucopyranosyl-22α-hydroxy-(25R)-furost-5-en-3β,26-diol-3-O-[3-O-acetyl-α-l-rhamnopyranosyl]-(1 → 2)-[α-l-rhamnopyranosyl-(1 → 4)]-β-d-glucopyranoside, 26-O-β-d-Glucopyranosyl-(25R)-furostan-5-en-3β,17α-diol-3-O-α-l-rhamnopyranosyl-(1 → 2)-α-l-rhamnopyranoside, Protogracillin, Parisaponin I, Parisyunnanoside A, Pseudoprotodioscin, 26-O-β-d-Glucopyranosyl-(25R)-furostan-5,20(22)-dien-3β,26-diol-3-O-α-l-rhamnopyranosyl-(1 → 2)-β-d-glucopyranoside, 15-Hydroxypseudoprotodioscin, 15-Methoxypseudoprotodioscin, 23-Oxopseudoprotodioscin, 26-O-β-d-Glucopyranosyl-(25S)-5-furosa-20(22)-en-3β,26-diol-3-

O-α-l-rhamnopyranosyl-(1 → 2)-O-[α-l-rhamnopyranosyl-(1 → 6)]-β-d-glucopyranoside, Pscudoproto-pb, 26-O-β-d-Glucopyranosyl-(25R)-5α-furostan-3β,22,26-triol-6-onc-3-O-α-l-arabinopyranosyl-(1 → 6)-β-d-glucopyranoside, 26-O-β-d-Glucopyranosyl-(25R)-5α-furostan-3β,22,26-triol-6-one-3-O-β-d-glucopyranosyl-(1 → 4)-[α-l-arabinopyranosyl-(1 → 6)]-β-d-glucopyranoside, 26-O-β-d-Glucopyranosyl-(25R)-5α-furostan-3β,26-diol-22-methoxyl-6-one-3-O-α-l-arabinopyranosyl-(1 → 6)-β-d-glucopyranoside, 26-O-β-d-Glucopyranosyl-(25R)-5α-furostan-3β,26-diol-22-methoxyl-6-one, 26-O-β-d-Glucopyranosyl-(25S)-5β-furostan-3β,26-diol-22α-methoxy-3-O-β-d-glucopyranosyl-(1 → 6)-[β-d-glucopyranosyl-(1 → 2)]-[β-d-glucopyranosyl-(1 → 4)]-β-d-glucopyranoside, (25S)-26-O-β-d-glucopyranosyl-3β,5β,22α-furostan-3,22,26-triol-3-O-α-l-rhamnopyranosyl-(1 → 2)-O-β-d-glucopyranosyl-(1 → 2)-O-β-d-glucopyranoside, Asparagoside E, Asparoside A, Asparoside B, 26-O-β-d-Glucopyranosyl-(25S)-5β-furostan-3β,22α-diol-3-O-α-l-arabinopyranosyl-(1 → 6)-[β-d-glucopyranosyl-(1 → 4)]-β-d-glucopyranoside, 26-O-β-d-Glucopyranosyl-(25S)-5α-furostan-3β,22α-diol-3-O-α-l-arabinopyranosyl-(1 → 6)-[β-d-glucopyranosyl-(1 → 4)]-β-d-glucopyranoside, 26-O-β-d-Glucopyranosyl-(25S)-5α-furostan-3β,6β,22α-tetraol-3-O-α-l-arabinopyranosyl-(1 → 6)-[β-d-glucopyranosyl-(1 → 4)]-β-d-glucopyranoside, Sarsaparilloside B, Sarsaparilloside C, Sarsaparilloside, Δ20(22)-Sarsaparilloside, Riparoside A, Smilaxchinoside A, (25R)-Smilaxchinoside A, Smilaxchinoside B, Smilaxchinoside C, Dioscoreside E, (25R)-5α-Furostan-3β,26-diol-20(22)-en-6-one-26-O-β-d-glucopyranoside, (23R,25R)-5α-Furostan-3β,23,26-triol-20(22)-en-6-one-26-O-β-d-glucopyranoside, 26-O-β-d-Glucopyranosyl-(25R)-5α-furostan-3β,26-diol-20(22)-en-6-one-3-O-α-l-arabinopyranosyl-(1 → 6)-β-d-glucopyranoside, (25S)-5β-Furostan-1β,2β,3β,5β,22α,26-hexaol-26-O-β-d-glucopyranoside, 26-O-β-d-Glucopyranosyl-(25S)-5β-furostan-1β,3β,22α,26-tetraol-1-O-β-d-glucopyranoside, Trinervuloside A, Riparoside B, Timosaponin J, Timosaponin K, Trinervuloside B, Pregna-5,16-diene-3β-ol-20-one-3-O-α-l-rhamnopyranosyl-(1 → 2)-O-[α-l-rhamnopyranosyl-(1 → 4)]-β-d-glucopyranoside, Pregna-5,16-diene-3β-ol-20-one-3-O-α-l-rhamnopyranosyl-(1 → 4)-α-l-rhamnopyranosyl-(1 → 4)-[α-l-rhamnopyranosyl-(1 → 2)]-β-d-glucopyranoside, Pregna-5,16-diene-3β-ol-20-one-3-O-α-l-rhamnopyranosyl-(1 → 2)-[α-l-rhamnopyranosyl-(1 → 4)]-α-l-rhamnopyranosyl-(1 → 2)-β-d-glucopyranoside, Pallidfloside D, Anguivioside XV,

Yamogenin, Diosgenin, Smilagenin, Sarsasapogenin, Tigogenin, Neotigogenin, Gitogenin, Yuccagenin, Saponarctin or Smilaxchinoside D.

[0908] In some embodiments of the aforementioned methods of making, the steroidal saponin or analog thereof or extract of a plant that comprises a steroidal saponin or an analog thereof comprises a glucosylated steroidal saponin or an aglycone of a steroidal sanponin.

[0909] In some embodiments of the aforementioned mixtures for use, the composition is an alcoholic or non-alcoholic beverage, a carbonated beverage, a spice or spicy compound, such as a chili, wasabi, horseradish, mustard, ginger, black pepper, cinnamon, pumpkin spice, Szechuan pepper, allspice or any combination thereof, an astringent compound, such as phenolic compounds, tannins, gallic acid, zinc oxide, zinc sulfate, tannic acid, potassium permanganate, silver nitrate, tincture of benzoin, potassium alum, caftaric acid, acacia, yarrow, sage, witch hazel, vinegar, tea, fruits, vegetables, dairy products, herbs, nuts or any combination thereof, a bitter compound, such as Absinthin, Aloin, Alpha acid, Amarogentin, Andrographolide, Brucine, Caffeine, Denatonium, Eugenin, Hesperidin, Humulone, Isohumulone, Kaempferol 3-O-rutinoside, 6-Methoxymellein, Naringin, Papaverine, Phenylthiocarbamide, Propylthiouracil, Quassin, Quinidine, Quinine, Salicin, Strychnine, Sucrose octaacetate, Sucrose octapropionate, Theobromine, Theophylline, vegetables, tea, chocolate, fruits or any combination thereof, a sour compound, such as acetic acid, citric acid, hydrochloric acid, lactic acid, malic acid, nitric acid, fumaric acid, sulfuric acid, tartaric acid, phosphoric acid, other acid or any combination thereof, a cooling compound, such as Menthol, Cyclohexanecarboxamide,N-Ethyl-5-Methyl-2-(1- Methylethyl) (WS-3), N-(Ethoxycarbonylmethyl)-3-p-menthanecarboxamide (WS-5), (1R,2S,5R)-N-(4-Methoxyphenyl)-5-methyl-2-(1- methylethyl)cyclohexanecarboxamide (WS-12), Butanamide, N,2,3-trimethyl-2-(1-methylethyl) (WS-23), or Menthyl Lactate or any combination thereof, a compound with an off-taste, such as plant-based milks or products of plant-based milks, dairy products, fruits, juices, proteins, plant protein, whole grain products or any combination thereof.

[0910] In some embodiments of the aforementioned mixtures for use, the dairy product, plant-based milk, or product of plant-based milk includes a milk, such as whole milk, nonfat milk, lactose-free milk, buttermilk, condensed milk, cashew milk, goat milk, rick milk,

soy milk, oat milk, almond milk, coconut milk, a yogurt, cheese, frosting, pudding, chocolate, custard, ice cream, gelato, sherbet, sorbet, frozen yogurt or any combination thereof.

[0911] In some embodiments of the aforementioned mixtures for use, the plant extract including a steroidal saponin is obtained from a plant from any one or more of the following families or genera: Asparagaceae, Amaryllidaceae, Dioscoreaceae, Liliaceae, Costaceae, Melanthiaceae, Plantaginaceae, Fabaceae, Asteraceae, Asparagus, Tupistra, Anemarrhena, Sansevieria, Polygonatum, Nolina, Convallaria, Ophipogon, Hosta, Ornithogalum, Ruscus, Agapanthus, Dioscorea, Fritillaria, Lilium, Costus, Paris, Digitalis, Trigonella, Smilax or Vernonia.

[0912] In some embodiments of the aforementioned mixtures for use, the plant extract including a steroidal saponin is obtained from a plant from any one or more of the following species: *Smilax riparia*, *Smilax lanceaefolia*, *Smilax nipponica*, *Smilax nigrescens*, *Smilax officinalis*, *Smilax aspera subsp. Mauritanica*, *Smilax aristolochiifolia*, *Smilax ornate*, *Smilax glabra*, *Smilax china*, *Smilax menispermoides*, *Smilax lebrunii*, *Smilax stans*, *Smilax bockii*, *Smilax excelsa*, *Smilax microphylla*, *Smilax scobinicaulis*, *Smilax sieboldii*, *Smilax krausiana*, *Smilax medica*, *Asparagus acutifolius*, *Asparagus aethiopicus*, *Asparagus africanus*, *Asparagus asparagoides*, *Asparagus burchellii*, *Asparagus cochinchinensis*, *Asparagus declinatus*, *Asparagus capensis*, *Asparagus curillus*, *Asparagus densiflorus*, *Asparagus exuvialis*, *Asparagus falcatus*, *Asparagus fallax*, *Asparagus flagellaris*, *Asparagus horridus*, *Asparagus krebsianus*, *Asparagus laricinus*, *Asparagus lignosus*, *Asparagus macowanii*, *Asparagus mariae*, *Asparagus maritimus*, *Asparagus mucronatus*, *Asparagus multiflorus*, *Asparagus nesiotes*, *Asparagus officinalis*, *Asparagus ovatus*, *Asparagus pastorianus*, *Asparagus persicus*, *Asparagus racemosus*, *Asparagus retrofractus*, *Asparagus rubicundus*, *Asparagus scandens*, *Asparagus schoberioides*, *Asparagus scoparius*, *Asparagus setaceus*, *Asparagus striatus*, *Asparagus suaveolens*, *Asparagus tenuifolius*, *Asparagus umbellatus*, *Asparagus vaginellatus*, *Trigonella foenum graecum* or *Asparagus virgatus*.

[0913] In some embodiments of the aforementioned mixtures for use, the mixture provides a taste perception in the subject of a reduction in bitterness or bitterness perception, a masking of bitter tastes or bitterness, a reduction in sourness or sourness perception, a masking of sour tastes or sourness, a reduction in initial sourness perception or lingering sourness perception, a reduction in astringency or astringency perception, a masking of

astringency, or a masking of off tastes when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0914] In some embodiments of the aforementioned mixtures for use, the mixture provides a taste perception in the subject of masked cooked tastes, masked metallic tastes, enhanced beer flavor, enhanced alcohol flavor, enhanced retro-nasal effect, increased bitterness perception, enhanced alcohol perception, enhanced spice intensity, increased sour perception, enhanced cooling intensity, faster onset of cooling sensation, increased duration of taste, or reduced stinging taste when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0915] In some embodiments of the aforementioned mixtures for use the mixture, increases the amount of carbonation bubbles or reduces the carbonation bubble size of a beverage when the mixture is provided to the subject, such as when the mixture is incorporated in a beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0916] In some embodiments of the aforementioned mixtures for use, the food or beverage or granule, powder, or liquid formulation is selected from water, a carbonated beverage, such as a carbonated fruit beverage, carbonated cola drink or carbonated water, alcoholic beverages, alcohol-free beverages, spices and/or seasonings, such as chili, wasabi, horseradish, mustard, ginger, black pepper, or cinnamon, energy beverages, flavored water, powders for drinks, dairy products, such as milk, yogurt, cheese, or ice cream, plant based milks, products of plant based milk, puddings, cakes, shakes, malts, brownies, pastries, cookies, cheesecakes, fudge, pies, cobblers, parfaits, mousse, biscuits, custards, frosting, fruits, vegetables, hard candy, soft candy, taffy, chocolates, sugarless candies, chewing gum, bubble gum, juices, teas, coffees, salsa, gel beads, film strips for breath, gelatin candies, pectin candies, starch candies, lozenges, cough drops, throat lozenges, throat sprays, toothpastes or mouth rinses.

[0917] In some embodiments of the aforementioned mixtures for use, the amount of component (a) in the mixture is at least 2 ppm, such as, 3, 4, 5, 7.5, 10, 20, 30, 40, 50, 60,

70, 80, 90, 100, 110, 120, 130, 140, 150, 160, 170, 180, 190, 200, 210, 220, 230, 240, 250, 260, 270, 280, 290, or 300 ppm or an amount within a range defined by any two of the aforementioned amounts, preferably 2-40 ppm, 6-75 ppm, 6-100 ppm, or 12-200 ppm.

[0918] In some embodiments, the methods described herein relate to a mixture for use, the method further including selecting or identifying a subject to receive a composition, which modulates a taste perception in a subject, such as alcohol, spice, cooling carbonation, bitterness, sourness, or astringency, or which masks off-tastes in a subject, such as bitter or sour tastes.

[0919] In some embodiments, the methods described herein relate to a mixture for use, the method further including determining or analyzing the alcohol perception, bitterness perception, bitterness intensity, the masking of bitterness, the sourness perception, sourness intensity, the masking of sourness, astringency perception, astringency intensity, the masking of astringency, or the masking of off-tastes or any combination thereof of the subject after consuming said mixture or determining or analyzing the increase of carbonation bubbles, the reduction of carbonation bubble size of a carbonated beverage after providing composition component (a).

[0920] In some embodiments of the aforementioned mixtures for use, component (a) is dissolved in food grade ethanol.

[0921] In some embodiments of the aforementioned mixtures for use, the food grade ethanol is at least 1%, such as 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 15, 20, 25, 30, 35, 40, 45, 50, 60, 70, 80, 85, 90, 95, or 100%, or with a range defined by any two of the aforementioned amounts, preferably 80, 90, or 95%.

D. Compounds containing *Rehmannia glutinosa* root extract or iridoid glycosides

[0922] Described herein are compositions and uses of compositions comprising *Rehmannia glutinosa* root extract or iridoid glycosides or an analog thereof (for example, a glycosylation molecule of an aglycone, an aglycone of a glycosylated molecule, or a further glycosylated molecule of a glycosylated molecule), preferably from *Rehmannia glutinosa* or other sources, which effectively reduce bitterness or bitterness taste perception, mask bitter tastes or bitterness, reduce sourness or sourness or acidic taste perception, mask sour or acidic tastes or sourness, reduce initial sourness or acidic taste perception or lingering sourness or

acidic taste perception, reduce astringency or astringency perception, mask astringency, or which effectively mask off tastes.

[0923] When *Rehmannia glutinosa* root extract or iridoid glycosides and derivatives thereof are added to compositions containing an astringent compound, a bitter compound, a sour compound, or a compound with an off-taste compound, they are found to reduce the astringency perception, astringency intensity, bitterness perception, bitterness intensity, sourness or acidic taste perception, sourness or acidic taste intensity, or to mask off-tastes of an astringent compound, bitter compound, sour or acidic compound, or compound with an off-taste admixed with the extract or iridoid glycoside. In the present disclosure, *Rehmannia glutinosa* root extract or iridoid gylcosides may be available commercially, and can also be isolated and purified from a botanical extract derived from particular families or genera, including, but not limited to, Cornaceae, Gentianaceae, Eucommiaceae, Scrophulariaceae, Rubiaceae, Lamiaceae, Pedaliaceae, Verbenaceae, Bignoniaceae, Gentiana, Rehmannia, or Antirrhinum, and from particular species or varieties, including, but not limited to, *Coronus officinalis, Eucommia ulmoides, Gardenia jasminoides, Stachys betonica, Harpagophytum procumbens, Rehmannia glutinosa, Rehmannia chingii, Rehmannia chrysantha, Rehmannia henryi, Rehmannia japonica, Rehmannia piasezkii, Rehmannia solanifolia, Verbena officinalis*, or *Kigelia pinnata*, or any plants comprising iridoid glycosides and/or iridoid glygoside components, including hybrids and progeny from any of the aforementioned species. For example, a botanical extract as described from the disclosure herein may be from 0.01% to 95%, from 0.05% to 50% or from 0.1% to 10%. Compositions may contain up to 99 wt% of a particular plant extract, preferably a combination of plant extracts, wherein an equal amount of each plant extract is used. Some compositions may contain, for example, between at least 0.05 wt% - 99 wt% of an extract. Unless otherwise specified, percentages (% s) are by weight.

[0924] In some embodiments, the plant extract or plant that includes an iridoid glycoside useful in the embodiments described herein includes iridoid glyscosides selected from one of the following: Aucubin, Catalpol, Rehmannioside A, Rehmannioside B, Rehmannioside C, Rehmannioside D, Rehmannioside E, or Rehmannioside F.

[0925] Several embodiments described herein relate to a method for modulating a subject's taste perception of astringency, bitterness, or sourness or masking off-tastes, the

method including: providing a subject a mixture that includes at least two components (a) and (b): (a) an iridoid glycoside or analog thereof (for example, a glycosylation molecule of an aglycone, an aglycone of a glycosylated molecule, or a further glycosylated molecule of a glycosylated molecule) or an extract of a plant that comprises an iridoid glycoside or an analog thereof, such as a *Rehmannia glutinosa* root extract; and (b) a composition including an astringent compound, a bitter compound, a sour compound, or a compound with an off-taste; wherein component (a) is admixed with component (b); wherein the mixture is preferably provided in a food, beverage, granule, powder or liquid formulation; and optionally, wherein the mixture includes one or more preservatives or antioxidants, such as a sulphite, sorbic acid, a sorbate compound, benzoic acid, benzoate, propionic acid, propionate, ascorbic acid, ascorbate, citric acid, a tocopherol, a retinol, a polyphenol, a phenolic acid, a flavonoid, lipoic acid, N-acetylcysteine, butylated hydroxyanisole, butylated hydroxytoluene or derivatives thereof, preferably, wherein the one or more preservatives or antioxidants improve the shelf-life, flavor profile, or reduce spoilage of the mixture; and/or optionally, selecting a composition that includes an astringent compound, a bitter compound, a sour compound, or a compound with an off-taste for receiving an agent that modulates the taste perception of a subject of astringency, bitterness, or sourness or masks off-tastes and providing said selected composition component (a); and/or optionally, evaluating the modulation of a subject's taste perception of astringency, bitterness, or sourness or evaluating the masking of off-tastes after providing the subject the mixture.

[0926] In some of the aforementioned methods, the iridoid glycoside or extract of a plant that comprises an iridoid glycoside includes iridoid glycosides selected from one or more of the following: Aucubin, Catalpol, Rehmannioside A, Rehmannioside B, Rehmannioside C, Rehmannioside D, Rehmannioside E, or Rehmannioside F.

[0927] In some of the aforementioned methods the iridoid glycoside or analog thereof or extract of a plant that comprises an iridoid glycoside or analog thereof comprises a glucosylated iridoid glycoside or an aglycones of an iridoid glycoside.

[0928] In some of the aforementioned methods, the composition is an alcoholic or non-alcoholic beverage, an astringent compound, such as phenolic compounds, tannins, tannic acid, citric acid, gallic acid, zinc oxide, zinc sulfate, tannic acid, potassium permanganate, silver nitrate, tincture of benzoin, potassium alum, caftaric acid, acacia, yarrow, sage, witch

hazel, vinegar, tea, fruits, vegetables, dairy products, herbs, nuts or any combination thereof, a bitter compound, such as Absinthin, Aloin, Alpha acid, Amarogentin, Andrographolide, Brucine, Caffeine, Denatonium, Eugenin, Hesperidin, Humulone, Isohumulone, Kaempferol 3-O-rutinoside, 6-Methoxymellein, Naringin, Papaverine, Phenylthiocarbamide, Propylthiouracil, Quassin, Quinidine, Quinine, Salicin, Strychnine, Sucrose octaacetate, Sucrose octapropionate, Theobromine, Theophylline, vegetables, tea, chocolate, fruits or any combination thereof, a sour compound, such as acetic acid, citric acid, hydrochloric acid, lactic acid, malic acid, nitric acid, fumaric acid, sulfuric acid, tartaric acid, phosphoric acid, other acid or any combination thereof, a compound with an off-taste, such as plant-based milks or products of plant-based milks, dairy products, fruits, juices, proteins, plant protein, whole grain products or any combination thereof.

[0929] In some of the aforementioned methods, the dairy product, plant-based milk, or product of plant-based milk includes a milk, such as whole milk, nonfat milk, lactose-free milk, buttermilk, condensed milk, cashew milk, goat milk, rick milk, soy milk, oat milk, almond milk, coconut milk, a yogurt, cheese, frosting, pudding, chocolate, custard, ice cream, gelato, sherbet, sorbet, frozen yogurt or any combination thereof.

[0930] In some of the aforementioned methods, the plant extract including an iridoid glycoside is obtained from a plant from any one or more of the following families or genera: Cornaceae, Gentianaceae, Eucommiaceae, Scrophulariaceae, Rubiaceae, Lamiaceae, Pedaliaceae, Verbenaceae, Bignoniaceae, Gentiana, Rehmannia, or Antirrhinum.

[0931] In some of the aforementioned methods, the plant extract including an iridoid glycoside is obtained from a plant from any one or more of the following species: *Coronus officinalis, Eucommia ulmoides, Gardenia jasminoides, Stachys betonica, Harpagophytum procumbens, Rehmannia glutinosa, Rehmannia chingii, Rehmannia chrysantha, Rehmannia henryi, Rehmannia japonica, Rehmannia piasezkii, Rehmannia solanifolia, Verbena officinalis,* or *Kigelia pinnata.*

[0932] In some of the aforementioned methods, the mixture provides a taste perception in the subject of a reduction in bitterness or bitterness perception, a masking of bitter tastes or bitterness, a reduction in sourness or sourness perception, a masking of sour tastes or sourness, a reduction in initial sourness perception or lingering sourness perception, a reduction in acidic taste or acidic taste perception, a reduction in lingering acidic taste

perception, a reduction in astringency or astringency perception, a masking of astringency, a masking of acidic tastes, or a masking of off tastes when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0933] In some of the aforementioned methods, the mixture provides a taste perception in the subject of an enhancement of creaminess, creamy flavor, or creaminess perception, an enhancement of fattiness, fatty flavor, or fattiness perception, an enhancement in fruitiness, fruity flavor, or fruitiness perception, an enhancement of brightness, bright flavor, or bright perception, or an increase of sweetness or sweetness perception when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0934] In some of the aforementioned methods, the mixture modulates a subject's taste perception when the mixture is provided to the subject without negatively affecting the shelf life of a food or beverage or without increasing the pH of the food or beverage when the mixture is incorporated into the food or beverage. By incorporating an iridoid glycoside or a plant extract comprising an iridoid glycoside in an acidic food or beverage, preferably obtained from any one or more of the following families or genera: *Cornaceae, Gentianaceae, Eucommiaceae, Scrophulariaceae, Rubiaceae, Lamiaceae, Pedaliaceae, Verbenaceae, Bignoniaceae, Gentiana, Rehmannia*, or *Antirrhinum,* and most preferably from any one or more of the following species: *Coronus officinalis, Eucommia ulmoides, Gardenia jasminoides, Stachys betonica, Harpagophytum procumbens, Rehmannia glutinosa, Rehmannia chingii, Rehmannia chrysantha, Rehmannia henryi, Rehmannia japonica, Rehmannia piasezkii, Rehmannia solanifolia, Verbena officinalis,* or *Kigelia pinnata,* the acidic food or beverage provides a subject with a non-acidic taste perception, a reduced acidic taste perception, or a masked acidic taste perception, yet the food or beverage maintains its acidic pH. By generating a non-acidic taste perception, a reduced acidic taste perception, or a masked acidic taste perception, in this manner and thereby maintaining the acidic pH of the food or beverage, a greater shelf-life or storage capacity for the food or beverage is provided. That is, by incorporating an iridoid glycoside or a plant extract comprising an iridoid glycoside

in an acidic food or beverage as set forth herein, one can unexpectedly maintain the longer shelf-life and storage capacity enjoyed by acidic food or beverages but mask the acidic taste perception of a subject that consumes the food or beverage comprising the iridoid glycoside or a plant extract comprising an iridoid glycoside.

[0935] In some of the aforementioned methods, the food or beverage or granule, powder, or liquid formulation is selected from water, a carbonated beverage, such as a carbonated fruit beverage, carbonated cola drink or carbonated water, alcoholic beverages, alcohol-free beverages, spices and/or seasonings, such as chili, wasabi, horseradish, mustard, ginger, black pepper, or cinnamon, energy beverages, flavored water, powders for drinks, dairy products, such as milk, yogurt, cheese, or ice cream, plant based milks, products of plant based milk, puddings, cakes, shakes, malts, brownies, pastries, cookies, cheesecakes, fudge, pies, cobblers, parfaits, mousse, biscuits, custards, frosting, fruits, vegetables, hard candy, soft candy, taffy, chocolates, sugarless candies, chewing gum, bubble gum, juices, teas, coffees, salsa, gel beads, film strips for breath, gelatin candies, pectin candies, starch candies, lozenges, cough drops, throat lozenges, throat sprays, toothpastes or mouth rinses.

[0936] In some of the aforementioned methods, the amount of component (a) in the mixture is at least 2 ppm, such as, 3, 4, 5, 7.5, 10, 20, 30, 40, 50, 60, 70, 80, 90, 100, 110, 120, 130, 140, 150, 160, 170, 180, 190, 200, 210, 220, 230, 240, 250, 260, 270, 280, 290, or 300 ppm or an amount within a range defined by any two of the aforementioned amounts, preferably 2-40 ppm, 6-75 ppm, 6-100 ppm, or 50-300 ppm.

[0937] In some embodiments, the aforementioned methods further include selecting or identifying a subject to receive a composition, which modulates a taste perception in a subject, such as bitterness, acidity, sourness, or astringency, or which masks off-tastes in a subject, such as bitter, acidic, or sour tastes.

[0938] In some embodiments, the aforementioned methods further include determining or analyzing the bitterness perception, bitterness intensity, the masking of bitterness, the sourness perception, sourness intensity, the masking of sourness, the acidic perception, acidic intensity, the masking of acidity, sweetness perception, sweetness intensity, astringency perception, astringency intensity, the masking of astringency, the enhancement of creaminess, creamy flavor, or creaminess perception, an enhancement of fattiness, fatty flavor, or fattiness perception, an enhancement in fruitiness, fruity flavor, or fruitiness perception or

the masking of off-tastes or any combination thereof of the subject after consuming said mixture.

[0939] In some of the aforementioned methods, component (a) is dissolved in food grade ethanol.

[0940] In some of the aforementioned methods, the food grade ethanol is at least 1%, such as 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 15, 20, 25, 30, 35, 40, 45, 50, 60, 70, 80, 85, 90, 95, or 100%, or with a range defined by any two of the aforementioned amounts, preferably 80, 90, or 95%.

[0941] Additional embodiments described herein relate to methods of making a mixture, which modulates a subject's taste perception of astringency, bitterness, acidity, or sourness or masking off-tastes, the method comprising: admixing a component (a) with a component (b) to form said mixture: (a) an iridoid glycoside or analog thereof (for example, a glycosylation molecule of an aglycone, an aglycone of a glycosylated molecule, or a further glycosylated molecule of a glycosylated molecule) or an extract of a plant that comprises an iridoid glycoside or an analog thereof, such as a *Rehmannia glutinosa* root extract; and (b) a composition including an astringent compound, a bitter compound, a sour compound, an acidic pH, or a compound with an off-taste; wherein component (a) is admixed with component (b); wherein the mixture is preferably provided in a food, beverage, granule, powder or liquid formulation; and optionally, wherein the composition comprises one or more preservatives or antioxidants, such as a sulphite, sorbic acid, a sorbate compound, benzoic acid, benzoate, propionic acid, propionate, ascorbic acid, ascorbate, citric acid, a tocopherol, a retinol, a polyphenol, a phenolic acid, a flavonoid, lipoic acid, N-acetylcysteine, butylated hydroxyanisole, butylated hydroxytoluene or derivatives thereof, preferably, wherein the one or more preservatives or antioxidants improve the shelf-life, flavor profile, or reduce spoilage of the mixture.

[0942] In some embodiments of the aforementioned methods of making, the iridoid glycoside or extract of a plant that comprises an iridoid glycoside comprises iridoid glycosides selected from one or more of the following: Aucubin, Catalpol, Rehmannioside A, Rehmannioside B, Rehmannioside C, Rehmannioside D, Rehmannioside E, or Rehmannioside F.

[0943] In some embodiments of the aforementioned methods of making, the iridoid glycoside or analog thereof or extract of a plant that comprises an iridoid glycoside or analog thereof comprises a glucosylated iridoid glycoside or an aglycones of an iridoid glycoside.

[0944] In some embodiments of the aforementioned methods of making, the composition is an alcoholic or non-alcoholic beverage, an astringent compound, such as phenolic compounds, tannins, citric acid, gallic acid, zinc oxide, zinc sulfate, tannic acid, potassium permanganate, silver nitrate, tincture of benzoin, potassium alum, caftaric acid, acacia, yarrow, sage, witch hazel, vinegar, tea, fruits, vegetables, dairy products, herbs, nuts or any combination thereof, a bitter compound, such as Absinthin, Aloin, Alpha acid, Amarogentin, Andrographolide, Brucine, Caffeine, Denatonium, Eugenin, Hesperidin, Humulone, Isohumulone, Kaempferol 3-O-rutinoside, 6-Methoxymellein, Naringin, Papaverine, Phenylthiocarbamide, Propylthiouracil, Quassin, Quinidine, Quinine, Salicin, Strychnine, Sucrose octaacetate, Sucrose octapropionate, Theobromine, Theophylline, vegetables, tea, chocolate, fruits or any combination thereof, a sour compound, such as acetic acid, citric acid, hydrochloric acid, lactic acid, malic acid, nitric acid, fumaric acid, sulfuric acid, tartaric acid, phosphoric acid, other acid or any combination thereof, a compound with an off-taste, such as plant-based milks or products of plant-based milks, dairy products, fruits, juices, proteins, plant protein, whole grain products or any combination thereof.

[0945] In some embodiments of the aforementioned methods of making, the dairy product, plant-based milk, or product of plant-based milk includes a milk, such as whole milk, nonfat milk, lactose-free milk, buttermilk, condensed milk, cashew milk, goat milk, rick milk, soy milk, oat milk, almond milk, coconut milk, a yogurt, cheese, frosting, pudding, chocolate, custard, ice cream, gelato, sherbet, sorbet, frozen yogurt or any combination thereof.

[0946] In some embodiments of the aforementioned methods of making, the plant extract comprising an iridoid glycoside is obtained from a plant from any one or more of the following families or genera: Cornaceae, Gentianaceae, Eucommiaceae, Scrophulariaceae, Rubiaceae, Lamiaceae, Pedaliaceae, Verbenaceae, Bignoniaceae, Gentiana, Rehmannia, or Antirrhinum.

[0947] In some embodiments of the aforementioned methods of making, the plant extract comprising an iridoid glycoside is obtained from a plant from any one or more of the following species: *Coronus officinalis, Eucommia ulmoides, Gardenia jasminoides, Stachys*

betonica, Harpagophytum procumbens, Rehmannia glutinosa, Rehmannia chingii, Rehmannia chrysantha, Rehmannia henryi, Rehmannia japonica, Rehmannia piasezkii, Rehmannia solanifolia, Verbena officinalis, or *Kigelia pinnata.*

[0948] In some embodiments of the aforementioned methods of making, the mixture provides a taste perception in the subject of a reduction in bitterness or bitterness perception, a masking of bitter tastes or bitterness, a reduction in sourness or sourness perception, a masking of sour tastes or sourness, a reduction in initial sourness perception or lingering sourness perception, a reduction in acidic taste or acidic taste perception, a reduction in lingering acidic taste perception, a reduction in astringency or astringency perception, a masking of astringency, a masking of acidic tastes, or a masking of off tastes when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0949] In some embodiments of the aforementioned methods of making, the mixture provides a taste perception in the subject of an enhancement of creaminess, creamy flavor, or creaminess perception, an enhancement of fattiness, fatty flavor, or fattiness perception, an enhancement in fruitiness, fruity flavor, or fruitiness perception, an enhancement of brightness, bright flavor, or bright perception, or an increase of sweetness or sweetness perception when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0950] In some of the aforementioned methods of making, the mixture modulates a subject's taste perception of acidity or sourness when the mixture is provided to the subject without negatively affecting the shelf life of a food or beverage or without increasing the pH of the food or beverage when the mixture is incorporated into the food or beverage.

[0951] In some embodiments of the aforementioned methods of making, the food or beverage or granule, powder, or liquid formulation is selected from water, a carbonated beverage, such as a carbonated fruit beverage, carbonated cola drink or carbonated water, alcoholic beverages, alcohol-free beverages, spices and/or seasonings, such as chili, wasabi, horseradish, mustard, ginger, black pepper, or cinnamon, energy beverages, flavored water, powders for drinks, dairy products, such as milk, yogurt, cheese, or ice cream, plant based

milks, products of plant based milk, puddings, cakes, shakes, malts, brownies, pastries, cookies, cheesecakes, fudge, pies, cobblers, parfaits, mousse, biscuits, custards, frosting, fruits, vegetables, hard candy, soft candy, taffy, chocolates, sugarless candies, chewing gum, bubble gum, juices, teas, coffees, salsa, gel beads, film strips for breath, gelatin candies, pectin candies, starch candies, lozenges, cough drops, throat lozenges, throat sprays, toothpastes or mouth rinses.

[0952] In some embodiments of the aforementioned methods of making, the amount of component (a) in the mixture is at least 2 ppm, such as, 3, 4, 5, 7.5, 10, 20, 30, 40, 50, 60, 70, 80, 90, 100, 110, 120, 130, 140, 150, 160, 170, 180, 190, 200, 210, 220, 230, 240, 250, 260, 270, 280, 290, or 300 ppm or an amount within a range defined by any two of the aforementioned amounts, preferably 2-40 ppm, 6-75 ppm, 6-100 ppm, or 50-300 ppm.

[0953] In some embodiments of the aforementioned methods of making, component (a) is dissolved in food grade ethanol.

[0954] In some embodiments of the aforementioned methods of making, the food grade ethanol is at least 1%, such as 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 15, 20, 25, 30, 35, 40, 45, 50, 60, 70, 80, 85, 90, 95, or 100%, or with a range defined by any two of the aforementioned amounts, preferably 80, 90, or 95%.

[0955] Additional embodiments further include a composition obtained or obtainable by any one or more of the methods mentioned above.

[0956] More embodiments relate to a mixture suitable for modulating a subject's taste perception of astringency, bitterness, acidity, or sourness or masking off-tastes, wherein the mixture comprises at least two components (a) and (b): (a) an iridoid glycoside or analog thereof (for example, a glycosylation molecule of an aglycone, an aglycone of a glycosylated molecule, or a further glycosylated molecule of a glycosylated molecule) or an extract of a plant that comprises an iridoid glycoside or an analog thereof, such as a *Rehmannia glutinosa* root extract; and (b) a composition comprising an astringent compound, a bitter compound, an acidic pH, a sour compound, or a compound with an off-taste; wherein component (a) is admixed with component (b); preferably, wherein the mixture is provided in a food, beverage, granule, powder or liquid formulation; and optionally, wherein the mixture comprises one or more preservatives or antioxidants, such as a sulphite, sorbic acid, a sorbate compound, benzoic acid, benzoate, propionic acid, propionate, ascorbic acid, ascorbate, citric acid, a

tocopherol, a retinol, a polyphenol, a phenolic acid, a flavonoid, lipoic acid, N-acetylcysteine, butylated hydroxyanisole, butylated hydroxytoluene or derivatives thereof, preferably, wherein the one or more preservatives or antioxidants improve the shelf-life, flavor profile, or reduce spoilage of the mixture.

[0957] In some embodiments of the aforementioned mixtures, the iridoid glycoside or extract of a plant that includes an iridoid glycoside comprises iridoid glycosides selected from one or more of the following: Aucubin, Catalpol, Rehmannioside A, Rehmannioside B, Rehmannioside C, Rehmannioside D, Rehmannioside E, or Rehmannioside F.

[0958] In some embodiments of the aforementioned mixtures, the iridoid glycoside or analog thereof or extract of a plant that comprises an iridoid glycoside or analog thereof comprises a glucosylated iridoid glycoside or an aglycone of an iridoid glycoside.

[0959] In some embodiments of the aforementioned mixtures, the composition is an alcoholic or non-alcoholic beverage, an astringent compound, such as phenolic compounds, tannins, citric acid, gallic acid, zinc oxide, zinc sulfate, tannic acid, potassium permanganate, silver nitrate, tincture of benzoin, potassium alum, caftaric acid, acacia, yarrow, sage, witch hazel, vinegar, tea, fruits, vegetables, dairy products, herbs, nuts or any combination thereof, a bitter compound, such as Absinthin, Aloin, Alpha acid, Amarogentin, Andrographolide, Brucine, Caffeine, Denatonium, Eugenin, Hesperidin, Humulone, Isohumulone, Kaempferol 3-O-rutinoside, 6-Methoxymellein, Naringin, Papaverine, Phenylthiocarbamide, Propylthiouracil, Quassin, Quinidine, Quinine, Salicin, Strychnine, Sucrose octaacetate, Sucrose octapropionate, Theobromine, Theophylline, vegetables, tea, chocolate, fruits or any combination thereof, a sour compound, such as acetic acid, citric acid, hydrochloric acid, lactic acid, malic acid, nitric acid, fumaric acid, sulfuric acid, tartaric acid, phosphoric acid, other acid or any combination thereof, a compound with an off-taste, such as plant-based milks or products of plant-based milks, dairy products, fruits, juices, proteins, plant protein, whole grain products or any combination thereof.

[0960] In some embodiments of the aforementioned mixtures, the dairy product, plant-based milk, or product of plant-based milk includes a milk, such as whole milk, nonfat milk, lactose-free milk, buttermilk, condensed milk, cashew milk, goat milk, rick milk, soy milk, oat milk, almond milk, coconut milk, a yogurt, cheese, frosting, pudding, chocolate, custard, ice cream, gelato, sherbet, sorbet, frozen yogurt or any combination thereof.

[0961] In some embodiments of the aforementioned mixtures, the plant extract comprising an iridoid glycoside is obtained from a plant from any one or more of the following families or genera: Cornaceae, Gentianaceae, Eucommiaceae, Scrophulariaceae, Rubiaceae, Lamiaceae, Pedaliaceae, Verbenaceae, Bignoniaceae, Gentiana, Rehmannia, or Antirrhinum.

[0962] In some embodiments of the aforementioned mixtures, the plant extract comprising an iridoid glycoside is obtained from a plant from any one or more of the following species: *Coronus officinalis, Eucommia ulmoides, Gardenia jasminoides, Stachys betonica, Harpagophytum procumbens, Rehmannia glutinosa, Rehmannia chingii, Rehmannia chrysantha, Rehmannia henryi, Rehmannia japonica, Rehmannia piasezkii, Rehmannia solanifolia, Verbena officinalis,* or *Kigelia pinnata.*

[0963] In some embodiments of the aforementioned mixtures, the mixture provides a taste perception in the subject of a reduction in bitterness or bitterness perception, a masking of bitter tastes or bitterness, a reduction in sourness or sourness perception, a masking of sour tastes or sourness, a reduction in initial sourness perception or lingering sourness perception, a reduction in acidic taste or acidic taste perception, a reduction in lingering acidic taste perception, a reduction in astringency or astringency perception, a masking of astringency, a masking of acidic tastes, or a masking of off tastes when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0964] In some embodiments of the aforementioned mixtures, the mixture provides a taste perception in the subject of an enhancement of creaminess, creamy flavor, or creaminess perception, an enhancement of fattiness, fatty flavor, or fattiness perception, an enhancement in fruitiness, fruity flavor, or fruitiness perception, an enhancement of brightness, bright flavor, or bright perception, or an increase of sweetness or sweetness perception when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0965] In some of the aforementioned mixtures, the mixture modulates a subject's taste perception of acidity or sourness when the mixture is provided to the subject without

negatively affecting the shelf life of a food or beverage or without increasing the pH of the food or beverage when the mixture is incorporated into the food or beverage.

[0966] In some embodiments of the aforementioned mixtures, the food or beverage or granule, powder, or liquid formulation is selected from water, a carbonated beverage, such as a carbonated fruit beverage, carbonated cola drink or carbonated water, alcoholic beverages, alcohol-free beverages, spices and/or seasonings, such as chili, wasabi, horseradish, mustard, ginger, black pepper, or cinnamon, energy beverages, flavored water, powders for drinks, dairy products, such as milk, yogurt, cheese, or ice cream, plant based milks, products of plant based milk, puddings, cakes, shakes, malts, brownies, pastries, cookies, cheesecakes, fudge, pies, cobblers, parfaits, mousse, biscuits, custards, frosting, fruits, vegetables, hard candy, soft candy, taffy, chocolates, sugarless candies, chewing gum, bubble gum, juices, teas, coffees, salsa, gel beads, film strips for breath, gelatin candies, pectin candies, starch candies, lozenges, cough drops, throat lozenges, throat sprays, toothpastes or mouth rinses.

[0967] In some embodiments of the aforementioned mixtures, the amount of component (a) in the mixture is at least 2 ppm, such as, 3, 4, 5, 7.5, 10, 20, 30, 40, 50, 60, 70, 80, 90, 100, 110, 120, 130, 140, 150, 160, 170, 180, 190, 200, 210, 220, 230, 240, 250, 260, 270, 280, 290, or 300 ppm or an amount within a range defined by any two of the aforementioned amounts, preferably 2-40 ppm, 6-75 ppm, 6-100 ppm, or 50-300 ppm.

[0968] In some embodiments of the aforementioned mixtures, component (a) is dissolved in food grade ethanol.

[0969] In some embodiments of the aforementioned mixtures, the food grade ethanol is at least 1%, such as 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 15, 20, 25, 30, 35, 40, 45, 50, 60, 70, 80, 85, 90, 95, or 100%, or with a range defined by any two of the aforementioned amounts, preferably 80, 90, or 95%.

E. Compounds including *Selaginella tamariscina*, *Garcia indica* extract, *Garcinia cambogia* extract, or amentoflavones or polyisoprenylated benzophenones obtained from plant extracts

[0970] Herein are described compositions and uses of compositions comprising *Selaginella tamariscina* (Spike Moss) extracts, amentoflavone or analog thereof (for example, a glycosylation molecule of an aglycone, an aglycone of a glycosylated molecule, or a further glycosylated molecule of a glycosylated molecule) obtained from *Selaginella tamariscina* or other sources, other biflavonoids, *Garcia indica* extract, *Garcinia cambogia* extract, or a

polyisoprenylated benzophenone or an analog thereof (for example, a glycosylation molecule of an aglycone, an aglycone of a glycosylated molecule, or a further glycosylated molecule of a glycosylated molecule) obtained from *Garcia indica* extract, *Garcinia cambogia* extract, or other sources which effectively enhance salt perception, increase salt impact, enhance saltiness, increase metallic taste, increase retro-nasal effect, improve chili flavor, increase salt and sour flavor notes, increase tingling or numbing perception, increase tingling or numbing intensity, enhance tingling or numbing sensation, decrease stinging sensation, mask off-tastes, such as jambu tastes or bitter tastes, enhanced enhance alcohol perception, increase alcohol intensity, increase alcoholic bitterness, enhance alcoholic bitterness intensity, increase tongue tingling effect, enhance cooling perception, increase cooling intensity, shorten onset of cooling, increase cooling duration, increase carbonation perception, increase fizzy sensation, enhance frothy sensation, increase harshness, enhance spiciness, increase spiciness duration, increase burning sensation, increase spice tingling sensation, enhance spiciness intensity, enhance umami perception, increase umami impact, enhance umami duration, increase umami intensity, increase mouth-watering effect, increase smooth mouthfeel effect, enhance sourness perception, increase sourness intensity, decrease astringency sensation and/or increase the carbonation bubble amount or decrease the carbonation bubble size of a carbonated beverage. The disclosed methods are useful for the effective lowering alcohol, spice, carbonation, salt, tingling compound, numbing compound, sour compound, umami compound or cooling agent concentrations in a consumable for instance, while retaining or enhancing aspects of taste and/or taste modulation.

[0971] *Selaginella tamariscina* extract or amentoflavone in an isolated form has no alcohol, spicy or carbonatation taste or perception. However, extracts and derivatives thereof, when added to compositions containing an alcohol, carbonation, spice or cooling compound were found to enhance the alcohol perception, alcohol intensity, alcoholic bitterness, tongue tingling effect, carbonation effect, carbonation perception, fizzy sensation, frothy sensation, harshness, spiciness, spiciness intensity, burning sensation, spice tingling sensation, cooling perception, of cooling intensity of the composition, thereby allowing for a lower or reduced amount of the alcohol, carbonation, spice, or cooling compound when admixed with the extract or amentoflavone. Moreover, the addition of *Selaginella tamariscina* extract or amentoflavone to compositions were found to increase the carbonation bubble amount and/or decrease the

carbonation bubble size or a carbonated beverage. In the present disclosure, *Selaginella tamariscina* extract or amentoflavone may be available commercially, and can also be isolated and purified from a botanical extract derived from particular families, including, but not limited to, Phyllanthaceae, Euphorbiaceae, Liliaceae, Guttiferae, Primulaceae, Oxalidaceae, Cupressaceae, Malpighiaceae, Leguminosae, Calophyllaceae, Ochnaceae, Burseraceae, Flacourtiaceae, Cephalotaxaceae, Connaraceae, Taxodiaceae, Cycadaceae, Podocarpaceae, Moraceae, Labiatae, Clusiaceae, Ginkgoaceae, Hypericaceae, Lanariaceae, Caprifoliaceae, Anacardiaceae, Berberidaceae, Velloziaceae, Ranunculaceae, Thymelaeaceae, Taxaceae, or Psilotaceae, and from particular species or varieties, including, but not limited to, *Amanoa almerindae*, *Alchornea glandulosa*, *Alchornea triplinervia*, *Aletris spicata*, *Allanblackia monticola*, *Androsace umbellate*, *Antidesma bunius*, *Antidesma laciniatum*, *Biophytum sensitivum*, *Biota semipervirens*, *Byrsonima crassa*, *Byrsonima intermedia*, *Caesalpinia pyramidalis*, *Callitris rhomboidea*, *Calocedrus microlepic* var. *formosana formosana*, *Calophyllum brasiliense*, *Calophyllum ferrugineum*, *Calophyllum flavoramulum*, *Calophyllum incrassatum*, *Calophyllum inophylloide*, *Calophyllum inophyllum*, *Calophyllum membranaceum*, *Calophyllum pinetorum*, *Calophyllum rivulare*, *Calophyllum symingtonianum*, *Calophyllum venulosum*, *Campylospermum calanthum*, *Campylospermum mannii*, *Canarium album*, *Canarium pimela*, *Canarium schweinfurthii*, *Casearia clarkei*, *Celaenodendron mexicanum*, *Cephalotaxus fortunei*, *Cephalotaxus koreana*, *Cephalotaxus oliveri*, *Chamaecyparis obtusa*, *Chrozophora tinctoria*, *Cnestis ferruginea*, *Cunninghamia lanceolata*, *Cupressocyparis leylandii*, *Cupressus chengiana*, *Cupressus sempervirens*, *Cycas beddomei*, *Cycas circinalis*, *Cycas panzhihuaensis*, *Cycas pectinate*, *Cycas revoluta*, *Dacrydium araucarioides*, *Decussocarpus rospigliosii*, *Discocleidion rufescens*, *Dorstenia barteri*, *Drypetes gerrardii*, *Drypetes hainanensis*, *Elateriospermum tapos*, *Galeobdolon chinense*, *Garcinia bakeriana*, *Garcinia brasiliensis*, *Garcinia brevipedicellata*, *Garcinia cowa*, *Garcinia intermedia*, *Garcinia livingstonei*, *Garcinia merguensis*, *Garcinia subelliptica*, *Garcinia xanthochymus*, *Gingko biloba*, *Hypericum connatum*, *Hypericum perforatum*, *Hyeronima alchorneoides*, *Juniperus occidentalis*, *Juniperus rigida*, *Lanaria lanata*, *Lonicera chrysantha*, *Lonicera macranthoides*, *Lonicera similes*, *Luxemburgia nobilis*, *Lysimachia christinae*, *Mangifera indica*, *Manihot esculenta*, *Microbiota decussata*, *Nandina domestica*, *Nanuza plicata*, *Ochna schweinfurthiana*, *Ouratea parviflora*, *Ouratea*

semiserrata, *Ouratea sulcate*, *Pistacia chinensis*, *Podocarpus imbricadus*, *Ranunculus ternatus*, *Retrophyllum rospigliosii*, *Rhus pyroides*, *Rhus succedanea*, *Sabina pingii* var. *wilsonii*, *Sabina sinoalpina*, *Sabina vulgaris*, *Speranskia Tuberculata*, *Struthiola argentea*, *Taxus baccata*, *Thuja orientalis*, *Tmesipteris tannensis*, *Torreya nucifera*, *Torreya yunnanensis*, *Viburnum chinshanense*, or *Zabelia tyaihyonii*, or any plants comprising amentoflavone and/or amentoflavone components, including hybrids and progeny from any of the aforementioned species. For example, a botanical extract as described from the disclosure herein may be from 0.01% to 95%, from 0.05% to 50% or from 0.1% to 10%. Compositions may contain up to 99 wt% of a particular plant extract, preferably a combination of plant extracts, wherein an equal amount of each plant extract is used. Some compositions may contain, for example, between at least 0.05 wt% - 99 wt% of an extract. Unless otherwise specified, percentages (% s) are by weight. In some embodiments, the plant extract or plant that includes an amentoflavone useful in the embodiments described herein includes flavonoids selected from one of the following: amentoflavone, 2',8"-biapigenin, delicaflavone, ginkgetin, heveaflavone, hinokiflavone, isocryptomerin, kayaflavone, ochnaflavone, podocarpusflavone A, robustaflavone, sumaflavone, or taiwaniaflavone. Table 2 illustrates amentoflavone content in a representative *Selaginell tamariscina* extract composition. It can be appreciated that component amentoflavone compounds may be present in varying amounts from any plant or plant derived extract.

Table 2: Amentoflavone content in the Selaginella tamariscina extract

CAS No.	Characterizing Constituent	Minimum% Presence	Maximum % presence	Mean % Presence
1617-53-4	Amentoflavone	24.45	26.83	25.6 ± 1.7

[0972] *Garcia indica* extract, *Garcinia cambogia* extract, or a polyisoprenylated benzophenone obtained from *Garcia indica* extract, *Garcinia cambogia* extract, or other sources, or a polyisoprenylated benzophenone in an isolated form has no alcohol, spicy, salt, cooling, tingling or numbing, umami, sour, or carbonatation taste or perception. However, extracts and derivatives thereof, when added to compositions containing an alcohol, carbonation, spice, salt, tingling compound, numbing compound, sour compound, umami compound or cooling compound were found to enhance the alcohol perception, alcohol

intensity, alcoholic bitterness, authentic alcohol taste, retro-nasal effect, tongue tingling effect, carbonation effect, carbonation perception, fizzy sensation, frothy sensation, harshness, spiciness, spiciness intensity, burning sensation, spice tingling sensation, salt impact, saltiness, salt perception, cooling perception, cooling intensity, umami perception, umami impact, umami duration, umami intensity, mouth-watering effect, mouthfeel effect, sourness perception, sourness intensity, reduce the astringency sensation, or mask an off taste of the composition, thereby allowing for a lower or reduced amount of the alcohol, carbonation, spice, salt, tingling compound, numbing compound, sour compound, umami compound or cooling compound when admixed with the extract or polyisoprenylated benzophenone. Moreover, the addition of *Garcia indica* extract, *Garcinia cambogia* extract or a polyisoprenylated benzophenone to compositions were found to increase the carbonation bubble amount and/or decrease the carbonation bubble size or a carbonated beverage. In the present disclosure, *Garcia indica* extract, *Garcinia cambogia* extract or a polyisoprenylated benzophenone may be available commercially, and can also be isolated and purified from a botanical extract derived from particular families or genra, including, but not limited to, Clusiasceae, Guttiferae, Clusia, Garcinia, Vismia, Allanblackia, Moronobea, Symphonia, Hypericum, Tovomita, Tovomiptosis, or Ochrocarpus, and from particular species or varieties, including, but not limited to, *Garcinia aristata*, *Garcinia xanthochymus*, *Garcinia multiflora*, *Garcinia hambroniana*, *Garcinia cambogia*, *Garcinia oblongifolia* , *Garcinia pedunculata*, *Garcinia mangostana*, *Garcinia cowa*, *Garcinia assigu*, *Garcinia humulis* , *Garcinia brasiliensis*, *Garcinia eugeniaefolia* , *Garcinia subelliptica*, *Garcinia purpurea*, *Garcinia indica*, *Garcinia speciosa*, *Garcinia yunnanensis*, *Garcinia livingstonei*, *Garcinia macrophylla*, *Garcinia intermedia*, *Garcinia virgata*, *Garcinia ovalifolia*, *Cuban propolis*, *Garcinia cochinchinensis*, *Garcinia solomonensis*, *Garcinia multiflora*, *Garcinia pyrifera*, *Garcinia kola*, *Garcinia myrtifolia*, *Garcinia pseudoguttifera*, *Garcinia paucinervis*, or *Garcinia semseii*, or any plants comprising polyisoprenylated benzophenone or polyisoprenylated benzophenone components, including hybrids and progeny from any of the aforementioned species. For example, a botanical extract as described from the disclosure herein may be from 0.01% to 95%, from 0.05% to 50% or from 0.1% to 10%. Compositions may contain up to 99 wt% of a particular plant extract, preferably a combination of plant extracts, wherein an equal amount of each plant extract is used. Some compositions may

contain, for example, between at least 0.05 wt% - 99 wt% of an extract. Unless otherwise specified, percentages (% s) are by weight.

[0973] In some embodiments, the plant extract or plant that includes a polyisoprenylated benzophenone or analog thereof useful in the embodiments described herein are selected from one of the following: Aristophenone A, Aristophenone B, Bronianone C, Camboginol C, Cambogin C, Chamuangone, Clusianone, 7-epi-aristophenone, 7-epi-clusianone, Eugeniaphenone, Gambogenone, Garcicowin A, Garcicowin B, Garcicowin C, Garcicowin D, Garcimangosone D, Garcimultiflorone A, Garcimultiflorone B, Garcimultiflorone C, Garcimultiflorone D, Garcimultiflorone E, Garcimultiflorone F, (+) Garcinialiptone A, (−) Garcinialiptone B, (−) Cycloxanthochymol, Garcinialiptone C, Garcinialiptone D, Garcinielliptone FA, Garcinielliptone FB, Garcinol, Garcinol 13-O-methylether, Garciosaphenone A, Guttiferone A, Guttiferone B, Guttiferone C, Guttiferone D, Guttiferone E, Guttiferone F, Guttiferone G, Guttiferone H, Guttiferone I, Guttiferone J, Guttiferone K, Guttiferone L, Guttiferone M, Guttiferone N, Guttiferone O, Guttiferone P, Guttiferone Q, Guttiferone R, Guttiferone S, Isogarcimultiflorone F, Isogarcinol, Isogarcinol 13-O-methylether, Isoxanthochymol, Kolanone, Macurin, Myrtiaphenone A, Myrtiaphenone B, Oblongifolins A, Oblongifolins B, Oblongifolins C, Oblongifolins D, Oblongifolins E, Oblongifolins F, Oblongifolins G, Paucinone A, Paucinone B, Paucinone C, Paucinone D, Pedunculol, Pseudoguttiaphenone A, Semsinones A, Semsinones B, Semsinones C, Xanthochymol, Vismiaphenone C, 13, 14 di-dehydroxyisogarcinol, 13-hydroxygarcimultiflorone B, 18-hydroxygarcimultiflorone D, Cariphenone A, Cariphenone B, Chamone I, Chamone II, Clusianone, Clusiaphenone A, Clusiaphenone B, Coccinone A, Coccinone B, Coccinone C, Coccinone D, Coccinone E, Coccinone F, Coccinone G, Coccinone H, Cudranone, Cudraphenone A, Cudraphenone B, Cudraphenone C, Cudraphenone D, 14-deoxygarcinol, 15, 16 dihydro-16-hydroperoxy plukenetione F, 7-epi-garcinol, 7-epi-isogarcinol, 7-epi nemorosone, 28, 29 epoxy plukenetione A, Garcinielliptone I, Guttiferone K, Hilarianone, 33-hydroperoxy-isoplukenetione, Hyperibone B, Hyperibone K, Hyperibone L, Insigninone, Isovismiaphenone B, Isoxanthochymol, Lanceolatone, Machuone, Methyl hydroxyl nemorosone, Microsphaerins A, Microsphaerins B, Microsphaerins C, Microsphaerins D, Methyl Grandone, Nemorosonal, Nemorosone, Nemorosone II, Ochrocarpinone A, Ochrocarpinone B, Ochrocarpinone C, Pestalone, Plukenetione A,

Plukenetione B, Plukenetione C, Plukenetione D acetate, Plukenetione E acetate, Plukenetione F, Plukenetione G, Propolone A, Propolone B, Propolone C, Propolone D, Sampsonione A, Sampsonione B, Sampsonione C, Sampsonione D, Sampsonione E, Sampsonione F, Sampsonione G, Sampsonione H, Sampsonione N, Sampsonione O, Sampsonione P, Sampsonione Q, Scrobiculatone A, Scrobiculatone B, Spiritone, Tovophenone A, Tovophenone B, Tovophenone C, Vismiaguianone A, Vismiaguianone B, Vismiaguianone C, Vismiaguianone D, Vismiaguianone E, Vismiaphenone A, Vismiaphenone B, Vismiaphenone C, Vismiaphenone D, Vismiaphenone E, Vismiaphenone F, Vismiaphenone G, Wedellianone A, Wedellianone B, Xerophenone A, Xerophenone B, 18-ethyloxy-17-hydroxy-17,18-dihydroscrobiculatone A, or 18-ethyloxy-17-hydroxy-17,18-dihydroscrobiculatone B. It can be appreciated that component polyisoprenylated benzophenone compounds may be present in varying amounts from any plant or plant derived extract.

[0974] Several embodiments described herein relate to a method for modulating a subject's taste perception of alcohol, carbonation, spice, or cooling, the method including: providing a subject a mixture that includes at least two components (a) and (b): (a) an amentoflavone or analog thereof (for example, a glycosylation molecule of an aglycone, an aglycone of a glycosylated molecule, or a further glycosylated molecule of a glycosylated molecule) or an extract of a plant that includes an amentoflavone or an analog thereof, such as a *Selaginella tamariscina* extract; and (b) a composition including an alcohol, carbonation, spice or a cooling compound or a non-alcoholic beverage; wherein component (a) is admixed with component (b); wherein the mixture is preferably provided in a food, beverage, granule, powder or liquid formulation; and optionally, wherein the mixture includes one or more preservatives or antioxidants, such as a sulphite, sorbic acid, a sorbate compound, benzoic acid, benzoate, propionic acid, propionate, ascorbic acid, ascorbate, citric acid, a tocopherol, a retinol, a polyphenol, a phenolic acid, a flavonoid, lipoic acid, N-acetylcysteine, butylated hydroxyanisole, butylated hydroxytoluene or derivatives thereof, preferably, wherein the one or more preservatives or antioxidants improve the shelf-life, flavor profile, or reduce spoilage of the mixture; and/or optionally, selecting a composition that includes an alcohol, carbonation, spice or cooling compound for receiving an agent that modulates the taste perception of a subject to an alcohol, carbonation, a spice, a cooling compound or a non-alcoholic beverage and providing said selected composition component (a); and/or optionally, evaluating the

modulation of a subject's taste perception of alcohol, carbonation, spice, or cooling after providing the subject the mixture.

[0975] In some of the aforementioned methods, the amentoflavone or analog thereof or the extract of a plant includes an amentoflavone or an analog thereof includes flavonoids selected from one or more of the following: amentoflavone, 2',8"-biapigenin, delicaflavone, ginkgetin, heveaflavone, hinokiflavone, isocryptomerin, kayaflavone, ochnaflavone, podocarpusflavone A, robustaflavone, sumaflavone, or taiwaniaflavone.

In some of the aforementioned methods, the amentoflavone or analog thereof or the extract of a plant that comprises an amentoflavone or an analog thereof comprises a glucosylated amentoflavone or an aglycone of an amentoflavone.

[0976] In some of the aforementioned methods, the composition is an alcoholic or non-alcoholic beverage, a spicey product that includes a chili, wasabi, horseradish, mustard, ginger, black pepper, cinnamon, pumpkin spice, Szechuan pepper, or allspice, a carbonated beverage e.g., to reduce the bubble size of the beverage or impart a champagne-like effect, or a cooling compound, such as Menthol, Cyclohexanecarboxamide,N-Ethyl-5-Methyl-2-(1-Methylethyl) (WS-3), N-(Ethoxycarbonylmethyl)-3-p-menthanecarboxamide (WS-5), (1R,2S,5R)-N-(4-Methoxyphenyl)-5-methyl-2-(1- methylethyl)cyclohexanecarboxamide (WS-12), Butanamide, N,2,3-trimethyl-2-(1-methylethyl) (WS-23), or Menthyl Lactate or any combination thereof.

[0977] In some of the aforementioned methods, the plant extract including amentoflavone is obtained from a plant from any one or more of the following families: Phyllanthaceae, Euphorbiaceae, Liliaceae, Guttiferae, Primulaceae, Oxalidaceae, Cupressaceae, Malpighiaceae, Leguminosae, Calophyllaceae, Ochnaceae, Burseraceae, Flacourtiaceae, Cephalotaxaceae, Connaraceae, Taxodiaceae, Cycadaceae, Podocarpaceae, Moraceae, Labiatae, Clusiaceae, Ginkgoaceae, Hypericaceae, Lanariaceae, Caprifoliaceae, Anacardiaceae, Berberidaceae, Velloziaceae, Ranunculaceae, Thymelaeaceae, Taxaceae, or Psilotaceae, such as *Amanoa almerindae*, *Alchornea glandulosa*, *Alchornea triplinervia*, *Aletris spicata*, *Allanblackia monticola*, *Androsace umbellate*, *Antidesma bunius*, *Antidesma laciniatum*, *Biophytum sensitivum*, *Biota semipervirens*, *Byrsonima crassa*, *Byrsonima intermedia*, *Caesalpinia pyramidalis*, *Callitris rhomboidea*, *Calocedrus microlepic* var. *formosana formosana*, *Calophyllum brasiliense*, *Calophyllum ferrugineum*, *Calophyllum*

flavoramulum, *Calophyllum incrassatum*, *Calophyllum inophylloide*, *Calophyllum inophyllum*, *Calophyllum membranaceum*, *Calophyllum pinetorum*, *Calophyllum rivulare*, *Calophyllum symingtonianum*, *Calophyllum venulosum*, *Campylospermum calanthum*, *Campylospermum mannii*, *Canarium album*, *Canarium pimela*, *Canarium schweinfurthii*, *Casearia clarkei*, *Celaenodendron mexicanum*, *Cephalotaxus fortunei*, *Cephalotaxus koreana*, *Cephalotaxus oliveri*, *Chamaecyparis obtusa*, *Chrozophora tinctoria*, *Cnestis ferruginea*, *Cunninghamia lanceolata*, *Cupressocyparis leylandii*, *Cupressus chengiana*, *Cupressus sempervirens*, *Cycas beddomei*, *Cycas circinalis*, *Cycas panzhihuaensis*, *Cycas pectinate*, *Cycas revoluta*, *Dacrydium araucarioides*, *Decussocarpus rospigliosii*, *Discocleidion rufescens*, *Dorstenia barteri*, *Drypetes gerrardii*, *Drypetes hainanensis*, *Elateriospermum tapos*, *Galeobdolon chinense*, *Garcinia bakeriana*, *Garcinia brasiliensis*, *Garcinia brevipedicellata*, *Garcinia cowa*, *Garcinia intermedia*, *Garcinia livingstonei*, *Garcinia merguensis*, *Garcinia subelliptica*, *Garcinia xanthochymus*, *Gingko biloba*, *Hypericum connatum*, *Hypericum perforatum*, *Hyeronima alchorneoides*, *Juniperus occidentalis*, *Juniperus rigida*, *Lanaria lanata*, *Lonicera chrysantha*, *Lonicera macranthoides*, *Lonicera similes*, *Luxemburgia nobilis*, *Lysimachia christinae*, *Mangifera indica*, *Manihot esculenta*, *Microbiota decussata*, *Nandina domestica*, *Nanuza plicata*, *Ochna schweinfurthiana*, *Ouratea parviflora*, *Ouratea semiserrata*, *Ouratea sulcate*, *Pistacia chinensis*, *Podocarpus imbricadus*, *Ranunculus ternatus*, *Retrophyllum rospigliosii*, *Rhus pyroides*, *Rhus succedanea*, *Sabina pingii* var. *wilsonii*, *Sabina sinoalpina*, *Sabina vulgaris*, *Speranskia Tuberculata*, *Struthiola argentea*, *Taxus baccata*, *Thuja orientalis*, *Tmesipteris tannensis*, *Torreya nucifera*, *Torreya yunnanensis*, *Viburnum chinshanense*, or *Zabelia tyaihyonii*.

[0978] In some of the aforementioned methods, plant extract including amentoflavone is obtained from a plant from any one or more of the following species: *Selaginella bryopteris*, *Selaginella chrysocaulos*, *Selaginella delicatula*, *Selaginella denticulate*, *Selaginella doederleinii*, *Selaginella involvens*, *Selaginella labordei*, *Selaginella moellendorffii*, *Selaginella nipponica*, *Selaginella nothohybrida*, *Selaginella pachystachys*, *Selaginella pulvinate*, *Selaginella remotifolia*, *Selaginella rupestris*, *Selaginella sanquinolenta*, *Selaginella selaginoides*, *Selaginella sinensis*, *Selaginella stauntoniana*, *Selaginella tamariscina*, *Selaginella uncinate*, or *Selaginella willdenowii*.

[0979] In some of the aforementioned methods, the mixture provides an increased alcohol perception, increased alcoholic bitterness, increased cooling intensity, enhanced spiciness duration, a tingling spice sensation, or an increased spiciness sensation in the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0980] In some of the aforementioned methods, the mixture provides a taste perception in the subject of an increase in alcohol perception or alcohol intensity when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0981] In some of the aforementioned methods, the mixture provides a taste perception in the subject of an increase in alcoholic bitterness when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0982] In some of the aforementioned methods, the mixture provides a taste perception in the subject of an increase in retro nasal effect or tongue tingling effect when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0983] In some of the aforementioned methods, the mixture provides a taste perception in the subject of an increase in spiciness or spice intensity when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0984] In some of the aforementioned methods, the mixture provides a taste perception in the subject of an increased spiciness duration when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0985] In some of the aforementioned methods, the mixture provides a taste perception in the subject of an increase in burning sensation or spice tingling sensation when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0986] In some of the aforementioned methods, the mixture provides a taste perception in the subject of an increase in cooling perception or cooling intensity when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0987] In some of the aforementioned methods, the mixture provides a taste perception in the subject of a faster onset of coolness when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0988] In some of the aforementioned methods, the mixture provides a taste perception in the subject of an increased duration of coolness when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0989] In some of the aforementioned methods, the mixture provides a taste perception in the subject of an increase in carbonation perception or reduced bubble size or champagne-like effect when the mixture is provided to the subject, such as when the mixture is incorporated in a beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0990] In some of the aforementioned methods, the mixture provides a taste perception in the subject of an increase in fizzy sensation or frothy sensation when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0991] In some of the aforementioned methods, the mixture provides a taste perception in the subject of a decrease in harshness when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[0992] In some of the aforementioned methods, the mixture reduces the carbonation bubble size of a beverage when the mixture is incorporated into a beverage, as compared to the carbonation bubble size of the beverage in the absence of component (a).

[0993] In some of the aforementioned methods, the mixture increases the amount of carbonation bubbles of a beverage when the mixture is incorporated into a beverage as compared to amount of carbonation bubbles of the beverage in the absence of component (a).

[0994] In some of the aforementioned methods, the food or beverage or granule, powder, or liquid formulation is selected from a carbonated beverage, such as a carbonated fruit beverage, carbonated cola drink or carbonated water, alcoholic beverages, alcohol-free beverages, spices and/or seasonings, such as chili, wasabi, horseradish, mustard, ginger, black pepper, or cinnamon, energy beverages, flavored water, powders for drinks, hard candy, soft candy, taffy, chocolates, sugarless candies, chewing gum, bubble gum, juices, teas, coffees, salsa, gel beads, film strips for breath, gelatin candies, pectin candies, starch candies, lozenges, cough drops, throat lozenges, throat sprays, toothpastes or mouth rinses.

[0995] In some of the aforementioned methods, the amount of component (a) in the mixture is at least 2 ppm, such as, 3, 4, 5, 7.5, 10, 20, 30, 40, 50, 60, 70, 80, 90, 100, 110, 120, 130, 140, 150, 160, 170, 180, 190, 200, 210, 220, 230, 240, 250, 260, 270, 280, 290, or 300 ppm or an amount within a range defined by any two of the aforementioned amounts, preferably 2-40 ppm, 6-75 ppm, 6-100 ppm, or 12-200 ppm.

[0996] In some embodiments, the aforementioned methods further include selecting or identifying a subject to receive a composition, which modulates taste perception in a subject, such as alcohol perception, alcohol intensity, alcoholic bitterness, alcoholic bitterness intensity, tongue tingling effect, cooling perception, cooling intensity, the time of onset of cooling, cooling duration, carbonation perception, fizzy sensation, frothy sensation, harshness, spiciness, spiciness duration, burning sensation, spice tingling sensation, or

spiciness intensity, which decreases the carbonation bubble size or increases the carbonation bubble amount in a carbonated beverage, or which increases the retro nasal effect in subject.

[0997] In some embodiments, the aforementioned methods further include determining or analyzing the alcohol perception, alcohol intensity, alcoholic bitterness, alcoholic bitterness intensity, tongue tingling effect, cooling perception, cooling intensity, the time of onset of cooling, cooling duration, carbonation perception, fizzy sensation, frothy sensation, harshness, spiciness, spiciness duration, burning sensation, spice tingling sensation, spiciness intensity, the reduction of carbonation bubble size or increase of carbonation bubble amount in a carbonated beverage, or the increase of the retro nasal effect or any combination thereof of the subject after consuming said mixture.

[0998] In some of the aforementioned methods, component (a) is dissolved in food grade ethanol.

[0999] In some of the aforementioned methods, the food grade ethanol is at least 1%, such as 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 15, 20, 25, 30, 35, 40, 45, 50, 60, 70, 80, 85, 90, 95, or 100%, or with a range defined by any two of the aforementioned amounts, preferably 80, 90, or 95%.

[1000] Additional embodiments described herein relate to methods of making a mixture, which modulates a subject's taste perception of alcohol, carbonation, spice or cooling, the method including: admixing a component (a) with a component (b) to form said mixture: (a) an amentoflavone or analog thereof (for example, a glycosylation molecule of an aglycone, an aglycone of a glycosylated molecule, or a further glycosylated molecule of a glycosylated molecule) or an extract of a plant that includes an amentoflavone or an analog thereof, such as a *Selaginella tamariscina* extract; and (b) a composition including an alcohol, carbonation, spice or a cooling compound or a non-alcoholic beverage; wherein the composition is preferably provided in a food, beverage, granule, powder or liquid formulation; and optionally, wherein the composition includes one or more preservatives or antioxidants, such as a sulphite, sorbic acid, a sorbate compound, benzoic acid, benzoate, propionic acid, propionate, ascorbic acid, ascorbate, citric acid, a tocopherol, a retinol, a polyphenol, a phenolic acid, a flavonoid, lipoic acid, N-acetylcysteine, butylated hydroxyanisole, butylated hydroxytoluene or derivatives thereof, preferably, wherein the one or more preservatives or antioxidants improve the shelf-life, flavor profile, or reduce spoilage of the mixture.

[1001] In some embodiments of the aforementioned methods of making, the amentoflavone or analog thereof or the extract of a plant that includes an amentoflavone or an analog thereof includes flavonoids selected from one or more of the following: amentoflavone, 2',8"-biapigenin, delicaflavone, ginkgetin, heveaflavone, hinokiflavone, isocryptomerin, kayaflavone, ochnaflavone, podocarpusflavone A, robustaflavone, sumaflavone, or taiwaniaflavone.

[1002] In some embodiments of the aforementioned methods of making, the amentoflavone or analog thereof or the extract of a plant that comprises an amentoflavone or an analog thereof comprises a glucosylated amentoflavone or an aglycone of an amentoflavone.

[1003] In some embodiments of the aforementioned methods of making, the composition is an alcoholic or non-alcoholic beverage, a spicey product that includes a chili, wasabi, horseradish, mustard, ginger, black pepper, cinnamon, pumpkin spice, Szechuan pepper, or allspice, a carbonated beverage e.g., to reduce the bubble size of the beverage or impart a champagne-like effect, or a cooling compound, such as Menthol, Cyclohexanecarboxamide,N-Ethyl-5-Methyl-2-(1- Methylethyl) (WS-3), N-(Ethoxycarbonylmethyl)-3-p-menthanecarboxamide (WS-5), (1R,2S,5R)-N-(4-Methoxyphenyl)-5-methyl-2-(1- methylethyl)cyclohexanecarboxamide (WS-12), Butanamide, N,2,3-trimethyl-2-(1-methylethyl) (WS-23), or Menthyl Lactate or any combination thereof.

[1004] In some embodiments of the aforementioned methods of making, the plant extract including amentoflavone is obtained from a plant from any one or more of the following families: Phyllanthaceae, Euphorbiaceae, Liliaceae, Guttiferae, Primulaceae, Oxalidaceae, Cupressaceae, Malpighiaceae, Leguminosae, Calophyllaceae, Ochnaceae, Burseraceae, Flacourtiaceae, Cephalotaxaceae, Connaraceae, Taxodiaceae, Cycadaceae, Podocarpaceae, Moraceae, Labiatae, Clusiaceae, Ginkgoaceae, Hypericaceae, Lanariaceae, Caprifoliaceae, Anacardiaceae, Berberidaceae, Velloziaceae, Ranunculaceae, Thymelaeaceae, Taxaceae, or Psilotaceae, such as *Amanoa almerindae*, *Alchornea glandulosa*, *Alchornea triplinervia*, *Aletris spicata*, *Allanblackia monticola*, *Androsace umbellate*, *Antidesma bunius*, *Antidesma laciniatum*, *Biophytum sensitivum*, *Biota semipervirens*, *Byrsonima crassa*, *Byrsonima intermedia*, *Caesalpinia pyramidalis*, *Callitris rhomboidea*, *Calocedrus microlepic* var.

formosana formosana, *Calophyllum brasiliense*, *Calophyllum ferrugineum*, *Calophyllum flavoramulum*, *Calophyllum incrassatum*, *Calophyllum inophylloide*, *Calophyllum inophyllum*, *Calophyllum membranaceum*, *Calophyllum pinetorum*, *Calophyllum rivulare*, *Calophyllum symingtonianum*, *Calophyllum venulosum*, *Campylospermum calanthum*, *Campylospermum mannii*, *Canarium album*, *Canarium pimela*, *Canarium schweinfurthii*, *Casearia clarkei*, *Celaenodendron mexicanum*, *Cephalotaxus fortunei*, *Cephalotaxus koreana*, *Cephalotaxus oliveri*, *Chamaecyparis obtusa*, *Chrozophora tinctoria*, *Cnestis ferruginea*, *Cunninghamia lanceolata*, *Cupressocyparis leylandii*, *Cupressus chengiana*, *Cupressus sempervirens*, *Cycas beddomei*, *Cycas circinalis*, *Cycas panzhihuaensis*, *Cycas pectinate*, *Cycas revoluta*, *Dacrydium araucarioides*, *Decussocarpus rospigliosii*, *Discocleidion rufescens*, *Dorstenia barteri*, *Drypetes gerrardii*, *Drypetes hainanensis*, *Elateriospermum tapos*, *Galeobdolon chinense*, *Garcinia bakeriana*, *Garcinia brasiliensis*, *Garcinia brevipedicellata*, *Garcinia cowa*, *Garcinia intermedia*, *Garcinia livingstonei*, *Garcinia merguensis*, *Garcinia subelliptica*, *Garcinia xanthochymus*, *Gingko biloba*, *Hypericum connatum*, *Hypericum perforatum*, *Hyeronima alchorneoides*, *Juniperus occidentalis*, *Juniperus rigida*, *Lanaria lanata*, *Lonicera chrysantha*, *Lonicera macranthoides*, *Lonicera similes*, *Luxemburgia nobilis*, *Lysimachia christinae*, *Mangifera indica*, *Manihot esculenta*, *Microbiota decussata*, *Nandina domestica*, *Nanuza plicata*, *Ochna schweinfurthiana*, *Ouratea parviflora*, *Ouratea semiserrata*, *Ouratea sulcate*, *Pistacia chinensis*, *Podocarpus imbricadus*, *Ranunculus ternatus*, *Retrophyllum rospigliosii*, *Rhus pyroides*, *Rhus succedanea*, *Sabina pingii* var. *wilsonii*, *Sabina sinoalpina*, *Sabina vulgaris*, *Speranskia Tuberculata*, *Struthiola argentea*, *Taxus baccata*, *Thuja orientalis*, *Tmesipteris tannensis*, *Torreya nucifera*, *Torreya yunnanensis*, *Viburnum chinshanense*, or *Zabelia tyaihyonii*.

[1005] In some embodiments of the aforementioned methods of making, the plant extract including amentoflavone is obtained from a plant from any one or more of the following species: *Selaginella bryopteris*, *Selaginella chrysocaulos*, *Selaginella delicatula*, *Selaginella denticulate*, *Selaginella doederleinii*, *Selaginella involvens*, *Selaginella labordei*, *Selaginella moellendorffii*, *Selaginella nipponica*, *Selaginella nothohybrida*, *Selaginella pachystachys*, *Selaginella pulvinate*, *Selaginella remotifolia*, *Selaginella rupestris*, *Selaginella sanquinolenta*, *Selaginella selaginoides*, *Selaginella sinensis*, *Selaginella stauntoniana*, *Selaginella tamariscina*, *Selaginella uncinate*, or *Selaginella willdenowii*.

[1006] In some embodiments of the aforementioned methods of making, the mixture provides an increased alcohol perception, increased alcoholic bitterness, increased cooling intensity, enhanced spiciness duration, a tingling spice sensation, or an increased spiciness sensation in the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[1007] In some embodiments of the aforementioned methods of making, the mixture provides a taste perception in the subject of an increase in alcohol perception or alcohol intensity when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[1008] In some embodiments of the aforementioned methods of making, the mixture provides a taste perception in the subject of an increase in alcoholic bitterness when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[1009] In some embodiments of the aforementioned methods of making, the mixture provides a taste perception in the subject of an increase in retro nasal effect or tongue tingling effect when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[1010] In some embodiments of the aforementioned methods of making, the mixture provides a taste perception in the subject of an increase in spiciness or spice intensity when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[1011] In some embodiments of the aforementioned methods of making, the mixture provides a taste perception in the subject of an increased spiciness duration when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[1012] In some embodiments of the aforementioned methods of making, the mixture provides a taste perception in the subject of an increase in burning sensation or spice tingling sensation when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[1013] In some embodiments of the aforementioned methods of making, the mixture provides a taste perception in the subject of an increase in cooling perception or cooling intensity when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[1014] In some embodiments of the aforementioned methods of making, the mixture provides a taste perception in the subject of a faster onset of coolness when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[1015] In some embodiments of the aforementioned methods of making, the mixture provides a taste perception in the subject of an increased duration of coolness when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[1016] In some embodiments of the aforementioned methods of making, the mixture provides a taste perception in the subject of an increase in carbonation perception or reduced bubble size or champagne-like effect when the mixture is provided to the subject, such as when the mixture is incorporated in a beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[1017] In some embodiments of the aforementioned methods of making, the mixture provides a taste perception in the subject of an increase in fizzy sensation or frothy sensation when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[1018] In some embodiments of the aforementioned methods of making, the mixture provides a taste perception in the subject of a decrease in harshness when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[1019] In some embodiments of the aforementioned methods of making, the mixture reduces the carbonation bubble size of a beverage when the mixture is incorporated into a beverage, as compared to the carbonation bubble size of the beverage in the absence of component (a).

[1020] In some embodiments of the aforementioned methods of making, the mixture increases the amount of carbonation bubbles of a beverage when the mixture is incorporated into a beverage as compared to amount of carbonation bubbles of the beverage in the absence of component (a).

[1021] In some embodiments of the aforementioned methods of making, the food or beverage or granule, powder, or liquid formulation is selected from a carbonated beverage, such as a carbonated fruit beverage, carbonated cola drink or carbonated water, alcoholic beverages, alcohol-free beverages, spices and/or seasonings, such as chili, wasabi, horseradish, mustard, ginger, black pepper, or cinnamon, energy beverages, flavored water, powders for drinks, hard candy, soft candy, taffy, chocolates, sugarless candies, chewing gum, bubble gum, juices, teas, coffees, salsa, gel beads, film strips for breath, gelatin candies, pectin candies, starch candies, lozenges, cough drops, throat lozenges, throat sprays, toothpastes or mouth rinses.

[1022] In some embodiments of the aforementioned methods of making, the amount of component (a) in the mixture is at least 2 ppm, such as, 3, 4, 5, 7.5, 10, 20, 30, 40, 50, 60, 70, 80, 90, 100, 110, 120, 130, 140, 150, 160, 170, 180, 190, 200, 210, 220, 230, 240, 250, 260, 270, 280, 290, or 300 ppm or an amount within a range defined by any two of the aforementioned amounts, preferably 2-40 ppm, 6-75 ppm, 6-100 ppm, or 12-200 ppm.

[1023] In some embodiments, the aforementioned methods of making further include dissolving component (a) in food grade ethanol.

[1024] In some embodiments of the aforementioned methods of making, the food grade ethanol is at least 1%, such as 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 15, 20, 25, 30, 35, 40, 45, 50,

60, 70, 80, 85, 90, 95, or 100%, or with a range defined by any two of the aforementioned amounts, preferably 80, 90, or 95%.

[1025] Additional embodiments further a composition obtained or obtainable by any of the methods of making the mixtures set forth herein.

[1026] More embodiments relate to a mixture used for modulating a subject's taste perception of alcohol, carbonation, spice, or cooling, wherein the mixture includes at least two components (a) and (b): (a) an amentoflavone or analog thereof (for example, a glycosylation molecule of an aglycone, an aglycone of a glycosylated molecule, or a further glycosylated molecule of a glycosylated molecule) or an extract of a plant that includes an amentoflavone or an analog thereof, such as a *Selaginella tamariscina* extract; (b) a composition including an alcohol, carbonation, spice or a cooling compound or a non-alcoholic beverage; wherein component (a) is admixed with component (b); preferably, wherein the mixture is provided in a food, beverage, granule, powder or liquid formulation; and optionally, wherein the mixture includes one or more preservatives or antioxidants, such as a sulphite, sorbic acid, a sorbate compound, benzoic acid, benzoate, propionic acid, propionate, ascorbic acid, ascorbate, citric acid, a tocopherol, a retinol, a polyphenol, a phenolic acid, a flavonoid, lipoic acid, N-acetylcysteine, butylated hydroxyanisole, butylated hydroxytoluene or derivatives thereof, preferably, wherein the one or more preservatives or antioxidants improve the shelf-life, flavor profile, or reduce spoilage of the mixture.

[1027] In some embodiments of the aforementioned mixtures for use, the amentoflavone or analog thereof or the extract of a plant that includes an amentoflavone or an analog thereof includes flavonoids selected from one or more of the following: amentoflavone, 2',8"-biapigenin, delicaflavone, ginkgetin, heveaflavone, hinokiflavone, isocryptomerin, kayaflavone, ochnaflavone, podocarpusflavone A, robustaflavone, sumaflavone, or taiwaniaflavone. In some embodiments of the aforementioned mixtures for use the amentoflavone or analog thereof or the extract of a plant that comprises an amentoflavone or an analog thereof comprises a glucosylated amentoflavone or an aglycone of an amentoflavone.

[1028] In some embodiments of the aforementioned mixtures for use, the composition is an alcoholic or non-alcoholic beverage, a spicey product that includes a chili, wasabi, horseradish, mustard, ginger, black pepper, cinnamon, pumpkin spice, Szechuan

pepper, or allspice, a carbonated beverage e.g., to reduce the bubble size of the beverage or impart a champagne-like effect, or a cooling compound, such as Menthol, Cyclohexanecarboxamide,N-Ethyl-5-Methyl-2-(1- Methylethyl) (WS-3), N-(Ethoxycarbonylmethyl)-3-p-menthanecarboxamide (WS-5), (1R,2S,5R)-N-(4-Methoxyphenyl)-5-methyl-2-(1- methylethyl)cyclohexanecarboxamide (WS-12), Butanamide, N,2,3-trimethyl-2-(1-methylethyl) (WS-23), or Menthyl Lactate or any combination thereof.

[1029] In some embodiments of the aforementioned mixtures for use, the plant extract including amentoflavone is obtained from a plant from any one or more of the following families: Phyllanthaceae, Euphorbiaceae, Liliaceae, Guttiferae, Primulaceae, Oxalidaceae, Cupressaceae, Malpighiaceae, Leguminosae, Calophyllaceae, Ochnaceae, Burseraceae, Flacourtiaceae, Cephalotaxaceae, Connaraceae, Taxodiaceae, Cycadaceae, Podocarpaceae, Moraceae, Labiatae, Clusiaceae, Ginkgoaceae, Hypericaceae, Lanariaceae, Caprifoliaceae, Anacardiaceae, Berberidaceae, Velloziaceae, Ranunculaceae, Thymelaeaceae, Taxaceae, or Psilotaceae, such as *Amanoa almerindae*, *Alchornea glandulosa*, *Alchornea triplinervia*, *Aletris spicata*, *Allanblackia monticola*, *Androsace umbellate*, *Antidesma bunius*, *Antidesma laciniatum*, *Biophytum sensitivum*, *Biota semipervirens*, *Byrsonima crassa*, *Byrsonima intermedia*, *Caesalpinia pyramidalis*, *Callitris rhomboidea*, *Calocedrus microlepic* var. *formosana formosana*, *Calophyllum brasiliense*, *Calophyllum ferrugineum*, *Calophyllum flavoramulum*, *Calophyllum incrassatum*, *Calophyllum inophylloide*, *Calophyllum inophyllum*, *Calophyllum membranaceum*, *Calophyllum pinetorum*, *Calophyllum rivulare*, *Calophyllum symingtonianum*, *Calophyllum venulosum*, *Campylospermum calanthum*, *Campylospermum mannii*, *Canarium album*, *Canarium pimela*, *Canarium schweinfurthii*, *Casearia clarkei*, *Celaenodendron mexicanum*, *Cephalotaxus fortunei*, *Cephalotaxus koreana*, *Cephalotaxus oliveri*, *Chamaecyparis obtusa*, *Chrozophora tinctoria*, *Cnestis ferruginea*, *Cunninghamia lanceolata*, *Cupressocyparis leylandii*, *Cupressus chengiana*, *Cupressus sempervirens*, *Cycas beddomei*, *Cycas circinalis*, *Cycas panzhihuaensis*, *Cycas pectinate*, *Cycas revoluta*, *Dacrydium araucarioides*, *Decussocarpus rospigliosii*, *Discocleidion rufescens*, *Dorstenia barteri*, *Drypetes gerrardii*, *Drypetes hainanensis*, *Elateriospermum tapos*, *Galeobdolon chinense*, *Garcinia bakeriana*, *Garcinia brasiliensis*, *Garcinia brevipedicellata*, *Garcinia cowa*, *Garcinia intermedia*, *Garcinia livingstonei*, *Garcinia*

merguensis, *Garcinia subelliptica*, *Garcinia xanthochymus*, *Gingko biloba*, *Hypericum connatum*, *Hypericum perforatum*, *Hyeronima alchorneoides*, *Juniperus occidentalis*, *Juniperus rigida*, *Lanaria lanata*, *Lonicera chrysantha*, *Lonicera macranthoides*, *Lonicera similes*, *Luxemburgia nobilis*, *Lysimachia christinae*, *Mangifera indica*, *Manihot esculenta*, *Microbiota decussata*, *Nandina domestica*, *Nanuza plicata*, *Ochna schweinfurthiana*, *Ouratea parviflora*, *Ouratea semiserrata*, *Ouratea sulcate*, *Pistacia chinensis*, *Podocarpus imbricadus*, *Ranunculus ternatus*, *Retrophyllum rospigliosii*, *Rhus pyroides*, *Rhus succedanea*, *Sabina pingii* var. *wilsonii*, *Sabina sinoalpina*, *Sabina vulgaris*, *Speranskia Tuberculata*, *Struthiola argentea*, *Taxus baccata*, *Thuja orientalis*, *Tmesipteris tannensis*, *Torreya nucifera*, *Torreya yunnanensis*, *Viburnum chinshanense*, or *Zabelia tyaihyonii*.

[1030] In some embodiments of the aforementioned mixtures for use, the plant extract including amentoflavone is obtained from a plant from any one or more of the following species: *Selaginella bryopteris*, *Selaginella chrysocaulos*, *Selaginella delicatula*, *Selaginella denticulate*, *Selaginella doederleinii*, *Selaginella involvens*, *Selaginella labordei*, *Selaginella moellendorffii*, *Selaginella nipponica*, *Selaginella nothohybrida*, *Selaginella pachystachys*, *Selaginella pulvinate*, *Selaginella remotifolia*, *Selaginella rupestris*, *Selaginella sanquinolenta*, *Selaginella selaginoides*, *Selaginella sinensis*, *Selaginella stauntoniana*, *Selaginella tamariscina*, *Selaginella uncinate*, or *Selaginella willdenowii*.

[1031] In some embodiments of the aforementioned mixtures for use, the mixture provides an increased alcohol perception, increased alcoholic bitterness, increased cooling intensity, enhanced spiciness duration, a tingling spice sensation, or an increased spiciness sensation in the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[1032] In some embodiments of the aforementioned mixtures for use, the mixture provides a taste perception in the subject of an increase in alcohol perception or alcohol intensity when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[1033] In some embodiments of the aforementioned mixtures for use, the mixture provides a taste perception in the subject of an increase in alcoholic bitterness when the mixture

is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[1034] In some embodiments of the aforementioned mixtures for use, the mixture provides a taste perception in the subject of an increase in retro nasal effect or tongue tingling effect when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[1035] In some embodiments of the aforementioned mixtures for use, the mixture provides a taste perception in the subject of an increase in spiciness or spice intensity when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[1036] In some embodiments of the aforementioned mixtures for use, the mixture provides a taste perception in the subject of an increased spiciness duration when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[1037] In some embodiments of the aforementioned mixtures for use, the mixture provides a taste perception in the subject of an increase in burning sensation or spice tingling sensation when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[1038] In some embodiments of the aforementioned mixtures for use, the mixture provides a taste perception in the subject of an increase in cooling perception or cooling intensity when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[1039] In some embodiments of the aforementioned mixtures for use, the mixture provides a taste perception in the subject of a faster onset of coolness when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is

provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[1040] In some embodiments of the aforementioned mixtures for use, the mixture provides a taste perception in the subject of an increased duration of coolness when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[1041] In some embodiments of the aforementioned mixtures for use, the mixture provides a taste perception in the subject of an increase in carbonation perception or reduced bubble size or champagne-like effect when the mixture is provided to the subject, such as when the mixture is incorporated in a beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[1042] In some embodiments of the aforementioned mixtures for use, the mixture provides a taste perception in the subject of an increase in fizzy sensation or frothy sensation when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[1043] In some embodiments of the aforementioned mixtures for use, the mixture provides a taste perception in the subject of a decrease in harshness when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[1044] In some embodiments of the aforementioned mixtures for use, the mixture reduces the carbonation bubble size of a beverage when the mixture is incorporated into a beverage, as compared to the carbonation bubble size of the beverage in the absence of component (a).

[1045] In some embodiments of the aforementioned mixtures for use, the mixture increases the amount of carbonation bubbles of a beverage when the mixture is incorporated into a beverage as compared to amount of carbonation bubbles of the beverage in the absence of component (a).

[1046] In some embodiments of the aforementioned mixtures for use, the food or beverage or granule, powder, or liquid formulation is selected from a carbonated beverage, such as a carbonated fruit beverage, carbonated cola drink or carbonated water, alcoholic beverages, alcohol-free beverages, spices and/or seasonings, such as chili, wasabi, horseradish, mustard, ginger, black pepper, or cinnamon, energy beverages, flavored water, powders for drinks, hard candy, soft candy, taffy, chocolates, sugarless candies, chewing gum, bubble gum, juices, teas, coffees, salsa, gel beads, film strips for breath, gelatin candies, pectin candies, starch candies, lozenges, cough drops, throat lozenges, throat sprays, toothpastes or mouth rinses.

[1047] In some embodiments of the aforementioned mixtures for use, the amount of component (a) in the mixture is at least 2 ppm, such as, 3, 4, 5, 7.5, 10, 20, 30, 40, 50, 60, 70, 80, 90, 100, 110, 120, 130, 140, 150, 160, 170, 180, 190, 200, 210, 220, 230, 240, 250, 260, 270, 280, 290, or 300 ppm or an amount within a range defined by any two of the aforementioned amounts, preferably 2-40 ppm, 6-75 ppm, 6-100 ppm, or 12-200 ppm.

[1048] In some embodiments, the methods described herein relate to a mixture for use, the method further including selecting or identifying a subject to receive a composition, which modulates taste perception in a subject, such as alcohol perception, alcohol intensity, alcoholic bitterness, alcoholic bitterness intensity, tongue tingling effect, cooling perception, cooling intensity, the time of onset of cooling, cooling duration, carbonation perception, fizzy sensation, frothy sensation, harshness, spiciness,, spiciness duration, burning sensation, spice tingling sensation, or spiciness intensity, which decreases the carbonation bubble size or increases carbonation bubble amount in a carbonated beverage, or which increases the retro nasal effect in subject.

[1049] In some embodiments, the methods described herein relate to a mixture for use, the method further including determining or analyzing the alcohol perception, alcohol intensity, alcoholic bitterness, alcoholic bitterness intensity, tongue tingling effect, cooling perception, cooling intensity, the time of onset of cooling, cooling duration, carbonation perception, fizzy sensation, frothy sensation, harshness, spiciness, spiciness duration, burning sensation, spice tingling sensation, spiciness intensity, the reduction of carbonation bubble size or increase of carbonation bubble amount in a carbonated beverage, or the increase of the retro nasal effect or any combination thereof of the subject after consuming said mixture.

[1050] In some embodiments of the aforementioned mixtures for use, component (a) is dissolved in food grade ethanol.

[1051] In some embodiments of the aforementioned mixtures for use, the food grade ethanol is at least 1%, such as 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 15, 20, 25, 30, 35, 40, 45, 50, 60, 70, 80, 85, 90, 95, or 100%, or with a range defined by any two of the aforementioned amounts, preferably 80, 90, or 95%.

[1052] Several embodiments described herein also relate to methods for modulating a subject's taste perception of alcohol, carbonation, spice, salt, sourness, umami, tingling, numbing, or cooling, or for masking an off-taste of a compound in a subject, the method including: providing a subject a mixture that includes at least two components (a) and (b): (a) a polyisoprenylated benzophenone or analog thereof (for example, a glycosylation molecule of an aglycone, an aglycone of a glycosylated molecule, or a further glycosylated molecule of a glycosylated molecule) or an extract of a plant that includes a polyisoprenylated benzophenone or an analog thereof, such as a *Garcinia indica* extract or a *Garcinia cambogia* extract; and (b) a composition including an alcohol, carbonation, spice, salt, tingling compound, numbing compound, sour compound, umami compound or a cooling compound or a non-alcoholic beverage; wherein component (a) is admixed with component (b); wherein the mixture is preferably provided in a food, beverage, granule, powder or liquid formulation; and optionally, wherein the mixture includes one or more preservatives or antioxidants, such as a sulphite, sorbic acid, a sorbate compound, benzoic acid, benzoate, propionic acid, propionate, ascorbic acid, ascorbate, citric acid, a tocopherol, a retinol, a polyphenol, a phenolic acid, a flavonoid, lipoic acid, N-acetylcysteine, butylated hydroxyanisole, butylated hydroxytoluene or derivatives thereof, preferably, wherein the one or more preservatives or antioxidants improve the shelf-life, flavor profile, or reduce spoilage of the mixture; and/or optionally, selecting a composition that includes an alcohol, carbonation, spice, salt, tingling compound, numbing compound, sour compound, umami compound or a cooling compound or a non-alcoholic beverage for receiving an agent that modulates the taste perception of a subject to an alcohol, carbonation, a spice, a salt, tingling, numbing or cooling and providing said selected composition component (a); and/or optionally, evaluating the modulation of a subject's taste perception of alcohol, carbonation, spice, salt, sourness, umami, tingling, numbing or cooling after providing the subject the mixture.

[1053] In some embodiments of the aforementioned methods, the polyisoprenylated benzophenone or an analog thereof is selected from one or more of the following: Aristophenone A, Aristophenone B, Bronianone C, Camboginol C, Cambogin C, Chamuangone, Clusianone, 7-epi-aristophenone, 7-epi-clusianone, Eugeniaphenone, Gambogenone, Garcicowin A, Garcicowin B, Garcicowin C, Garcicowin D, Garcimangosone D, Garcimultiflorone A, Garcimultiflorone B, Garcimultiflorone C, Garcimultiflorone D, Garcimultiflorone E, Garcimultiflorone F, (+) Garcinialiptone A, (−) Garcinialiptone B, (−) Cycloxanthochymol, Garcinialiptone C, Garcinialiptone D, Garcinielliptone FA, Garcinielliptone FB, Garcinol, Garcinol 13-O-methylether, Garciosaphenone A, Guttiferone A, Guttiferone B, Guttiferone C, Guttiferone D, Guttiferone E, Guttiferone F, Guttiferone G, Guttiferone H, Guttiferone I, Guttiferone J, Guttiferone K, Guttiferone L, Guttiferone M, Guttiferone N, Guttiferone O, Guttiferone P, Guttiferone Q, Guttiferone R, Guttiferone S, Isogarcimultiflorone F, Isogarcinol, Isogarcinol 13-O-methylether, Isoxanthochymol, Kolanone, Macurin, Myrtiaphenone A, Myrtiaphenone B, Oblongifolins A, Oblongifolins B, Oblongifolins C, Oblongifolins D, Oblongifolins E, Oblongifolins F, Oblongifolins G, Paucinone A, Paucinone B, Paucinone C, Paucinone D, Pedunculol, Pseudoguttiaphenone A, Semsinones A, Semsinones B, Semsinones C, Xanthochymol, Vismiaphenone C, 13, 14 di-dehydroxyisogarcinol, 13-hydroxygarcimultiflorone B, 18-hydroxygarcimultiflorone D, Cariphenone A, Cariphenone B, Chamone I, Chamone II, Clusianone, Clusiaphenone A, Clusiaphenone B, Coccinone A, Coccinone B, Coccinone C, Coccinone D, Coccinone E, Coccinone F, Coccinone G, Coccinone H, Cudranone, Cudraphenone A, Cudraphenone B, Cudraphenone C, Cudraphenone D, 14-deoxygarcinol, 15, 16 dihydro-16-hydroperoxy plukenetione F, 7-epi-garcinol, 7-epi-isogarcinol, 7-epi nemorosone, 28, 29 epoxy plukenetione A, Garcinielliptone I, Guttiferone K, Hilarianone, 33-hydroperoxy-isoplukenetione, Hyperibone B, Hyperibone K, Hyperibone L, Insigninone, Isovismiaphenone B, Isoxanthochymol, Lanceolatone, Machuone, Methyl hydroxyl nemorosone, Microsphaerins A, Microsphaerins B, Microsphaerins C, Microsphaerins D, Methyl Grandone, Nemorosonal, Nemorosone, Nemorosone II, Ochrocarpinone A, Ochrocarpinone B, Ochrocarpinone C, Pestalone, Plukenetione A, Plukenetione B, Plukenetione C, Plukenetione D acetate, Plukenetione E acetate, Plukenetione F, Plukenetione G, Propolone A, Propolone B, Propolone C, Propolone D, Sampsonione A, Sampsonione B, Sampsonione C, Sampsonione D,

Sampsonione E, Sampsonione F, Sampsonione G, Sampsonione H, Sampsonione N, Sampsonione O, Sampsonione P, Sampsonione Q, Scrobiculatone A, Scrobiculatone B, Spiritone, Tovophenone A, Tovophenone B, Tovophenone C, Vismiaguianone A, Vismiaguianone B, Vismiaguianone C, Vismiaguianone D, Vismiaguianone E, Vismiaphenone A, Vismiaphenone B, Vismiaphenone C, Vismiaphenone D, Vismiaphenone E, Vismiaphenone F, Vismiaphenone G, Wedellianone A, Wedellianone B, Xerophenone A, Xerophenone B, 18-ethyloxy-17-hydroxy-17,18-dihydroscrobiculatone A, or 18-ethyloxy-17-hydroxy-17,18-dihydroscrobiculatone B.

[1054] In some embodiments of the aforementioned methods, the polyisoprenylated benzophenone or analog thereof or the extract of a plant that comprises an polyisoprenylated benzophenone or an analog thereof comprises a glucosylated polyisoprenylated benzophenone or an aglycone of a polyisoprenylated benzophenone.

[1055] In some embodiments of the aforementioned methods, the composition is an alcoholic or non-alcoholic beverage, a spicey product that includes a chili, wasabi, horseradish, mustard, ginger, black pepper, cinnamon, pumpkin spice, Szechuan pepper, or allspice, a salt, a carbonated beverage e.g., to reduce the bubble size of the beverage or impart a champagne-like effect, a sour compound, such as acetic acid, citric acid, malic acid, fumaric acid, tartaric acid, phosphoric acid or other acid, an umami compound, such as monosodium glutamate, disodium inosinate, disodium guanylate, seafoods, meats, vegetables, tea, seaweed, mushrooms, eggs, dairy products, or fermented products, a tingling or numbing compound, such as jambu oleoresin or spilanthol, or a cooling compound, such as Menthol, Cyclohexanecarboxamide,N-Ethyl-5-Methyl-2-(1- Methylethyl) (WS-3), N-(Ethoxycarbonylmethyl)-3-p-menthanecarboxamide (WS-5), (1R,2S,5R)-N-(4-Methoxyphenyl)-5-methyl-2-(1- methylethyl)cyclohexanecarboxamide (WS-12), Butanamide, N,2,3-trimethyl-2-(1-methylethyl) (WS-23), or Menthyl Lactate or any combination thereof.

[1056] In some embodiments of the aforementioned methods, the plant extract including a polyisoprenylated benzophenone or an analog thereof is obtained from a plant from any one or more of the following families or genera: Clusiasceae, Guttiferae, Clusia, Garcinia, Vismia, Allanblackia, Moronobea, Symphonia, Hypericum, Tovomita, Tovomiptosis, or Ochrocarpus.

[1057] In some embodiments of the aforementioned methods, the plant extract including a polyisoprenylated benzophenone or an analog thereof is obtained from a plant from any one or more of the following species: *Garcinia aristata, Garcinia xanthochymus, Garcinia multiflora, Garcinia hambroniana, Garcinia cambogia, Garcinia oblongifolia , Garcinia pedunculata, Garcinia mangostana, Garcinia cowa, Garcinia assigu, Garcinia humulis , Garcinia brasiliensis, Garcinia eugeniaefolia , Garcinia subelliptica, Garcinia purpurea, Garcinia indica, Garcinia speciosa, Garcinia yunnanensis, Garcinia livingstonei, Garcinia macrophylla, Garcinia intermedia, Garcinia virgata, Garcinia ovalifolia, Cuban propolis, Garcinia cochinchinensis, Garcinia solomonensis, Garcinia multiflora, Garcinia pyrifera, Garcinia kola, Garcinia myrtifolia, Garcinia pseudoguttifera, Garcinia paucinervis,* or *Garcinia semseii.*

[1058] In some embodiments of the aforementioned methods, the mixture provides an increased salt perception, increased salt impact, enhanced saltiness, increased metallic taste, increased alcohol perception, increased authentic alcohol taste, increased retro-nasal effect, increased tingling effect, increased alcoholic bitterness, increased herbal off-note taste, increased cooling intensity, increased cooling perception, enhanced spiciness duration, faster onset of spicy sensation, increase spicy intensity, improved chili flavor, increase in salt and sour flavor notes, an increased spiciness sensation in the subject, faster onset of tingling or numbing sensation, increased tingling or numbing perception, increased tingling or numbing intensity, enhanced tingling or numbing sensation, enhanced tingling or numbing impact, decreased harshness, decreased stinging sensation, enhanced umami perception, increased umami impact, enhanced umami duration, increased umami intensity, increased mouth-watering effect, increased smooth mouthfeel effect, enhanced sourness perception, increased sourness intensity, decreased astringency sensation, or a masking of off-tastes, such as jambu off-tastes, herbal off-tastes or bitter off-tastes, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[1059] In some embodiments of the aforementioned methods, the mixture provides a taste perception in the subject of an increase in alcohol perception or alcohol intensity when the mixture is provided to the subject, such as when the mixture is incorporated in a food or

beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[1060] In some embodiments of the aforementioned methods, the mixture provides a taste perception in the subject of an increase in alcoholic bitterness or an increase in authentic alcohol taste when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[1061] In some embodiments of the aforementioned methods, the mixture provides a taste perception in the subject of an increase in retro nasal effect or tingling effect when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[1062] In some embodiments of the aforementioned methods, the mixture provides a taste perception in the subject of an increase in spiciness or spice intensity when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[1063] In some embodiments of the aforementioned methods, the mixture provides a taste perception in the subject of an increased spiciness duration or a faster spiciness onset when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[1064] In some embodiments of the aforementioned methods, the mixture provides a taste perception in the subject of an increase in salt and sour flavors or improved chili flavor when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[1065] In some embodiments of the aforementioned methods, the mixture provides a taste perception in the subject of an increase in cooling perception or cooling intensity when the mixture is provided to the subject, such as when the mixture is incorporated in a food or

beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[1066] In some embodiments of the aforementioned methods, the mixture provides a taste perception in the subject of a faster onset of coolness or an increased duration of coolness when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[1067] In some embodiments of the aforementioned methods, the mixture provides a taste perception in the subject of an increase in carbonation perception or reduced bubble size or champagne-like effect when the mixture is provided to the subject, such as when the mixture is incorporated in a beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[1068] In some embodiments of the aforementioned methods, the mixture provides a taste perception in the subject of a decrease in harshness or decrease in stinging sensation when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[1069] In some embodiments of the aforementioned methods, the mixture reduces the carbonation bubble size of a beverage when the mixture is incorporated into a beverage, as compared to the carbonation bubble size of the beverage in the absence of component (a).

[1070] In some embodiments of the aforementioned methods, the mixture increases the amount of carbonation bubbles of a beverage when the mixture is incorporated into a beverage as compared to amount of carbonation bubbles of the beverage in the absence of component (a).

[1071] In some embodiments of the aforementioned methods, the mixture provides a taste perception in the subject of an increase in numbing or tingling perception or numbing or tingling intensity when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[1072] In some embodiments of the aforementioned methods, the mixture provides a taste perception in the subject of a faster onset of numbing or tingling or an increased duration

of numbing or tingling when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[1073] In some embodiments of the aforementioned methods, the mixture provides a taste perception in the subject of an increase in saltiness perception or salt intensity when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[1074] In some embodiments of the aforementioned methods, the mixture provides a taste perception in the subject of an enhanced initial salt impact or enhanced saltiness taste when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[1075] In some embodiments of the aforementioned methods, the mixture provides a taste perception in the subject that masks a bitter off-taste, herbal off-taste or jambu off-taste when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[1076] In some embodiments of the aforementioned methods, the mixture provides a taste perception in the subject of an enhanced umami perception or increased umami intensity when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[1077] In some embodiments of the aforementioned methods, the mixture provides a taste perception in the subject of an increased umami impact or increased duration of umami sensation when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[1078] In some embodiments of the aforementioned methods, the mixture provides a taste perception in the subject of an increased mouth-watering effect when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is

provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[1079] In some embodiments of the aforementioned methods, wherein the mixture provides a perception in the subject of an increased smooth mouthfeel effect when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[1080] In some embodiments of the aforementioned methods, the mixture provides a taste perception in the subject of an enhanced sourness perception of increased sourness intensity when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[1081] In some embodiments of the aforementioned methods, wherein the mixture provides a taste perception in the subject of a reduction of astringency when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[1082] In some embodiments of the aforementioned methods, the food or beverage or granule, powder, or liquid formulation is selected from a carbonated beverage, such as a carbonated fruit beverage, carbonated cola drink or carbonated water, alcoholic beverages, alcohol-free beverages, spices and/or seasonings, such as chili, wasabi, horseradish, mustard, ginger, black pepper, or cinnamon, meat, vegetables, mushrooms, cheese, seafood, dry cereal, oatmeal, granola bars, salt, energy beverages, flavored water, powders for drinks, hard candy, soft candy, taffy, chocolates, sugarless candies, chewing gum, bubble gum, juices, teas, coffees, salsa, gel beads, film strips for breath, gelatin candies, pectin candies, starch candies, lozenges, cough drops, throat lozenges, throat sprays, toothpastes or mouth rinses.

[1083] In some embodiments of the aforementioned methods, the amount of component (a) in the mixture is at least 0.1 ppm, such as at least 0.2, 0.3, 0.4, 0.5, 0.75, 1, 1.5, 2.5, 3, 4, 5, 7.5, 10, 20, 30, 40, 50, 60, 70, 80, 90, 100, 110, 120, 130, 140, 150, 160, 170, 180, 190, 200, 210, 220, 230, 240, 250, 260, 270, 280, 290, or 300 ppm or an amount within a range defined by any two of the aforementioned amounts, preferably 1-5 ppm, 2.5-5 ppm, 5-300ppm,

20-300ppm, 25-300 ppm, 50-300 ppm, 100-300 ppm, 150-300 ppm, 200-300 ppm, or 1-300 ppm.

[1084] In some embodiments, the aforementioned methods further include selecting or identifying a subject to receive a composition, which modulates taste perception in a subject, such as salt perception, salt impact, saltiness, metallic taste, alcohol perception, authentic alcohol taste, tingling effect, alcoholic bitterness, cooling intensity, cooling perception, spiciness duration, the time of onset of spicy sensation, spicy intensity, chili flavor, salt or sour flavor, spiciness, the time of onset of tingling or numbing sensation, tingling or numbing perception, tingling or numbing intensity, tingling or numbing sensation, tingling or numbing impact, harshness, stinging sensation, umami perception, umami impact, umami duration, umami intensity, mouth-watering effect, sourness perception, sourness intensity, astringency sensation, which masks off-tastes, such as jambu off-tastes, herbal off-tastes or bitter off-tastes, which modulates the mouthfeel effect in a subject, which decreases the carbonation bubble size or increases the carbonation bubble amount in a carbonated beverage, or which increases the retro nasal effect in a subject.

[1085] In some embodiments, the aforementioned methods further include determining or analyzing the salt perception, salt impact, saltiness, metallic taste, alcohol perception, authentic alcohol taste, tingling effect, alcoholic bitterness, cooling intensity, cooling perception, spiciness duration, the time of onset of spicy sensation, spicy intensity, chili flavor, salt or sour flavor, spiciness, the time of onset of tingling or numbing sensation, tingling or numbing perception, tingling or numbing intensity, tingling or numbing sensation, tingling or numbing impact, harshness, stinging sensation, umami perception, umami impact, umami duration, umami intensity, mouth-watering effect, sourness perception, sourness intensity, astringency sensation, the masking of off-tastes, such as jambu off-tastes, herbal off-tastes or bitter off-tastes, the mouthfeel, the reduction of carbonation bubble size or increase of carbonation bubble amount in a carbonated beverage, or the increase of the retro nasal effect or any combination thereof of the subject after consuming said mixture.

[1086] In some embodiments of the aforementioned methods component (a) is dissolved in food grade ethanol.

[1087] In some embodiments of the aforementioned methods the food grade ethanol is at least 1%, such as 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 15, 20, 25, 30, 35, 40, 45, 50, 60, 70,

80, 85, 90, 95, or 100%, or with a range defined by any two of the aforementioned amounts, preferably 80, 90, or 95%.

[1088] Additional embodiments described herein relate to methods of making a mixture, which modulates a subject's taste perception of alcohol, carbonation, spice, salt, sourness, umami, tingling, numbing, or cooling, or which masks an off-taste of a compound in a subject, the method including: admixing a component (a) with a component (b) to form said mixture: (a) a polyisoprenylated benzophenone or analog thereof (for example, a glycosylation molecule of an aglycone, an aglycone of a glycosylated molecule, or a further glycosylated molecule of a glycosylated molecule) or an extract of a plant that includes a polyisoprenylated benzophenone or an analog thereof, such as a *Garcinia indica* extract or a *Garcinia cambogia* extract; and (b) a composition including an alcohol, carbonation, spice, salt, tingling compound, numbing compound, sour compound, umami compound or a cooling compound or a non-alcoholic beverage; wherein the composition is preferably provided in a food, beverage, granule, powder or liquid formulation; and optionally, wherein the composition includes one or more preservatives or antioxidants, such as a sulphite, sorbic acid, a sorbate compound, benzoic acid, benzoate, propionic acid, propionate, ascorbic acid, ascorbate, citric acid, a tocopherol, a retinol, a polyphenol, a phenolic acid, a flavonoid, lipoic acid, N-acetylcysteine, butylated hydroxyanisole, butylated hydroxytoluene or derivatives thereof, preferably, wherein the one or more preservatives or antioxidants improve the shelf-life, flavor profile, or reduce spoilage of the mixture.

[1089] In some embodiments of the aforementioned methods of making, the polyisoprenylated benzophenone or an analog thereof is selected from one or more of the following: Aristophenone A, Aristophenone B, Bronianone C, Camboginol C, Cambogin C, Chamuangone, Clusianone, 7-epi-aristophenone, 7-epi-clusianone, Eugeniaphenone, Gambogenone, Garcicowin A, Garcicowin B, Garcicowin C, Garcicowin D, Garcimangosone D, Garcimultiflorone A, Garcimultiflorone B, Garcimultiflorone C, Garcimultiflorone D, Garcimultiflorone E, Garcimultiflorone F, (+) Garcinialiptone A, (−) Garcinialiptone B, (−) Cycloxanthochymol, Garcinialiptone C, Garcinialiptone D, Garcinielliptone FA, Garcinielliptone FB, Garcinol, Garcinol 13-O-methylether, Garciosaphenone A, Guttiferone A, Guttiferone B, Guttiferone C, Guttiferone D, Guttiferone E, Guttiferone F, Guttiferone G, Guttiferone H, Guttiferone I, Guttiferone J, Guttiferone K, Guttiferone L, Guttiferone M,

Guttiferone N, Guttiferone O, Guttiferone P, Guttiferone Q, Guttiferone R, Guttiferone S, Isogarcimultiflorone F, Isogarcinol, Isogarcinol 13-O-methylether, Isoxanthochymol, Kolanone, Macurin, Myrtiaphenone A, Myrtiaphenone B, Oblongifolins A, Oblongifolins B, Oblongifolins C, Oblongifolins D, Oblongifolins E, Oblongifolins F, Oblongifolins G, Paucinone A, Paucinone B, Paucinone C, Paucinone D, Pedunculol, Pseudoguttiaphenone A, Semsinones A, Semsinones B, Semsinones C, Xanthochymol, Vismiaphenone C, 13, 14 di-dehydroxyisogarcinol, 13-hydroxygarcimultiflorone B, 18-hydroxygarcimultiflorone D, Cariphenone A, Cariphenone B, Chamone I, Chamone II, Clusianone, Clusiaphenone A, Clusiaphenone B, Coccinone A, Coccinone B, Coccinone C, Coccinone D, Coccinone E, Coccinone F, Coccinone G, Coccinone H, Cudranone, Cudraphenone A, Cudraphenone B, Cudraphenone C, Cudraphenone D, 14-deoxygarcinol, 15, 16 dihydro-16-hydroperoxy plukenetione F, 7-epi-garcinol, 7-epi-isogarcinol, 7-epi nemorosone, 28, 29 epoxy plukenetione A, Garcinielliptone I, Guttiferone K, Hilarianone, 33-hydroperoxy-isoplukenetione, Hyperibone B, Hyperibone K, Hyperibone L, Insigninone, Isovismiaphenone B, Isoxanthochymol, Lanceolatone, Machuone, Methyl hydroxyl nemorosone, Microsphaerins A, Microsphaerins B, Microsphaerins C, Microsphaerins D, Methyl Grandone, Nemorosonal, Nemorosone, Nemorosone II, Ochrocarpinone A, Ochrocarpinone B, Ochrocarpinone C, Pestalone, Plukenetione A, Plukenetione B, Plukenetione C, Plukenetione D acetate, Plukenetione E acetate, Plukenetione F, Plukenetione G, Propolone A, Propolone B, Propolone C, Propolone D, Sampsonione A, Sampsonione B, Sampsonione C, Sampsonione D, Sampsonione E, Sampsonione F, Sampsonione G, Sampsonione H, Sampsonione N, Sampsonione O, Sampsonione P, Sampsonione Q, Scrobiculatone A, Scrobiculatone B, Spiritone, Tovophenone A, Tovophenone B, Tovophenone C, Vismiaguianone A, Vismiaguianone B, Vismiaguianone C, Vismiaguianone D, Vismiaguianone E, Vismiaphenone A, Vismiaphenone B, Vismiaphenone C, Vismiaphenone D, Vismiaphenone E, Vismiaphenone F, Vismiaphenone G, Wedellianone A, Wedellianone B, Xerophenone A, Xerophenone B, 18-ethyloxy-17-hydroxy-17,18-dihydroscrobiculatone A, or 18-ethyloxy-17-hydroxy-17,18-dihydroscrobiculatone B. In some embodiments of the aforementioned methods of making, the polyisoprenylated benzophenone or analog thereof or the extract of a plant that comprises an polyisoprenylated benzophenone or an analog thereof comprises a

glucosylated polyisoprenylated benzophenone or an aglycone of a polyisoprenylated benzophenone.

[1090] In some embodiments of the aforementioned methods of making, the composition is an alcoholic or non-alcoholic beverage, a spicey product that includes a chili, wasabi, horseradish, mustard, ginger, black pepper, cinnamon, pumpkin spice, Szechuan pepper, or allspice, a salt, a carbonated beverage e.g., to reduce the bubble size of the beverage or impart a champagne-like effect, acetic acid, citric acid, malic acid, fumaric acid, tartaric acid, phosphoric acid or other acid, an umami compound, such as monosodium glutamate, disodium inosinate, disodium guanylate, seafoods, meats, vegetables, tea, seaweed, mushrooms, eggs, dairy products, or fermented products, a tingling or numbing compound, such as jambu oleoresin or spilanthol, or a cooling compound, such as Menthol, Cyclohexanecarboxamide,N-Ethyl-5-Methyl-2-(1- Methylethyl) (WS-3), N-(Ethoxycarbonylmethyl)-3-p-menthanecarboxamide (WS-5), (1R,2S,5R)-N-(4-Methoxyphenyl)-5-methyl-2-(1- methylethyl)cyclohexanecarboxamide (WS-12), Butanamide, N,2,3-trimethyl-2-(1-methylethyl) (WS-23), or Menthyl Lactate or any combination thereof.

[1091] In some embodiments of the aforementioned methods of making, the plant extract including a polyisoprenylated benzophenone or an analog is obtained from a plant from any one or more of the following families or genera: Clusiasceae, Guttiferae, Clusia, Garcinia, Vismia, Allanblackia, Moronobea, Symphonia, Hypericum, Tovomita, Tovomiptosis, or Ochrocarpus.

[1092] In some embodiments of the aforementioned methods of making, the plant extract including amentoflavone is obtained from a plant from any one or more of the following species: *Garcinia aristata, Garcinia xanthochymus, Garcinia multiflora, Garcinia hambroniana, Garcinia cambogia, Garcinia oblongifolia , Garcinia pedunculata, Garcinia mangostana, Garcinia cowa, Garcinia assigu, Garcinia humulis , Garcinia brasiliensis, Garcinia eugeniaefolia , Garcinia subelliptica, Garcinia purpurea, Garcinia indica, Garcinia speciosa, Garcinia yunnanensis, Garcinia livingstonei, Garcinia macrophylla, Garcinia intermedia, Garcinia virgata, Garcinia ovalifolia, Cuban propolis, Garcinia cochinchinensis, Garcinia solomonensis, Garcinia multiflora, Garcinia pyrifera, Garcinia kola, Garcinia myrtifolia, Garcinia pseudoguttifera, Garcinia paucinervis,* or *Garcinia semseii.*

[1093] In some embodiments of the aforementioned methods of making, the mixture provides an increased salt perception, increased salt impact, enhanced saltiness, increased metallic taste, increased alcohol perception, increased authentic alcohol taste, increased retro-nasal effect, increased tingling effect, increased alcoholic bitterness, increased herbal off-note taste, increased cooling intensity, increased cooling perception, enhanced spiciness duration, faster onset of spicy sensation, increase spicy intensity, improved chili flavor, increase in salt and sour flavor notes, an increased spiciness sensation in the subject, faster onset of tingling or numbing sensation, increased tingling or numbing perception, increased tingling or numbing intensity, enhanced tingling or numbing sensation, enhanced tingling or numbing impact, decreased harshness, decreased stinging sensation, enhanced umami perception, increased umami impact, enhanced umami duration, increased umami intensity, increased mouth-watering effect, increased smooth mouthfeel effect, enhanced sourness perception, increased sourness intensity, decreased astringency sensation, or a masking of off-tastes, such as jambu off-tastes, herbal off-tastes or bitter off-tastes, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[1094] In some embodiments of the aforementioned methods of making, the mixture provides a taste perception in the subject of an increase in alcohol perception or alcohol intensity when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[1095] In some embodiments of the aforementioned methods of making, the mixture provides a taste perception in the subject of an increase in alcoholic bitterness or authentic alcohol taste when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[1096] In some embodiments of the aforementioned methods of making, the mixture provides a taste perception in the subject of an increase in retro nasal effect or tingling effect when the mixture is provided to the subject, such as when the mixture is incorporated in

a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[1097] In some embodiments of the aforementioned methods of making, the mixture provides a taste perception in the subject of an increase in spiciness or spice intensity when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[1098] In some embodiments of the aforementioned methods of making, the mixture provides a taste perception in the subject of an increased spiciness duration or faster spiciness onset when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[1099] In some embodiments of the aforementioned methods of making, the mixture provides a taste perception in the subject of an increase in salt and sour flavors or improved chili flavor when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[1100] In some embodiments of the aforementioned methods of making, the mixture provides a taste perception in the subject of an increase in cooling perception or cooling intensity when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[1101] In some embodiments of the aforementioned methods of making, the mixture provides a taste perception in the subject of a faster onset of coolness or an increased duration of coolness when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[1102] In some embodiments of the aforementioned methods of making, the mixture provides a taste perception in the subject of an increase in carbonation perception or reduced bubble size or champagne-like effect when the mixture is provided to the subject, such as when the mixture is incorporated in a beverage that is provided to the subject, as compared,

for example, to when component (b) is provided to the subject in the absence of component (a).

[1103] In some embodiments of the aforementioned methods of making, the mixture provides a taste perception in the subject of a decrease in harshness or decrease in stinging sensation when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[1104] In some embodiments of the aforementioned methods of making, the mixture reduces the carbonation bubble size of a beverage when the mixture is incorporated into a beverage, as compared to the carbonation bubble size of the beverage in the absence of component (a).

[1105] In some embodiments of the aforementioned methods of making, the mixture increases the amount of carbonation bubbles of a beverage when the mixture is incorporated into a beverage as compared to amount of carbonation bubbles of the beverage in the absence of component (a).

[1106] In some embodiments of the aforementioned methods of making, the mixture provides a taste perception in the subject of an increase in numbing or tingling perception or numbing or tingling intensity when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[1107] In some embodiments of the aforementioned methods of making, the mixture provides a taste perception in the subject of a faster onset of numbing or tingling or an increased duration of numbing or tingling when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[1108] In some embodiments of the aforementioned methods of making, the mixture provides a taste perception in the subject of an increase in saltiness perception or salt intensity when the mixture is provided to the subject, such as when the mixture is incorporated

in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[1109] In some embodiments of the aforementioned methods of making, the mixture provides a taste perception in the subject of an enhanced initial salt impact or enhanced saltiness taste when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[1110] In some embodiments of the aforementioned methods of making, the mixture provides a taste perception in the subject that masks a bitter off-taste, herbal off-taste or jambu off-taste when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b)is provided to the subject in the absence of component (a).

[1111] In some embodiments of the aforementioned methods of making, the mixture provides a taste perception in the subject of an enhanced umami perception or increased umami intensity when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[1112] In some embodiments of the aforementioned methods of making, the mixture provides a taste perception in the subject of an increased umami impact or increased duration of umami sensation when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[1113] In some embodiments of the aforementioned methods of making, the mixture provides a taste perception in the subject of an increased mouth-watering effect when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[1114] In some embodiments of the aforementioned methods of making, wherein the mixture provides a perception in the subject of an increased smooth mouthfeel effect when the mixture is provided to the subject, such as when the mixture is incorporated in a food or

beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[1115] In some embodiments of the aforementioned methods of making, the mixture provides a taste perception in the subject of an enhanced sourness perception of increased sourness intensity when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[1116] In some embodiments of the aforementioned methods of making, wherein the mixture provides a taste perception in the subject of a reduction of astringency when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[1117] In some embodiments of the aforementioned methods of making, the food or beverage or granule, powder, or liquid formulation is selected from a carbonated beverage, such as a carbonated fruit beverage, carbonated cola drink or carbonated water, alcoholic beverages, alcohol-free beverages, spices and/or seasonings, such as chili, wasabi, horseradish, mustard, ginger, black pepper, or cinnamon, meat, vegetables, mushrooms, cheese, seafood, dry cereal, oatmeal, granola bars, salt, energy beverages, flavored water, powders for drinks, hard candy, soft candy, taffy, chocolates, sugarless candies, chewing gum, bubble gum, juices, teas, coffees, salsa, gel beads, film strips for breath, gelatin candies, pectin candies, starch candies, lozenges, cough drops, throat lozenges, throat sprays, toothpastes or mouth rinses.

[1118] In some embodiments of the aforementioned methods of making, the amount of component (a) in the mixture is at least 2 ppm, such as, 3, 4, 5, 7.5, 10, 20, 30, 40, 50, 60, 70, 80, 90, 100, 110, 120, 130, 140, 150, 160, 170, 180, 190, 200, 210, 220, 230, 240, 250, 260, 270, 280, 290, or 300 ppm or an amount within a range defined by any two of the aforementioned amounts, preferably 1-5 ppm, 2.5-5 ppm, 5-300ppm, 20-300ppm, 25-300 ppm, 50-300 ppm, 100-300 ppm, 150-300 ppm, 200-300 ppm, or 1-300 ppm.

[1119] In some embodiments, the aforementioned methods of making further include dissolving component (a) in food grade ethanol.

[1120] In some embodiments of the aforementioned methods of making, the food grade ethanol is at least 1%, such as 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 15, 20, 25, 30, 35, 40, 45, 50,

60, 70, 80, 85, 90, 95, or 100%, or with a range defined by any two of the aforementioned amounts, preferably 80, 90, or 95%.

[1121] Additional embodiments further a composition obtained or obtainable by any of the methods of making the mixtures set forth herein.

[1122] More embodiments relate to a mixture used for modulating a subject's taste perception of alcohol, carbonation, spice, salt, sourness, umami, tingling, numbing, or cooling, or for masking an off-taste of a compound in a subject, wherein the mixture includes at least two components (a) and (b): (a) a polyisoprenylated benzophenone or analog thereof (for example, a glycosylation molecule of an aglycone, an aglycone of a glycosylated molecule, or a further glycosylated molecule of a glycosylated molecule) or an extract of a plant that includes a polyisoprenylated benzophenone or an analog thereof, such as a *Garcinia indica* extract or a *Garcinia cambogia* extract; and (b) a composition including an alcohol, carbonation, spice, salt, tingling compound, numbing compound, sour compound, umami compound or a cooling compound or a non-alcoholic beverage; wherein component (a) is admixed with component (b); preferably, wherein the mixture is provided in a food, beverage, granule, powder or liquid formulation; and optionally, wherein the mixture includes one or more preservatives or antioxidants, such as a sulphite, sorbic acid, a sorbate compound, benzoic acid, benzoate, propionic acid, propionate, ascorbic acid, ascorbate, citric acid, a tocopherol, a retinol, a polyphenol, a phenolic acid, a flavonoid, lipoic acid, N-acetylcysteine, butylated hydroxyanisole, butylated hydroxytoluene or derivatives thereof, preferably, wherein the one or more preservatives or antioxidants improve the shelf-life, flavor profile, or reduce spoilage of the mixture.

[1123] In some embodiments of the aforementioned mixtures for use, the polyisoprenylated benzophenone or an analog thereof is selected from one or more of the following: Aristophenone A, Aristophenone B, Bronianone C, Camboginol C, Cambogin C, Chamuangone, Clusianone, 7-epi-aristophenone, 7-epi-clusianone, Eugeniaphenone, Gambogenone, Garcicowin A, Garcicowin B, Garcicowin C, Garcicowin D, Garcimangosone D, Garcimultiflorone A, Garcimultiflorone B, Garcimultiflorone C, Garcimultiflorone D, Garcimultiflorone E, Garcimultiflorone F, (+) Garcinialiptone A, (–) Garcinialiptone B, (–) Cycloxanthochymol, Garcinialiptone C, Garcinialiptone D, Garcinielliptone FA, Garcinielliptone FB, Garcinol, Garcinol 13-O-methylether, Garciosaphenone A, Guttiferone

A, Guttiferone B, Guttiferone C, Guttiferone D, Guttiferone E, Guttiferone F, Guttiferone G, Guttiferone H, Guttiferone I, Guttiferone J, Guttiferone K, Guttiferone L, Guttiferone M, Guttiferone N, Guttiferone O, Guttiferone P, Guttiferone Q, Guttiferone R, Guttiferone S, Isogarcimultiflorone F, Isogarcinol, Isogarcinol 13-O-methylether, Isoxanthochymol, Kolanone, Macurin, Myrtiaphenone A, Myrtiaphenone B, Oblongifolins A, Oblongifolins B, Oblongifolins C, Oblongifolins D, Oblongifolins E, Oblongifolins F, Oblongifolins G, Paucinone A, Paucinone B, Paucinone C, Paucinone D, Pedunculol, Pseudoguttiaphenone A, Semsinones A, Semsinones B, Semsinones C, Xanthochymol, Vismiaphenone C, 13, 14 di-dehydroxyisogarcinol, 13-hydroxygarcimultiflorone B, 18-hydroxygarcimultiflorone D, Cariphenone A, Cariphenone B, Chamone I, Chamone II, Clusianone, Clusiaphenone A, Clusiaphenone B, Coccinone A, Coccinone B, Coccinone C, Coccinone D, Coccinone E, Coccinone F, Coccinone G, Coccinone H, Cudranone, Cudraphenone A, Cudraphenone B, Cudraphenone C, Cudraphenone D, 14-deoxygarcinol, 15, 16 dihydro-16-hydroperoxy plukenetione F, 7-epi-garcinol, 7-epi-isogarcinol, 7-epi nemorosone, 28, 29 epoxy plukenetione A, Garcinielliptone I, Guttiferone K, Hilarianone, 33-hydroperoxy-isoplukenetione, Hyperibone B, Hyperibone K, Hyperibone L, Insigninone, Isovismiaphenone B, Isoxanthochymol, Lanceolatone, Machuone, Methyl hydroxyl nemorosone, Microsphaerins A, Microsphaerins B, Microsphaerins C, Microsphaerins D, Methyl Grandone, Nemorosonal, Nemorosone, Nemorosone II, Ochrocarpinone A, Ochrocarpinone B, Ochrocarpinone C, Pestalone, Plukenetione A, Plukenetione B, Plukenetione C, Plukenetione D acetate, Plukenetione E acetate, Plukenetione F, Plukenetione G, Propolone A, Propolone B, Propolone C, Propolone D, Sampsonione A, Sampsonione B, Sampsonione C, Sampsonione D, Sampsonione E, Sampsonione F, Sampsonione G, Sampsonione H, Sampsonione N, Sampsonione O, Sampsonione P, Sampsonione Q, Scrobiculatone A, Scrobiculatone B, Spiritone, Tovophenone A, Tovophenone B, Tovophenone C, Vismiaguianone A, Vismiaguianone B, Vismiaguianone C, Vismiaguianone D, Vismiaguianone E, Vismiaphenone A, Vismiaphenone B, Vismiaphenone C, Vismiaphenone D, Vismiaphenone E, Vismiaphenone F, Vismiaphenone G, Wedellianone A, Wedellianone B, Xerophenone A, Xerophenone B, 18-ethyloxy-17-hydroxy-17,18-dihydroscrobiculatone A, or 18-ethyloxy-17-hydroxy-17,18-dihydroscrobiculatone B. In some embodiments of the aforementioned mixtures for use, the polyisoprenylated benzophenone or analog thereof or the extract of a

plant that comprises an polyisoprenylated benzophenone or an analog thereof comprises a glucosylated polyisoprenylated benzophenone or an aglycone of a polyisoprenylated benzophenone.

[1124] In some embodiments of the aforementioned mixtures for use, the composition is an alcoholic or non-alcoholic beverage, a spicey product that includes a chili, wasabi, horseradish, mustard, ginger, black pepper, cinnamon, pumpkin spice, Szechuan pepper, or allspice, a salt, a carbonated beverage e.g., to reduce the bubble size of the beverage or impart a champagne-like effect, a sour compound, such as acetic acid, citric acid, malic acid, fumaric acid, tartaric acid, phosphoric acid or other acid, an umami compound, such as monosodium glutamate, disodium inosinate, disodium guanylate, seafoods, meats, vegetables, tea, seaweed, mushrooms, eggs, dairy products, or fermented products, a tingling or numbing compound, such as jambu oleoresin or spilanthol, or a cooling compound, such as Menthol, Cyclohexanecarboxamide,N-Ethyl-5-Methyl-2-(1- Methylethyl) (WS-3), N-(Ethoxycarbonylmethyl)-3-p-menthanecarboxamide (WS-5), (1R,2S,5R)-N-(4-Methoxyphenyl)-5-methyl-2-(1- methylethyl)cyclohexanecarboxamide (WS-12), Butanamide, N,2,3-trimethyl-2-(1-methylethyl) (WS-23), or Menthyl Lactate or any combination thereof.

[1125] In some embodiments of the aforementioned mixtures for use, the plant extract including a polyisoprenylated benzophenone or an analog is obtained from a plant from any one or more of the following families or genera: Clusiasceae, Guttiferae, Clusia, Garcinia, Vismia, Allanblackia, Moronobea, Symphonia, Hypericum, Tovomita, Tovomiptosis, or Ochrocarpus.

[1126] In some embodiments of the aforementioned mixtures for use, the plant extract including amentoflavone is obtained from a plant from any one or more of the following species: *Garcinia aristata, Garcinia xanthochymus, Garcinia multiflora, Garcinia hambroniana, Garcinia cambogia, Garcinia oblongifolia , Garcinia pedunculata, Garcinia mangostana, Garcinia cowa, Garcinia assigu, Garcinia humulis , Garcinia brasiliensis, Garcinia eugeniaefolia , Garcinia subelliptica, Garcinia purpurea, Garcinia indica, Garcinia speciosa, Garcinia yunnanensis, Garcinia livingstonei, Garcinia macrophylla, Garcinia intermedia, Garcinia virgata, Garcinia ovalifolia, Cuban propolis, Garcinia cochinchinensis,*

Garcinia solomonensis, Garcinia multiflora, Garcinia pyrifera, Garcinia kola, Garcinia myrtifolia, Garcinia pseudoguttifera, Garcinia paucinervis, or *Garcinia semseii.*

[1127] In some embodiments of the aforementioned mixtures for use, the mixture provides an increased salt perception, increased salt impact, enhanced saltiness, increased metallic taste, increased alcohol perception, increased authentic alcohol taste, increased retro-nasal effect, increased tingling effect, increased alcoholic bitterness, increased herbal off-note taste, increased cooling intensity, increased cooling perception, enhanced spiciness duration, faster onset of spicy sensation, increase spicy intensity, improved chili flavor, increase in salt and sour flavor notes, an increased spiciness sensation in the subject, faster onset of tingling or numbing sensation, increased tingling or numbing perception, increased tingling or numbing intensity, enhanced tingling or numbing sensation, enhanced tingling or numbing impact, decreased harshness, decreased stinging sensation, enhanced umami perception, increased umami impact, enhanced umami duration, increased umami intensity, increased mouth-watering effect, increased smooth mouthfeel effect, enhanced sourness perception, increased sourness intensity, decreased astringency sensation, or a masking of off-tastes, such as jambu off-tastes, herbal off-tastes or bitter off-tastes, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[1128] In some embodiments of the aforementioned mixtures for use, the mixture provides a taste perception in the subject of an increase in alcohol perception or alcohol intensity when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[1129] In some embodiments of the aforementioned mixtures for use, the mixture provides a taste perception in the subject of an increase in alcoholic bitterness or authentic alcohol taste when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[1130] In some embodiments of the aforementioned mixtures for use, the mixture provides a taste perception in the subject of an increase in retro nasal effect or tingling effect when the mixture is provided to the subject, such as when the mixture is incorporated in a food

or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[1131] In some embodiments of the aforementioned mixtures for use, the mixture provides a taste perception in the subject of an increase in spiciness or spice intensity when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[1132] In some embodiments of the aforementioned mixtures for use, the mixture provides a taste perception in the subject of an increased spiciness duration or faster spiciness onset when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[1133] In some embodiments of the aforementioned mixtures for use, the mixture provides a taste perception in the subject of an increase in salt and sour flavors or improved chili flavor when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[1134] In some embodiments of the aforementioned mixtures for use, the mixture provides a taste perception in the subject of an increase in cooling perception or cooling intensity when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[1135] In some embodiments of the aforementioned mixtures for use, the mixture provides a taste perception in the subject of a faster onset of coolness or an increased duration of coolness when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[1136] In some embodiments of the aforementioned mixtures for use, the mixture provides a taste perception in the subject of an increase in carbonation perception or reduced bubble size or champagne-like effect when the mixture is provided to the subject, such as when

the mixture is incorporated in a beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[1137] In some embodiments of the aforementioned mixtures for use, the mixture provides a taste perception in the subject of a decrease in harshness or decrease in stinging sensation when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[1138] In some embodiments of the aforementioned mixtures for use, the mixture reduces the carbonation bubble size of a food or beverage when the mixture is incorporated into a beverage, as compared to the carbonation bubble size of the beverage in the absence of component (a).

[1139] In some embodiments of the aforementioned mixtures for use, the mixture increases the amount of carbonation bubbles of a beverage when the mixture is incorporated into a beverage as compared to amount of carbonation bubbles of the beverage in the absence of component (a).

[1140] In some embodiments of the aforementioned mixtures for use, the mixture provides a taste perception in the subject of an increase in numbing or tingling perception or numbing or tingling intensity when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[1141] In some embodiments of the aforementioned mixtures for use, the mixture provides a taste perception in the subject of a faster onset of numbing or tingling or an increased duration of numbing or tingling when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[1142] In some embodiments of the aforementioned mixtures for use, the mixture provides a taste perception in the subject of an increase in saltiness perception or salt intensity when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[1143] In some embodiments of the aforementioned mixtures for use, the mixture provides a taste perception in the subject of an enhanced initial salt impact or enhanced saltiness taste when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[1144] In some embodiments of the aforementioned mixtures for use, the mixture provides a taste perception in the subject that masks a bitter off-taste, herbal off-taste or jambu off-taste when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b)is provided to the subject in the absence of component (a).

[1145] In some embodiments of the aforementioned mixtures for use, the mixture provides a taste perception in the subject of an enhanced umami perception or increased umami intensity when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[1146] In some embodiments of the aforementioned mixtures for use, the mixture provides a taste perception in the subject of an increased umami impact or increased duration of umami sensation when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[1147] In some embodiments of the aforementioned mixtures for use, the mixture provides a taste perception in the subject of an increased mouth-watering effect when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[1148] In some embodiments of the aforementioned mixtures for use, wherein the mixture provides a perception in the subject of an increased smooth mouthfeel effect when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[1149] In some embodiments of the aforementioned mixtures for use, the mixture provides a taste perception in the subject of an enhanced sourness perception of increased sourness intensity when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[1150] In some embodiments of the aforementioned mixtures for use, wherein the mixture provides a taste perception in the subject of a reduction of astringency when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[1151] In some embodiments of the aforementioned mixtures for use, the food or beverage or granule, powder, or liquid formulation is selected from a carbonated beverage, such as a carbonated fruit beverage, carbonated cola drink or carbonated water, alcoholic beverages, alcohol-free beverages, spices and/or seasonings, such as chili, wasabi, horseradish, mustard, ginger, black pepper, or cinnamon, meat, vegetables, mushrooms, cheese, seafood, dry cereal, oatmeal, granola bars, salt, energy beverages, flavored water, powders for drinks, hard candy, soft candy, taffy, chocolates, sugarless candies, chewing gum, bubble gum, juices, teas, coffees, salsa, gel beads, film strips for breath, gelatin candies, pectin candies, starch candies, lozenges, cough drops, throat lozenges, throat sprays, toothpastes or mouth rinses.

[1152] In some embodiments of the aforementioned mixtures for use, the amount of component (a) in the mixture is at least 2 ppm, such as, 3, 4, 5, 7.5, 10, 20, 30, 40, 50, 60, 70, 80, 90, 100, 110, 120, 130, 140, 150, 160, 170, 180, 190, 200, 210, 220, 230, 240, 250, 260, 270, 280, 290, or 300 ppm or an amount within a range defined by any two of the aforementioned amounts, preferably 1-5 ppm, 2.5-5 ppm, 5-300ppm, 20-300ppm, 25-300 ppm, 50-300 ppm, 100-300 ppm, 150-300 ppm, 200-300 ppm, or 1-300 ppm.

[1153] In some embodiments, the methods described herein relate to a mixture for use, the method further including selecting or identifying a subject to receive a composition, which modulates taste perception in a subject, such as salt perception, salt impact, saltiness, metallic taste, alcohol perception, authentic alcohol taste, tingling effect, alcoholic bitterness, cooling intensity, cooling perception, spiciness duration, the time of onset of spicy sensation, spicy intensity, chili flavor, salt or sour flavor, spiciness, the time of onset of tingling or

numbing sensation, tingling or numbing perception, tingling or numbing intensity, tingling or numbing sensation, tingling or numbing impact, harshness, stinging sensation, umami perception, umami impact, umami duration, umami intensity, mouth-watering effect, sourness perception, sourness intensity, astringency sensation, which masks off-tastes, such as jambu off-tastes, herbal off-tastes or bitter off-tastes, which modulates the mouthfeel effect in a subject, which decreases the carbonation bubble size or increases the carbonation bubble amount in a carbonated beverage, or which increases the retro nasal effect in a subject.

[1154] In some embodiments, the methods described herein relate to a mixture for use, the method further including determining or analyzing the salt perception, salt impact, saltiness, metallic taste, alcohol perception, authentic alcohol taste, tingling effect, alcoholic bitterness, cooling intensity, cooling perception, spiciness duration, the time of onset of spicy sensation, spicy intensity, chili flavor, salt or sour flavor, spiciness, the time of onset of tingling or numbing sensation, tingling or numbing perception, tingling or numbing intensity, tingling or numbing sensation, tingling or numbing impact, harshness, stinging sensation, umami perception, umami impact, umami duration, umami intensity, mouth-watering effect, sourness perception, sourness intensity, astringency sensation, the masking of off-tastes, such as jambu off-tastes, herbal off-tastes or bitter off-tastes, the mouthfeel, the reduction of carbonation bubble size or increase of carbonation bubble amount in a carbonated beverage, or the increase of the retro nasal effect or any combination thereof of the subject after consuming said mixture.

[1155] In some embodiments of the aforementioned mixtures for use, component (a) is dissolved in food grade ethanol.

[1156] In some embodiments of the aforementioned mixtures for use, the food grade ethanol is at least 1%, such as 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 15, 20, 25, 30, 35, 40, 45, 50, 60, 70, 80, 85, 90, 95, or 100%, or with a range defined by any two of the aforementioned amounts, preferably 80, 90, or 95%.

F. Compounds containing *Rhodiola rosea* root extact or phenylpropanoids, phenylethanol derivatives, or glycosides obtained from a plant extract

[1157] Described herein are compositions and uses of compositions comprising *Rhodiola rosea* root or rhizome extract or phenylpropanoids, phenylethanol derivates, or glycosides or an analog thereof (for example, a glycosylation molecule of an aglycone, an aglycone of a glycosylated molecule, or a further glycosylated molecule of a glycosylated molecule), preferably from *Rhodiola rosea* root or rhizome extract or other sources, which

effectively reduce bitterness or bitterness taste perception, reduce astringency or astringency perception, enhance ripeness or ripeness perception, enhance juiciness or juiciness perception, enhance freshness or freshness perception, enhance fruity flavors or notes, enhance flavor depth, enhance cocoa flavors or notes, enhance dark cocoa flavors or notes, enhance vanilla bean flavors or notes, enhance roasted coffee flavors or notes, enhance dark roasted coffee flavors or notes, enhance creaminess or creaminess perception, enhance cinnamic flavors or notes, enhance brown flavors or notes, enhance honey flavors or notes, reduce pungency or pungency perception, reduce initial pungency perception, reduce burning sensation or burning perception, reduce initial burning sensation, delay onset of burning sensation or burning perception, mask alcohol perception, enhance aged fruit flavors or notes, enhance brandy flavors or notes, reduce tingling sensation or tingling perception, reduce initial tingling perception, delay onset of tingling sensation or tingling perception, reduce harshness or harshness perception, delay onset of spice burn or spice burn perception, reduce spice intensity, enhance aging effect, enhance wood tastes or notes, enhances sweet flavors or notes, enhance caramel flavors or notes, enhance floral flavors or notes, enhance hay flavors or notes, or enhance saffron flavor or notes.

[1158] When *Rhodiola rosea* root or rhizome extract or phenylpropanoids, phenylethanol derivates, glycosides and derivatives thereof are added to compositions containing a fruit, vanilla, cocoa, chocolate, coffee, a pungent compound, a burning compound, a harsh compound, a bitter compound, saffron, oak extract, honey, tea, syrup, or an alcohol, they are found to reduce bitterness or bitterness taste perception, reduce astringency or astringency perception, enhance ripeness or ripeness perception, enhance juiciness or juiciness perception, enhance freshness or freshness perception, enhance fruity flavors or notes, enhance flavor depth, enhance cocoa flavors or notes, enhance dark cocoa flavors or notes, enhance vanilla bean flavors or notes, enhance roasted coffee flavors or notes, enhance dark roasted coffee flavors or notes, enhance creaminess or creaminess perception, enhance cinnamic flavors or notes, enhance brown flavors or notes, enhance honey flavors or notes, reduce pungency or pungency perception, reduce initial pungency perception, reduce burning sensation or burning perception, reduce initial burning sensation, delay onset of burning sensation or burning perception, mask alcohol perception, enhance aged fruit flavors or notes, enhance brandy flavors or notes, reduce tingling sensation or tingling perception, reduce initial

tingling perception, delay onset of tingling sensation or tingling perception, reduce harshness or harshness perception, delay onset of spice burn or spice burn perception, reduce spice intensity, enhance aging effect, enhance wood tastes or notes, enhances sweet flavors or notes, enhance caramel flavors or notes, enhance floral flavors or notes, enhance hay flavors or notes, or enhance saffron flavor or notes of a composition containing a fruit, vanilla, cocoa, chocolate, coffee, a pungent compound, a burning compound, a harsh compound, a bitter compound, saffron, oak extract, honey, tea, syrup, or an alcohol admixed with the extract or phenylpropanoids, phenylethanol derivates, or glycosides.

[1159] In the present disclosure, *Rhodiola rosea* root extract or phenylpropanoids, phenylethanol derivates, or glycosides may be available commercially, and can also be isolated and purified from a botanical extract derived from particular species, including, but not limited to, *Rhodiola rosea*, *Rhodiola alterna*, *Rhodiola brevipetiolata*, *Rhodiola crenulate*, *Rhodiola kirilowi*, *Rhodiola quadrifida*, *Rhodiola sachalinensis*, *Rhodiola sacra.*, or *Rhodiola iremelica.*, or any plants comprising phenylpropanoids, phenylethanol derivates, or glycosides or components thereof, including hybrids and progeny from any of the aforementioned species. For example, a botanical extract as described from the disclosure herein may be from 0.01% to 95%, from 0.05% to 50% or from 0.1% to 10%. Compositions may contain up to 99 wt% of a particular plant extract, preferably a combination of plant extracts, wherein an equal amount of each plant extract is used. Some compositions may contain, for example, between at least 0.05 wt% - 99 wt% of an extract. Unless otherwise specified, percentages (% s) are by weight.

[1160] In some embodiments, a phenylpropanoid, a phenylethanol derivative, a glycoside or an analog thereof or an extract of a plant that comprises a phenylpropanoid, a phenylethanol derivative, a glycoside or an analog thereof comprises molecules selected from one or more of the following: salidroside (rhodioloside), rosin, rosavin, rosarin, rosiridrin, rhodioniside, and p-tyrosol.

[1161] Table 3 illustrates the composition of three representative *Rhodiola rosea* extracts, including phenylpropanoids, phenylethanol derivates, or glycosides, such as, tyrosol, salidroside, rosarin, rosavin, rosin, rosiridin and derivatives thereof. It can be appreciated that component sylimarin compounds may be present in varying amounts from any plant derived extract.

Table 3: Rhodiola rosea extract composition

No	Components	Rt (min)	CHJT-C-A302227	CHJT-E-A203947	CHJT-C-A121009
1	Tyrosol	9.7	0.15% ± 0.01%	0.29% ± 0.01%	0.14% ± 0.01%
2	Salidroside	10.0	1.05% ± 0.05%	1.35% ± 0.03%	3.52% ± 0.05%
3	Rosarin	18.5	0.69% ± 0.01%	1.09% ± 0.01%	0.30% ± 0.01%
4	Rosavin	18.7	2.01% ± 0.04%	1.42% ± 0.01%	0.84% ± 0.01%
5	Rosin	18.9	0.69% ± 0.02%	0.71% ± 0.01%	0.26% ± 0.01%
6	Rosiridin	19.1	3.67% ± 0.03%	5.24% ± 0.28%	1.40% ± 0.02%

[1162] Several embodiments described herein relate to a method for modulating a subject's taste perception of fruity flavors, white flavors, brown flavors, pungency, burning, harshness, bitterness, aging, oak, honey, alcohol, syrup, tea, or saffron, the method including: providing a subject a mixture that includes at least two components (a) and (b): (a) a phenylpropanoid, a phenylethanol derivative, a glycoside or an analog thereof (for example, a glycosylation molecule of an aglycone, an aglycone of a glycosylated molecule, or a further glycosylated molecule of a glycosylated molecule) or an extract of a plant that includes a phenylpropanoid, a phenylethanol derivative, a glycoside or an analog thereof, such as a Rhodiola rosea root extract; and (b) a composition including a fruit, vanilla, cocoa, chocolate, coffee, a pungent compound, a burning compound, a harsh compound, a bitter compound, saffron, oak extract, honey, tea, syrup, or an alcohol, wherein component (a) is admixed with component (b); wherein the mixture is preferably provided in a food, beverage, granule, powder or liquid formulation; and optionally, wherein the mixture includes one or more preservatives or antioxidants, such as a sulphite, sorbic acid, a sorbate compound, benzoic acid, benzoate, propionic acid, propionate, ascorbic acid, ascorbate, citric acid, a tocopherol, a retinol, a polyphenol, a phenolic acid, a flavonoid, lipoic acid, N-acetylcysteine, butylated hydroxyanisole, butylated hydroxytoluene or derivatives thereof, preferably, wherein the one or more preservatives or antioxidants improve the shelf-life, flavor profile, or reduce spoilage of the mixture; and/or optionally, selecting a composition that includes an compound with a fruit, vanilla, chocolate, coffee, a pungent compound, a burning compound, a harsh compound, a bitter compound, saffron, oak extract, honey, tea, syrup, or an alcohol for receiving an agent that modulates the taste perception of a subject of fruity flavors, white flavors, brown flavors,

pungency, burning, harshness, bitterness, aging, oak tastes, or saffron tastes and providing said selected composition component (a); and/or optionally, evaluating the modulation of a subject's taste perception of fruity flavors, white flavors, brown flavors, pungency, burning, harshness, bitterness, aging, oak tastes, or saffron tastes after providing the subject the mixture.

[1163] In some of the aforementioned methods, the phenylpropanoid, the phenylethanol derivative, the glycoside or an analog thereof or the extract of a plant that includes a phenylpropanoid, a phenylethanol derivative, a glycoside or an analog thereof includes molecules selected from one or more of the following: salidroside (rhodioloside), rosin, rosavin, rosarin, rosiridrin, rhodioniside, and p-tyrosol.

[1164] In some of the aforementioned methods, the phenylpropanoid, the phenylethanol derivative, the glycoside or an analog thereof or the extract of a plant that comprises a phenylpropanoid, a phenylethanol derivative, a glycoside or an analog thereof comprises a glucosylated phenylpropanoid, a glucosylated phenylethanol derivative, a glucosylated glycoside, an aglycone of a phenylpropanoid, an aglycone of a phenylethanol derivative, or an aglycone of a glycoside.

[1165] In some of the aforementioned methods, the composition is a fruit, such as citrus fruits, tropical fruits, or berries, juices, puree, jam, jelly, sports drinks, fruit flavored beverages, wine, dairy product, plant-based milk, product of plant-based milk, coffee, such as black coffee, milk-based coffee drinks, iced coffee drinks, instant coffee, coffee beans, or any combination thereof, alcoholic or non-alcoholic beverage, such as vodka, brandy, whiskey, or any combination thereof, a pungent compound, such as capsaicin, capsicum, piperine, allyl isothiocyanate, allicin, gingerol, sinigrin, eugenol, sinalbin, safrole, menthol, isothiocyanates, thymol, curcumin, resiniferatoxin, oleocanthal or any combination thereof, a harsh compound, such as quinine, caffeine, nicotine, tannins, catechins, limonene, pinene, amygdalin, saponins, oxalic acid, formic acid, allyl isothiocyanate, dimethyl sulfide, casein peptides, bromelain, capsaicin or any combination thereof, a burning compound, such as capsaicin, dihydrocapsaicin, nordihydrocapsaicin, allyl isothiocyanate, piperine, gingerol, allicin, allyl sulfide, diallyl disulfide, resiniferatoxin, acrolein, cinnamaldehyde, menthol, eugenol, ethanol, acetic acid, oleocanthal, citric acid or any combination thereof, a bitter compound, such as absinthin, aloin, alpha acid, amarogentin, andrographolide, brucine, caffeine, denatonium, eugenin, hesperidin, humulone, isohumulone, Kaempferol 3-O-rutinoside, 6-Methoxymellein,

naringin, papaverine, phenylthiocarbamide, propylthiouracil, quassin, quinidine, quinine, salicin, strychnine, sucrose octaacetate, sucrose octapropionate, theobromine, theophylline, vegetables, tea, chocolate, fruits or any combination thereof, honey, vanilla, chocolate, tea, saffron, safranal or syrup, such as maple syrup.

[1166] In some of the aforementioned methods, the dairy product, plant-based milk, or product of plant-based milk includes a milk, such as whole milk, nonfat milk, lactose-free milk, buttermilk, condensed milk, cashew milk, goat milk, rick milk, soy milk, oat milk, almond milk, coconut milk, chocolate milk, a yogurt, cheese, frosting, pudding, chocolate, custard, ice cream, gelato, sherbet, sorbet, frozen yogurt or any combination thereof.

[1167] In some of the aforementioned methods, the plant extract that includes a phenylpropanoid, a phenylethanol derivative, a glycoside or an analog thereof is obtained from a plant from any one or more of the following species: *Rhodiola rosea*, *Rhodiola alterna*, *Rhodiola brevipetiolata*, *Rhodiola crenulate*, *Rhodiola kirilowi*, *Rhodiola quadrifida*, *Rhodiola sachalinensis*, *Rhodiola sacra.*, or *Rhodiola iremelica.*.

[1168] In some of the aforementioned methods, the mixture provides a taste perception in the subject of an enhancement of ripeness or ripeness perception, an enhancement of juiciness or juiciness perception, an enhancement of freshness or freshness perception, an enhancement of fruity flavors or notes, an enhancement of flavor depth, an enhancement in mouthfeel or mouthfeel perception when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[1169] In some of the aforementioned methods, the mixture provides a taste perception in the subject of an enhancement of cocoa flavors or notes, an enhancement of dark cocoa flavors or notes, an enhancement of vanilla bean flavors or notes, an enhancement of sweetness or sweetness perception, an enhancement of roasted coffee flavors or notes, an enhancement of dark roasted flavors or notes, or an enhancement of creaminess or creaminess perception when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[1170] In some of the aforementioned methods, the mixture provides a taste perception in the subject of an enhancement of cinnamic notes, an enhancement of brown notes, or an enhancement of honey notes when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[1171] In some of the aforementioned methods, the mixture provides a taste perception in the subject of a reduction in pungency or pungency perception, a reduction in initial pungency perception, a reduction in burning sensation or burning perception, a reduction in initial burning perception, a delayed onset of burning sensation or burning perception, a reduction in burning sensation duration, a masking of alcohol perception, an enhancement of aged fruit notes, enhancement of brandy flavors or notes, a reduction in tingling sensation or tingling perception, a reduction in initial tingling perception, a delayed onset of tingling sensation or tingling perception, a reduction in harshness or harshness perception, a reduction in bitterness or bitterness perception, a delayed onset of spice burn or spice burn perception, or a reduction in spice intensity when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[1172] In some of the aforementioned methods, the mixture provides a taste perception in the subject of an enhancement of aging effect, an enhancement of wood tastes or notes, an enhancement of brown flavors or notes, an enhancement of sweet flavors or notes, an enhancement of caramel flavors or notes, an enhancement of floral flavors or notes, an enhancement of woodiness, an enhancement of hay flavors or notes, an enhancement of saffron taste or an enhancement of astringency or astringency perception when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[1173] In some of the aforementioned methods, the food or beverage or granule, powder, or liquid formulation is selected from a sugar substitute, water, a carbonated beverage, such as a carbonated fruit beverage, carbonated cola drink or carbonated water, sport beverage, alcoholic beverages, alcohol-free beverages, spices and/or seasonings, such as chili, wasabi,

horseradish, mustard, ginger, black pepper, or cinnamon, meat, vegetables, mushrooms, cheese, seafood, salt, energy beverages, flavored water, powders for drinks, dairy products, such as milk, yogurt, cheese, or ice cream, plant based milks, products of plant based milk, puddings, cakes, shakes, malts, brownies, pastries, cookies, cheesecakes, fudge, pies, cobblers, parfaits, mousse, biscuits, custards, frosting, fruits, vegetables, condiments, dry cereal, oatmeal, granola bars, hard candy, soft candy, taffy, chocolates, sugarless candies, chewing gum, bubble gum, juices, teas, coffees, salsa, gel beads, film strips for breath, gelatin candies, pectin candies, starch candies, lozenges, cough drops, throat lozenges, throat sprays, toothpastes or mouth rinses.

[1174] In some of the aforementioned methods, the amount of component (a) in the mixture is at least 2 ppm, such as, 3, 4, 5, 7.5, 10, 20, 30, 40, 50, 60, 70, 80, 90, 100, 110, 120, 130, 140, 150, 160, 170, 180, 190, 200, 210, 220, 230, 240, 250, 260, 270, 280, 290, or 300 ppm or an amount within a range defined by any two of the aforementioned amounts, preferably 15-25 ppm, 12.5-40 ppm, 25-50 ppm, 25-60 ppm, 25-75 ppm, 50-90 ppm, 50-150 ppm, 100-150 ppm, 100-200 ppm, 150-200 ppm, 200-250 ppm, or 12-200 ppm.

[1175] In some embodiments, the aforementioned methods further include selecting or identifying a subject to receive a composition, which modulates a taste perception in a subject, such as fruity flavors, white flavors, brown flavors, pungency, burning, harshness, bitterness, aging, oak tastes, or saffron tastes.

[1176] In some embodiments, the aforementioned methods further include determining or analyzing the ripeness perception, juiciness perception, freshness perception, flavor depth perception, mouthfeel perception, creaminess perception, pungency perception, initial pungency onset, burning perception, initial burning onset, tingling perception, initial tingling onset, harshness perception, bitterness perception, aging effect perception, initial spice burn onset, spice intensity perception, alcohol perception, astringency perception, or perception of fruity, vanilla bean, cocoa, dark cocoa, roasted coffee, dark roasted coffee, cinnamic, brown, honey, aged fruit, wood, sweet, hay, saffron, caramel, or floral flavor or notes or any combination thereof of the subject after consuming said mixture.

[1177] In some of the aforementioned methods, component (a) is dissolved in food grade ethanol.

[1178] In some of the aforementioned methods, the food grade ethanol is at least 1%, such as 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 15, 20, 25, 30, 35, 40, 45, 50, 60, 70, 80, 85, 90, 95, or 100%, or with a range defined by any two of the aforementioned amounts, preferably 80, 90, or 95%.

[1179] Additional embodiments described herein relate to a method of making a mixture which modulates a subject's taste perception of fruity flavors, white flavors, brown flavors, pungency, burning, harshness, bitterness, aging, oak, honey, alcohol, syrup, tea, or saffron, the method including: admixing a component (a) with a component (b) to form said mixture: (a) a phenylpropanoid, a phenylethanol derivative, a glycoside or an analog thereof (for example, a glycosylation molecule of an aglycone, an aglycone of a glycosylated molecule, or a further glycosylated molecule of a glycosylated molecule) or an extract of a plant that includes a phenylpropanoid, a phenylethanol derivative, a glycoside or an analog thereof, such as a *Rhodiola rosea* root extract; and (b) a composition including a fruit, vanilla, cocoa, chocolate, coffee, a pungent compound, a burning compound, a harsh compound, a bitter compound, saffron, oak extract, honey, tea, syrup, or an alcohol; wherein the composition is preferably provided in a food, beverage, granule, powder or liquid formulation; and optionally, wherein the composition includes one or more preservatives or antioxidants, such as a sulphite, sorbic acid, a sorbate compound, benzoic acid, benzoate, propionic acid, propionate, ascorbic acid, ascorbate, citric acid, a tocopherol, a retinol, a polyphenol, a phenolic acid, a flavonoid, lipoic acid, N-acetylcysteine, butylated hydroxyanisole, butylated hydroxytoluene or derivatives thereof, preferably, wherein the one or more preservatives or antioxidants improve the shelf-life, flavor profile, or reduce spoilage of the mixture.

[1180] In some embodiments of the aforementioned methods of making, the phenylpropanoid, the phenylethanol derivative, the glycoside or an analog thereof or the extract of a plant that includes a phenylpropanoid, a phenylethanol derivative, a glycoside or an analog thereof includes molecules selected from one or more of the following: salidroside (rhodioloside), rosin, rosavin, rosarin, rosiridrin, rhodioniside, or p-tyrosol.

[1181] In some embodiments of the aforementioned methods of making, the phenylpropanoid, the phenylethanol derivative, the glycoside or an analog thereof or the extract of a plant that comprises a phenylpropanoid, a phenylethanol derivative, a glycoside or an analog thereof comprises a glucosylated phenylpropanoid, a glucosylated phenylethanol

derivative, a glucosylated glycoside, an aglycone of a phenylpropanoid, an aglycone of a phenylethanol derivative, or an aglycone of a glycoside.

[1182] In some embodiments of the aforementioned methods of making, the composition is a fruit, such as citrus fruits, tropical fruits, or berries, juices, puree, jam, jelly, sports drinks, fruit flavored beverages, wine, dairy product, plant-based milk, product of plant-based milk, coffee, such as black coffee, milk-based coffee drinks, iced coffee drinks, instant coffee, coffee beans, or any combination thereof, alcoholic or non-alcoholic beverage, such as vodka, brandy, whiskey, or any combination thereof, a pungent compound, such as capsaicin, capsicum, piperine, allyl isothiocyanate, allicin, gingerol, sinigrin, eugenol, sinalbin, safrole, menthol, isothiocyanates, thymol, curcumin, resiniferatoxin, oleocanthal or any combination thereof, a harsh compound, such as quinine, caffeine, nicotine, tannins, catechins, limonene, pinene, amygdalin, saponins, oxalic acid, formic acid, allyl isothiocyanate, dimethyl sulfide, casein peptides, bromelain, capsaicin or any combination thereof, a burning compound, such as capsaicin, dihydrocapsaicin, nordihydrocapsaicin, allyl isothiocyanate, piperine, gingerol, allicin, allyl sulfide, diallyl disulfide, resiniferatoxin, acrolein, cinnamaldehyde, menthol, eugenol, ethanol, acetic acid, oleocanthal, citric acid or any combination thereof, a bitter compound, such as absinthin, aloin, alpha acid, amarogentin, andrographolide, brucine, caffeine, denatonium, eugenin, hesperidin, humulone, isohumulone, Kaempferol 3-O-rutinoside, 6-Methoxymellein, naringin, papaverine, phenylthiocarbamide, propylthiouracil, quassin, quinidine, quinine, salicin, strychnine, sucrose octaacetate, sucrose octapropionate, theobromine, theophylline, vegetables, tea, chocolate, fruits or any combination thereof, honey, vanilla, chocolate, tea, saffron, safranal or syrup, such as maple syrup.

[1183] In some embodiments of the aforementioned methods of making, the dairy product, plant-based milk, or product of plant-based milk includes a milk, such as whole milk, nonfat milk, lactose-free milk, buttermilk, condensed milk, cashew milk, goat milk, rick milk, soy milk, oat milk, almond milk, coconut milk, chocolate milk, a yogurt, cheese, frosting, pudding, chocolate, custard, ice cream, gelato, sherbet, sorbet, frozen yogurt or any combination thereof.

[1184] In some embodiments of the aforementioned methods of making, the plant extract that includes a phenylpropanoid, a phenylethanol derivative, a glycoside or an analog thereof is obtained from a plant from any one or more of the following species: *Rhodiola rosea*,

Rhodiola alterna, *Rhodiola brevipetiolata*, *Rhodiola crenulate*, *Rhodiola kirilowi*, *Rhodiola quadrifida*, *Rhodiola sachalinensis*, *Rhodiola sacra.*, or *Rhodiola iremelica*..

[1185] In some embodiments of the aforementioned methods of making, the mixture provides a taste perception in the subject of an enhancement of ripeness or ripeness perception, an enhancement of juiciness or juiciness perception, an enhancement of freshness or freshness perception, an enhancement of fruity flavors or notes, an enhancement of flavor depth, an enhancement in mouthfeel or mouthfeel perception when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[1186] In some embodiments of the aforementioned methods of making, the mixture provides a taste perception in the subject of an enhancement of cocoa flavors or notes, an enhancement of dark cocoa flavors or notes, an enhancement of vanilla bean flavors or notes, an enhancement of sweetness or sweetness perception, an enhancement of roasted coffee flavors or notes, an enhancement of dark roasted flavors or notes, or an enhancement of creaminess or creaminess perception when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[1187] In some embodiments of the aforementioned methods of making, the mixture provides a taste perception in the subject of an enhancement of cinnamic notes, an enhancement of brown notes, or an enhancement of honey notes when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[1188] In some embodiments of the aforementioned methods of making, the mixture provides a taste perception in the subject of a reduction in pungency or pungency perception, a reduction in initial pungency perception, a reduction in burning sensation or burning perception, a reduction in initial burning perception, a delayed onset of burning sensation or burning perception, a reduction in burning sensation duration, a masking of alcohol perception, an enhancement of aged fruit notes, enhancement of brandy flavors or

notes, a reduction in tingling sensation or tingling perception, a reduction in initial tingling perception, a delayed onset of tingling sensation or tingling perception, a reduction in harshness or harshness perception, a reduction in bitterness or bitterness perception, a delayed onset of spice burn or spice burn perception, or a reduction in spice intensity when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[1189] In some embodiments of the aforementioned methods of making, the mixture provides a taste perception in the subject of an enhancement of aging effect, an enhancement of wood tastes or notes, an enhancement of brown flavors or notes, an enhancement of sweet flavors or notes, an enhancement of caramel flavors or notes, an enhancement of floral flavors or notes, an enhancement of woodiness, an enhancement of hay flavors or notes, an enhancement of saffron taste or an enhancement of astringency or astringency perception when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[1190] In some embodiments of the aforementioned methods of making, the food or beverage or granule, powder, or liquid formulation is selected from a sugar substitute, water, a carbonated beverage, such as a carbonated fruit beverage, carbonated cola drink or carbonated water, sport beverage, alcoholic beverages, alcohol-free beverages, spices and/or seasonings, such as chili, wasabi, horseradish, mustard, ginger, black pepper, or cinnamon, meat, vegetables, mushrooms, cheese, seafood, salt, energy beverages, flavored water, powders for drinks, dairy products, such as milk, yogurt, cheese, or ice cream, plant based milks, products of plant based milk, puddings, cakes, shakes, malts, brownies, pastries, cookies, cheesecakes, fudge, pies, cobblers, parfaits, mousse, biscuits, custards, frosting, fruits, vegetables, condiments, dry cereal, oatmeal, granola bars, hard candy, soft candy, taffy, chocolates, sugarless candies, chewing gum, bubble gum, juices, teas, coffees, salsa, gel beads, film strips for breath, gelatin candies, pectin candies, starch candies, lozenges, cough drops, throat lozenges, throat sprays, toothpastes or mouth rinses.

[1191] In some embodiments of the aforementioned methods of making, the amount of component (a) in the mixture is at least 2 ppm, such as, 3, 4, 5, 7.5, 10, 20, 30, 40,

50, 60, 70, 80, 90, 100, 110, 120, 130, 140, 150, 160, 170, 180, 190, 200, 210, 220, 230, 240, 250, 260, 270, 280, 290, or 300 ppm or an amount within a range defined by any two of the aforementioned amounts, preferably 15-25 ppm, 12.5-40 ppm, 25-50 ppm, 25-60 ppm, 25-75 ppm, 50-90 ppm, 50-150 ppm, 100-150 ppm, 100-200 ppm, 150-200 ppm, 200-250 ppm, or 12-200 ppm.

[1192] In some embodiments of the aforementioned methods of making, component (a) is dissolved in food grade ethanol.

[1193] In some embodiments of the aforementioned methods of making, the food grade ethanol is at least 1%, such as 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 15, 20, 25, 30, 35, 40, 45, 50, 60, 70, 80, 85, 90, 95, or 100%, or with a range defined by any two of the aforementioned amounts, preferably 80, 90, or 95%.

[1194] Additional embodiments further include a composition obtained or obtainable by the method.

[1195] More embodiments described herein relate to a mixture used for modulating a subject's taste perception of fruity flavors, white flavors, brown flavors, pungency, burning, harshness, bitterness, aging, oak, honey, alcohol, syrup, tea, or saffron in a subject, wherein the mixture includes at least two components (a) and (b): (a) a phenylpropanoid, a phenylethanol derivative, a glycoside or an analog thereof (for example, a glycosylation molecule of an aglycone, an aglycone of a glycosylated molecule, or a further glycosylated molecule of a glycosylated molecule) or an extract of a plant that includes a phenylpropanoid, a phenylethanol derivative or an analog thereof, such as a *Rhodiola rosea* root extract; and (b) a composition including a fruit, vanilla, cocoa, chocolate, coffee, a pungent compound, a burning compound, a harsh compound, a bitter compound, saffron, oak extract, honey, tea, syrup, or an alcohol; wherein component (a) is admixed with component (b); preferably, wherein the mixture is provided in a food, beverage, granule, powder or liquid formulation; and optionally, wherein the mixture includes one or more preservatives or antioxidants, such as a sulphite, sorbic acid, a sorbate compound, benzoic acid, benzoate, propionic acid, propionate, ascorbic acid, ascorbate, citric acid, a tocopherol, a retinol, a polyphenol, a phenolic acid, a flavonoid, lipoic acid, N-acetylcysteine, butylated hydroxyanisole, butylated hydroxytoluene or derivatives thereof, preferably, wherein the one or more preservatives or antioxidants improve the shelf-life, flavor profile, or reduce spoilage of the mixture.

[1196] In some embodiments of the aforementioned mixtures for use, the phenylpropanoid, the phenylethanol derivative, a glycoside or an analog thereof or the extract of a plant that includes a phenylpropanoid, a phenylethanol derivative, a glycoside or an analog thereof includes molecules selected from one or more of the following: salidroside (rhodioloside), rosin, rosavin, rosarin, rosiridrin, rhodioniside, and p-tyrosol.

[1197] In some embodiments of the aforementioned mixtures for use, the phenylpropanoid, the phenylethanol derivative, the glycoside or an analog thereof or the extract of a plant that comprises a phenylpropanoid, a phenylethanol derivative, a glycoside or an analog thereof comprises a glucosylated phenylpropanoid, a glucosylated phenylethanol derivative, a glucosylated glycoside, an aglycone of a phenylpropanoid, an aglycone of a phenylethanol derivative, or an aglycone of a glycoside.

[1198] In some embodiments of the aforementioned mixtures for use, the composition is a fruit, such as citrus fruits, tropical fruits, or berries, juices, puree, jam, jelly, sports drinks, fruit flavored beverages, wine, dairy product, plant-based milk, product of plant-based milk, coffee, such as black coffee, milk-based coffee drinks, iced coffee drinks, instant coffee, coffee beans, or any combination thereof, alcoholic or non-alcoholic beverage, such as vodka, brandy, whiskey, or any combination thereof, a pungent compound, such as capsaicin, capsicum, piperine, allyl isothiocyanate, allicin, gingerol, sinigrin, eugenol, sinalbin, safrole, menthol, isothiocyanates, thymol, curcumin, resiniferatoxin, oleocanthal or any combination thereof, a harsh compound, such as quinine, caffeine, nicotine, tannins, catechins, limonene, pinene, amygdalin, saponins, oxalic acid, formic acid, allyl isothiocyanate, dimethyl sulfide, casein peptides, bromelain, capsaicin or any combination thereof, a burning compound, such as capsaicin, dihydrocapsaicin, nordihydrocapsaicin, allyl isothiocyanate, piperine, gingerol, allicin, allyl sulfide, diallyl disulfide, resiniferatoxin, acrolein, cinnamaldehyde, menthol, eugenol, ethanol, acetic acid, oleocanthal, citric acid or any combination thereof, a bitter compound, such as absinthin, aloin, alpha acid, amarogentin, andrographolide, brucine, caffeine, denatonium, eugenin, hesperidin, humulone, isohumulone, Kaempferol 3-O-rutinoside, 6-Methoxymellein, naringin, papaverine, phenylthiocarbamide, propylthiouracil, quassin, quinidine, quinine, salicin, strychnine, sucrose octaacetate, sucrose octapropionate, theobromine, theophylline, vegetables, tea, chocolate, fruits or any combination thereof, honey, vanilla, chocolate, tea, saffron, safranal or syrup, such as maple syrup.

[1199] In some embodiments of the aforementioned mixtures for use, the dairy product, plant-based milk, or product of plant-based milk includes a milk, such as whole milk, nonfat milk, lactose-free milk, buttermilk, condensed milk, cashew milk, goat milk, rick milk, soy milk, oat milk, almond milk, coconut milk, chocolate milk, a yogurt, cheese, frosting, pudding, chocolate, custard, ice cream, gelato, sherbet, sorbet, frozen yogurt or any combination thereof.

[1200] In some embodiments of the aforementioned mixtures for use, the plant extract that includes a phenylpropanoid, a phenylethanol derivative, a glycoside or an analog thereof is obtained from a plant from any one or more of the following species: *Rhodiola rosea*, *Rhodiola alterna*, *Rhodiola brevipetiolata*, *Rhodiola crenulate*, *Rhodiola kirilowi*, *Rhodiola quadrifida*, *Rhodiola sachalinensis*, *Rhodiola sacra.*, or *Rhodiola iremelica*..

[1201] In some embodiments of the aforementioned mixtures for use, the mixture provides a taste perception in the subject of an enhancement of ripeness or ripeness perception, an enhancement of juiciness or juiciness perception, an enhancement of freshness or freshness perception, an enhancement of fruity flavors or notes, an enhancement of flavor depth, an enhancement in mouthfeel or mouthfeel perception when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[1202] In some embodiments of the aforementioned mixtures for use, the mixture provides a taste perception in the subject of an enhancement of cocoa flavors or notes, an enhancement of dark cocoa flavors or notes, an enhancement of vanilla bean flavors or notes, an enhancement of sweetness or sweetness perception, an enhancement of roasted coffee flavors or notes, an enhancement of dark roasted flavors or notes, or an enhancement of creaminess or creaminess perception when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[1203] In some embodiments of the aforementioned mixtures for use, the mixture provides a taste perception in the subject of an enhancement of cinnamic notes, an enhancement of brown notes, or an enhancement of honey notes when the mixture is provided

to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[1204] In some embodiments of the aforementioned mixtures for use, the mixture provides a taste perception in the subject of a reduction in pungency or pungency perception, a reduction in initial pungency perception, a reduction in burning sensation or burning perception, a reduction in initial burning perception, a delayed onset of burning sensation or burning perception, a reduction in burning sensation duration, a masking of alcohol perception, an enhancement of aged fruit notes, enhancement of brandy flavors or notes, a reduction in tingling sensation or tingling perception, a reduction in initial tingling perception, a delayed onset of tingling sensation or tingling perception, a reduction in harshness or harshness perception, a reduction in bitterness or bitterness perception, a delayed onset of spice burn or spice burn perception, or a reduction in spice intensity when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[1205] In some embodiments of the aforementioned mixtures for use, the mixture provides a taste perception in the subject of an enhancement of aging effect, an enhancement of wood tastes or notes, an enhancement of brown flavors or notes, an enhancement of sweet flavors or notes, an enhancement of caramel flavors or notes, an enhancement of floral flavors or notes, an enhancement of woodiness, an enhancement of hay flavors or notes, an enhancement of saffron taste or an enhancement of astringency or astringency perception when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[1206] In some embodiments of the aforementioned mixtures for use, the food or beverage or granule, powder, or liquid formulation is selected from a sugar substitute, water, a carbonated beverage, such as a carbonated fruit beverage, carbonated cola drink or carbonated water, sport beverage, alcoholic beverages, alcohol-free beverages, spices and/or seasonings, such as chili, wasabi, horseradish, mustard, ginger, black pepper, or cinnamon, meat, vegetables, mushrooms, cheese, seafood, salt, energy beverages, flavored water,

powders for drinks, dairy products, such as milk, yogurt, cheese, or ice cream, plant based milks, products of plant based milk, puddings, cakes, shakes, malts, brownies, pastries, cookies, cheesecakes, fudge, pies, cobblers, parfaits, mousse, biscuits, custards, frosting, fruits, vegetables, condiments, dry cereal, oatmeal, granola bars, hard candy, soft candy, taffy, chocolates, sugarless candies, chewing gum, bubble gum, juices, teas, coffees, salsa, gel beads, film strips for breath, gelatin candies, pectin candies, starch candies, lozenges, cough drops, throat lozenges, throat sprays, toothpastes or mouth rinses.

[1207] In some embodiments of the aforementioned mixtures for use, the use further includes selecting or identifying a subject to receive a composition, which modulates a taste perception in a subject, such as fruity flavors, white flavors, brown flavors, pungency, burning, harshness, bitterness, aging, oak tastes, or saffron tastes.

[1208] In some embodiments of the aforementioned mixtures for use, the use further includes determining or analyzing the ripeness perception, juiciness perception, freshness perception, flavor depth perception, mouthfeel perception, creaminess perception, pungency perception, initial pungency onset, burning perception, initial burning onset, tingling perception, initial tingling onset, harshness perception, bitterness perception, aging effect perception, initial spice burn onset, spice intensity perception, alcohol perception, astringency perception, or perception of fruity, vanilla bean, cocoa, dark cocoa, roasted coffee, dark roasted coffee, cinnamic, brown, honey, aged fruit, wood, sweet, hay, saffron, caramel, or floral flavor or notes or any combination thereof of the subject after consuming said mixture.

[1209] In some embodiments of the aforementioned mixtures for use, the amount of component (a) in the mixture is at least 2 ppm, such as, 3, 4, 5, 7.5, 10, 20, 30, 40, 50, 60, 70, 80, 90, 100, 110, 120, 130, 140, 150, 160, 170, 180, 190, 200, 210, 220, 230, 240, 250, 260, 270, 280, 290, or 300 ppm or an amount within a range defined by any two of the aforementioned amounts, preferably 15-25 ppm, 12.5-40 ppm, 25-50 ppm, 25-60 ppm, 25-75 ppm, 50-90 ppm, 50-150 ppm, 100-150 ppm, 100-200 ppm, 150-200 ppm, 200-250 ppm, or 12-200 ppm.

[1210] In some embodiments of the aforementioned mixtures for use, component (a) is dissolved in food grade ethanol.

[1211] In some embodiments of the aforementioned mixtures for use, the food grade ethanol is at least 1%, such as 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 15, 20, 25, 30, 35, 40, 45, 50,

60, 70, 80, 85, 90, 95, or 100%, or with a range defined by any two of the aforementioned amounts, preferably 80, 90, or 95%.

G. Compounds containing *Trigonella foenum graecum L.* extract or steroidal saponins obtained from a plant extract

[1212] Described herein are compositions and uses of compositions comprising *Trigonella foenum graecum L.* extract or steroidal saponins or an analog thereof (for example, a glycosylation molecule of an aglycone, an aglycone of a glycosylated molecule, or a further glycosylated molecule of a glycosylated molecule), preferably from *Trigonella foenum graecum L.* extract or other sources, which effectively reduce bitterness perception, reduce initial bitterness perception, enhance bitterness, mask bitterness, reduce sourness perception, reduce lingering sourness perception, shorten the duration of lingering sourness perception, reduce initial sourness perception, reduce astringency perception, mask astringency, enhance mildness perception, reduce beany tastes or flavors, reduce grittiness perception, reduce cooling perception, enhance spice intensity, increase duration of spiciness perception, enhance sourness perception, or delay onset of spiciness perception.

[1213] When *Trigonella foenum graecum L.* extract or steroidal saponins and derivatives thereof are added to compositions containing an alcohol, a plant protein or plant protein product, a spice, a cooling compound, a spicy compound, an astringent compound, a bitter compound or a sour compound, they are found to reduce bitterness perception, reduce initial bitterness perception, enhance bitterness, mask bitterness, reduce sourness perception, reduce lingering sourness perception, shorten the duration of lingering sourness perception, reduce initial sourness perception, reduce astringency perception, mask astringency, enhance mildness perception, reduce beany tastes or flavors, reduce grittiness perception, reduce cooling perception, enhance spice intensity, increase duration of spiciness perception, enhance sourness perception, or delay onset of spiciness perception of a composition containing an alcohol, a plant protein or plant protein product, a spice, a cooling compound, a spicy compound, an astringent compound, a bitter compound or a sour compound admixed with the extract or steroidal saponin.

[1214] In the present disclosure, *Trigonella foenum graecum L* extract or steroidal saponins may be available commercially, and can also be isolated and purified from a botanical extract derived from particular species or any plants comprising steroidal saponins or components thereof. For example, a botanical extract as described from the disclosure herein

may be from 0.01% to 95%, from 0.05% to 50% or from 0.1% to 10%. Compositions may contain up to 99 wt% of a particular plant extract, preferably a combination of plant extracts, wherein an equal amount of each plant extract is used. Some compositions may contain, for example, between at least 0.05 wt% - 99 wt% of an extract. Unless otherwise specified, percentages (% s) are by weight.

[1215] In some embodiments, the steroidal saponin or an analog thereof or the extract of a plant that includes the steroidal saponin or an analog thereof comprises molecules selected from one or more of the following: yamogenin, diosgenin, smilagenin, sarsasapogenin, tigogenin, neotigogenin, gitogenin, yuccagenin, or saponaretin

[1216] Several embodiments described herein relate to a method for modulating a subject's taste perception of astringency, spiciness, bitterness, plant protein, cooling, alcohol or sourness or for masking of astringency, bitterness or sourness, the method including: providing a subject a mixture that includes at least two components (a) and (b): (a) a steroidal saponin or an analog thereof (for example, a glycosylation molecule of an aglycone, an aglycone of a glycosylated molecule, or a further glycosylated molecule of a glycosylated molecule) or an extract of a plant that includes a steroidal saponin or an analog thereof, such as a *Trigonella foenum graecum L.* extract; and (b) a composition including an alcohol, a plant protein or plant protein product, a spice, a cooling compound, a spicy compound, an astringent compound, a bitter compound or a sour compound wherein component (a) is admixed with component (b); wherein the mixture is preferably provided in a food, beverage, granule, powder or liquid formulation; and optionally, wherein the mixture includes one or more preservatives or antioxidants, such as a sulphite, sorbic acid, a sorbate compound, benzoic acid, benzoate, propionic acid, propionate, ascorbic acid, ascorbate, citric acid, a tocopherol, a retinol, a polyphenol, a phenolic acid, a flavonoid, lipoic acid, N-acetylcysteine, butylated hydroxyanisole, butylated hydroxytoluene or derivatives thereof, preferably, wherein the one or more preservatives or antioxidants improve the shelf-life, flavor profile, or reduce spoilage of the mixture; and/or optionally, selecting a composition that includes an alcohol, a plant protein or plant protein product, a spice, a cooling compound, a spicy compound, an astringent compound, a bitter compound or a sour compound for receiving an agent that modulates the taste perception of a subject of astringency, spiciness, bitterness, plant protein, cooling, alcohol or sourness or that masks astringency, bitterness or sourness and providing said selected

composition component (a); and/or optionally, evaluating the modulation of a subject's taste perception of astringency, spiciness, bitterness, plant protein, cooling, alcohol or sourness or masking of astringency, bitterness or sourness after providing the subject the mixture.

[1217] In some of the aforementioned methods, the steroidal saponin or an analog thereof or the extract of a plant that includes the steroidal saponin or an analog thereof includes molecules selected from one or more of the following: yamogenin, diosgenin, smilagenin, sarsasapogenin, tigogenin, neotigogenin, gitogenin, yuccagenin, or saponaretin.

[1218] In some of the aforementioned methods, the steroidal saponin or an analog thereof or the extract of a plant that includes steroidal saponin or an analog thereof includes a glucosylated steroidal saponin or an aglycone of a steroidal saponin.

[1219] In some of the aforementioned methods, the composition is a fruit, such as citrus fruits, tropical fruits, or berries, juices, puree, jam, jelly, sports drinks, fruit flavored beverages, wine, dairy product, plant-based milk, product of plant-based milk, coffee, such as black coffee, milk-based coffee drinks, iced coffee drinks, instant coffee, coffee beans, or any combination thereof, alcoholic or non-alcoholic beverage, such as vodka, brandy, whiskey, or any combination thereof, a spice or spicy compound, such as a chili, wasabi, horseradish, mustard, ginger, black pepper, cinnamon, pumpkin spice, Szechuan pepper, or allspice, a salt, a sour compound, such as acetic acid, citric acid, hydrochloric acid, lactic acid, malic acid, nitric acid, fumaric acid, sulfuric acid, tartaric acid, phosphoric acid, other acid or any combination thereof, a bitter compound, such as absinthin, aloin, alpha acid, amarogentin, andrographolide, brucine, caffeine, denatonium, eugenin, hesperidin, humulone, isohumulone, Kaempferol 3-O-rutinoside, 6-Methoxymellein, naringin, papaverine, phenylthiocarbamide, propylthiouracil, quassin, quinidine, quinine, salicin, strychnine, sucrose octaacetate, sucrose octapropionate, theobromine, theophylline, vegetables, tea, chocolate, fruits or any combination thereof, an astringent compound, such as phenolic compounds, tannins, gallic acid, zinc oxide, zinc sulfate, tannic acid, potassium permanganate, silver nitrate, tincture of benzoin, potassium alum, caftaric acid, acacia, yarrow, sage, witch hazel, vinegar, tea, fruits, vegetables, dairy products, herbs, nuts or any combination thereof, a cooling compound, such as Menthol, Cyclohexanecarboxamide,N-Ethyl-5-Methyl-2-(1- Methylethyl) (WS-3), N-(Ethoxycarbonylmethyl)-3-p-menthanecarboxamide (WS-5), (1R,2S,5R)-N-(4-Methoxyphenyl)-5-methyl-2-(1- methylethyl)cyclohexanecarboxamide (WS-12),

Butanamide, N,2,3-trimethyl-2-(1-methylethyl) (WS-23), or Menthyl Lactate or any combination thereof honey, vanilla, chocolate, tea, saffron, safranal or syrup, such as maple syrup.

[1220] In some of the aforementioned methods, the dairy product, plant-based milk, or product of plant-based milk includes a milk, such as whole milk, nonfat milk, lactose-free milk, buttermilk, condensed milk, cashew milk, fermented milk, goat milk, rick milk, soy milk, oat milk, almond milk, pea milk, coconut milk, chocolate milk, a yogurt, cheese, frosting, pudding, chocolate, custard, ice cream, gelato, sherbet, sorbet, frozen yogurt or any combination thereof.

[1221] In some of the aforementioned methods, the mixture provides a taste perception in the subject of a reduction in bitterness perception, reduction in initial bitterness perception, enhancement of bitterness, masking of bitterness, reduction of sourness perception, reduction of lingering sourness perception, shorter duration of lingering sourness perception, reduction of initial sourness perception, reduction of astringency perception, masking of astringency, enhancement of mildness perception, reduction of beany tastes or flavors, reduction of grittiness perception, reduction in cooling perception, enhancement of spice intensity, increased duration of spiciness perception, enhancement of sourness perception, delayed onset of spiciness perception when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[1222] In some of the aforementioned methods, the food or beverage or granule, powder, or liquid formulation is selected from a sugar substitute, water, a carbonated beverage, such as a carbonated fruit beverage, carbonated cola drink or carbonated water, sport beverage, alcoholic beverages, alcohol-free beverages, spices and/or seasonings, such as chili, wasabi, horseradish, mustard, ginger, black pepper, or cinnamon, meat, vegetables, mushrooms, cheese, seafood, salt, energy beverages, flavored water, powders for drinks, dairy products, such as milk, yogurt, cheese, or ice cream, plant based milks, products of plant based milk, puddings, cakes, shakes, malts, brownies, pastries, cookies, cheesecakes, fudge, pies, cobblers, parfaits, mousse, biscuits, custards, frosting, fruits, vegetables, condiments, dry cereal, oatmeal, granola bars, hard candy, soft candy, taffy, chocolates, sugarless candies, chewing

gum, bubble gum, juices, teas, coffees, salsa, gel beads, film strips for breath, gelatin candies, pectin candies, starch candies, lozenges, cough drops, throat lozenges, throat sprays, toothpastes or mouth rinses.

[1223] In some of the aforementioned methods, the amount of component (a) in the mixture is at least 2 ppm, such as, 3, 4, 5, 7.5, 10, 20, 30, 40, 50, 60, 70, 80, 90, 100, 110, 120, 130, 140, 150, 160, 170, 180, 190, 200, 210, 220, 230, 240, 250, 260, 270, 280, 290, or 300 ppm or an amount within a range defined by any two of the aforementioned amounts, preferably 15-25 ppm, 12.5-40 ppm, 25-50 ppm, 25-60 ppm, 25-75 ppm, 50-90 ppm, 50-150 ppm, 100-150 ppm, 100-200 ppm, 150-200 ppm, 200-250 ppm, or 12-200 ppm.

[1224] In some embodiments, the aforementioned methods further include selecting or identifying a subject to receive a composition, which modulates a taste perception in a subject, such as astringency, spiciness, bitterness, plant protein, cooling, alcohol or sourness or which masks astringency, bitterness or sourness.

[1225] In some embodiments, the aforementioned methods further include determining or analyzing the bitterness perception, initial bitterness perception, sourness perception, lingering sourness perception, duration of sourness perception, initial sourness perception, astringency perception, masking of astringency, mildness perception, perception of beany tastes or flavors, or grittiness perception or any combination thereof of the subject after consuming said mixture.

[1226] In some of the aforementioned methods, component (a) is dissolved in food grade ethanol.

[1227] In some of the aforementioned methods, the food grade ethanol is at least 1%, such as 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 15, 20, 25, 30, 35, 40, 45, 50, 60, 70, 80, 85, 90, 95, or 100%, or with a range defined by any two of the aforementioned amounts, preferably 80, 90, or 95%.

[1228] Additional embodiments described herein relate to methods of making a mixture which modulates a subject's taste perception of astringency, spiciness, bitterness, plant protein, cooling, alcohol or sourness or for masking of astringency, bitterness or sourness, the method including: admixing a component (a) with a component (b) to form said mixture: (a) a steroidal saponin or an analog thereof (for example, a glycosylation molecule of an aglycone, an aglycone of a glycosylated molecule, or a further glycosylated molecule of a glycosylated

molecule) or an extract of a plant that includes a steroidal saponin or an analog thereof, such as a *Trigonella foenum graecum L.* extract; and (b) a composition including an alcohol, a plant protein or plant protein product, a spice, a cooling compound, a spicy compound, an astringent compound, a bitter compound or a sour compound; wherein the composition is preferably provided in a food, beverage, granule, powder or liquid formulation; and optionally, wherein the composition includes one or more preservatives or antioxidants, such as a sulphite, sorbic acid, a sorbate compound, benzoic acid, benzoate, propionic acid, propionate, ascorbic acid, ascorbate, citric acid, a tocopherol, a retinol, a polyphenol, a phenolic acid, a flavonoid, lipoic acid, N-acetylcysteine, butylated hydroxyanisole, butylated hydroxytoluene or derivatives thereof, preferably, wherein the one or more preservatives or antioxidants improve the shelf-life, flavor profile, or reduce spoilage of the mixture.

[1229] In some embodiments of the aforementioned methods of making, the steroidal saponin or an analog thereof or the extract of a plant that includes the steroidal saponin or an analog thereof includes molecules selected from one or more of the following: yamogenin, diosgenin, smilagenin, sarsasapogenin, tigogenin, neotigogenin, gitogenin, yuccagenin, or saponaretin.

[1230] In some embodiments of the aforementioned methods of making, the steroidal saponin or an analog thereof or the extract of a plant that includes steroidal saponin or an analog thereof includes a glucosylated steroidal saponin or an aglycone of a steroidal saponin.

[1231] In some embodiments of the aforementioned methods of making, the composition is a fruit, such as citrus fruits, tropical fruits, or berries, juices, puree, jam, jelly, sports drinks, fruit flavored beverages, wine, dairy product, plant-based milk, product of plant-based milk, coffee, such as black coffee, milk-based coffee drinks, iced coffee drinks, instant coffee, coffee beans, or any combination thereof, alcoholic or non-alcoholic beverage, such as vodka, brandy, whiskey, or any combination thereof, a spice or spicy compound, such as a chili, wasabi, horseradish, mustard, ginger, black pepper, cinnamon, pumpkin spice, Szechuan pepper, or allspice, a salt, a sour compound, such as acetic acid, citric acid, hydrochloric acid, lactic acid, malic acid, nitric acid, fumaric acid, sulfuric acid, tartaric acid, phosphoric acid, other acid or any combination thereof, a bitter compound, such as absinthin, aloin, alpha acid, amarogentin, andrographolide, brucine, caffeine, denatonium, eugenin, hesperidin, humulone,

isohumulone, Kaempferol 3-O-rutinoside, 6-Methoxymellein, naringin, papaverine, phenylthiocarbamide, propylthiouracil, quassin, quinidine, quinine, salicin, strychnine, sucrose octaacetate, sucrose octapropionate, theobromine, theophylline, vegetables, tea, chocolate, fruits or any combination thereof, an astringent compound, such as phenolic compounds, tannins, gallic acid, zinc oxide, zinc sulfate, tannic acid, potassium permanganate, silver nitrate, tincture of benzoin, potassium alum, caftaric acid, acacia, yarrow, sage, witch hazel, vinegar, tea, fruits, vegetables, dairy products, herbs, nuts or any combination thereof, a cooling compound, such as Menthol, Cyclohexanecarboxamide,N-Ethyl-5-Methyl-2-(1-Methylethyl) (WS-3), N-(Ethoxycarbonylmethyl)-3-p-menthanecarboxamide (WS-5), (1R,2S,5R)-N-(4-Methoxyphenyl)-5-methyl-2-(1- methylethyl)cyclohexanecarboxamide (WS-12), Butanamide, N,2,3-trimethyl-2-(1-methylethyl) (WS-23), or Menthyl Lactate or any combination thereof honey, vanilla, chocolate, tea, saffron, safranal or syrup, such as maple syrup.

[1232] In some embodiments of the aforementioned methods of making, the dairy product, plant-based milk, or product of plant-based milk includes a milk, such as whole milk, nonfat milk, lactose-free milk, buttermilk, condensed milk, cashew milk, fermented milk, goat milk, rick milk, soy milk, oat milk, almond milk, pea milk, coconut milk, chocolate milk, a yogurt, cheese, frosting, pudding, chocolate, custard, ice cream, gelato, sherbet, sorbet, frozen yogurt or any combination thereof.

[1233] In some embodiments of the aforementioned methods of making, the mixture provides a taste perception in the subject of a reduction in bitterness perception, reduction in initial bitterness perception, enhancement of bitterness, masking of bitterness, reduction of sourness perception, reduction of lingering sourness perception, shorter duration of lingering sourness perception, reduction of initial sourness perception, reduction of astringency perception, masking of astringency, enhancement of mildness perception, reduction of beany tastes or flavors, reduction of grittiness perception, reduction in cooling perception, enhancement of spice intensity, increased duration of spiciness perception, enhancement of sourness perception, delayed onset of spiciness perception when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[1234] In some embodiments of the aforementioned methods of making, the food or beverage or granule, powder, or liquid formulation is selected from a sugar substitute, water, a carbonated beverage, such as a carbonated fruit beverage, carbonated cola drink or carbonated water, sport beverage, alcoholic beverages, alcohol-free beverages, spices and/or seasonings, such as chili, wasabi, horseradish, mustard, ginger, black pepper, or cinnamon, meat, vegetables, mushrooms, cheese, seafood, salt, energy beverages, flavored water, powders for drinks, dairy products, such as milk, yogurt, cheese, or ice cream, plant based milks, products of plant based milk, puddings, cakes, shakes, malts, brownies, pastries, cookies, cheesecakes, fudge, pies, cobblers, parfaits, mousse, biscuits, custards, frosting, fruits, vegetables, condiments, dry cereal, oatmeal, granola bars, hard candy, soft candy, taffy, chocolates, sugarless candies, chewing gum, bubble gum, juices, teas, coffees, salsa, gel beads, film strips for breath, gelatin candies, pectin candies, starch candies, lozenges, cough drops, throat lozenges, throat sprays, toothpastes or mouth rinses.

[1235] In some embodiments of the aforementioned methods of making, the amount of component (a) in the mixture is at least 2 ppm, such as, 3, 4, 5, 7.5, 10, 20, 30, 40, 50, 60, 70, 80, 90, 100, 110, 120, 130, 140, 150, 160, 170, 180, 190, 200, 210, 220, 230, 240, 250, 260, 270, 280, 290, or 300 ppm or an amount within a range defined by any two of the aforementioned amounts, preferably 15-25 ppm, 12.5-40 ppm, 25-50 ppm, 25-60 ppm, 25-75 ppm, 50-90 ppm, 50-150 ppm, 100-150 ppm, 100-200 ppm, 150-200 ppm, 200-250 ppm, or 12-200 ppm.

[1236] In some embodiments of the aforementioned methods of making, component (a) is dissolved in food grade ethanol.

[1237] In some embodiments of the aforementioned methods of making, the food grade ethanol is at least 1%, such as 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 15, 20, 25, 30, 35, 40, 45, 50, 60, 70, 80, 85, 90, 95, or 100%, or with a range defined by any two of the aforementioned amounts, preferably 80, 90, or 95%.

[1238] Additional embodiments further include a composition obtained or obtainable by any one or more of the methods mentioned above.

[1239] More embodiments relate to a mixture used for modulating a subject's taste perception of astringency, spiciness, bitterness, plant protein, cooling, alcohol or sourness or for masking of astringency, bitterness or sourness in a subject, wherein the mixture includes at

least two components (a) and (b): (a) a steroidal saponin or an analog thereof (for example, a glycosylation molecule of an aglycone, an aglycone of a glycosylated molecule, or a further glycosylated molecule of a glycosylated molecule) or an extract of a plant that includes a steroidal saponin or an analog thereof, such as a *Trigonella foenum graecum L.* extract; and (b) a composition including an alcohol, a plant protein or plant protein product, a spice, a cooling compound, a spicy compound, an astringent compound, a bitter compound or a sour compound; wherein component (a) is admixed with component (b); preferably, wherein the mixture is provided in a food, beverage, granule, powder or liquid formulation; and optionally, wherein the mixture includes one or more preservatives or antioxidants, such as a sulphite, sorbic acid, a sorbate compound, benzoic acid, benzoate, propionic acid, propionate, ascorbic acid, ascorbate, citric acid, a tocopherol, a retinol, a polyphenol, a phenolic acid, a flavonoid, lipoic acid, N-acetylcysteine, butylated hydroxyanisole, butylated hydroxytoluene or derivatives thereof, preferably, wherein the one or more preservatives or antioxidants improve the shelf-life, flavor profile, or reduce spoilage of the mixture.

[1240] In some embodiments of the aforementioned mixtures, the steroidal saponin or an analog thereof or the extract of a plant that includes the steroidal saponin or an analog thereof includes molecules selected from one or more of the following: yamogenin, diosgenin, smilagenin, sarsasapogenin, tigogenin, neotigogenin, gitogenin, yuccagenin, or saponaretin.

[1241] In some embodiments of the aforementioned mixtures, the steroidal saponin or an analog thereof or the extract of a plant that includes steroidal saponin or an analog thereof includes a glucosylated steroidal saponin or an aglycone of a steroidal saponin.

[1242] In some embodiments of the aforementioned mixtures, the composition is fruit, such as citrus fruits, tropical fruits, or berries, juices, puree, jam, jelly, sports drinks, fruit flavored beverages, wine, dairy product, plant-based milk, product of plant-based milk, coffee, such as black coffee, milk-based coffee drinks, iced coffee drinks, instant coffee, coffee beans, or any combination thereof, alcoholic or non-alcoholic beverage, such as vodka, brandy, whiskey, or any combination thereof, a spice or spicy compound, such as a chili, wasabi, horseradish, mustard, ginger, black pepper, cinnamon, pumpkin spice, Szechuan pepper, or allspice, a salt, a sour compound, such as acetic acid, citric acid, hydrochloric acid, lactic acid, malic acid, nitric acid, fumaric acid, sulfuric acid, tartaric acid, phosphoric acid, other acid or any combination thereof, a bitter compound, such as absinthin, aloin, alpha acid, amarogentin,

andrographolide, brucine, caffeine, denatonium, eugenin, hesperidin, humulone, isohumulone, Kaempferol 3-O-rutinoside, 6-Methoxymellein, naringin, papaverine, phenylthiocarbamide, propylthiouracil, quassin, quinidine, quinine, salicin, strychnine, sucrose octaacetate, sucrose octapropionate, theobromine, theophylline, vegetables, tea, chocolate, fruits or any combination thereof, an astringent compound, such as phenolic compounds, tannins, gallic acid, zinc oxide, zinc sulfate, tannic acid, potassium permanganate, silver nitrate, tincture of benzoin, potassium alum, caftaric acid, acacia, yarrow, sage, witch hazel, vinegar, tea, fruits, vegetables, dairy products, herbs, nuts or any combination thereof, a cooling compound, such as Menthol, Cyclohexanecarboxamide,N-Ethyl-5-Methyl-2-(1- Methylethyl) (WS-3), N-(Ethoxycarbonylmethyl)-3-p-menthanecarboxamide (WS-5), (1R,2S,5R)-N-(4-Methoxyphenyl)-5-methyl-2-(1- methylethyl)cyclohexanecarboxamide (WS-12), Butanamide, N,2,3-trimethyl-2-(1-methylethyl) (WS-23), or Menthyl Lactate or any combination thereof honey, vanilla, chocolate, tea, saffron, safranal or syrup, such as maple syrup.

[1243] In some embodiments of the aforementioned mixtures, the dairy product, plant-based milk, or product of plant-based milk includes a milk, such as whole milk, nonfat milk, lactose-free milk, buttermilk, condensed milk, cashew milk, fermented milk, goat milk, rick milk, soy milk, oat milk, almond milk, pea milk, coconut milk, chocolate milk, a yogurt, cheese, frosting, pudding, chocolate, custard, ice cream, gelato, sherbet, sorbet, frozen yogurt or any combination thereof.

[1244] In some embodiments of the aforementioned mixtures, the mixture provides a taste perception in the subject of a reduction in bitterness perception, reduction in initial bitterness perception, enhancement of bitterness, masking of bitterness, reduction of sourness perception, reduction of lingering sourness perception, shorter duration of lingering sourness perception, reduction of initial sourness perception, reduction of astringency perception, masking of astringency, enhancement of mildness perception, reduction of beany tastes or flavors, reduction of grittiness perception, reduction in cooling perception, enhancement of spice intensity, increased duration of spiciness perception, enhancement of sourness perception, delayed onset of spiciness perception when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject,

as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

[1245] In some embodiments of the aforementioned mixtures, the food or beverage or granule, powder, or liquid formulation is selected from a sugar substitute, water, a carbonated beverage, such as a carbonated fruit beverage, carbonated cola drink or carbonated water, sport beverage, alcoholic beverages, alcohol-free beverages, spices and/or seasonings, such as chili, wasabi, horseradish, mustard, ginger, black pepper, or cinnamon, meat, vegetables, mushrooms, cheese, seafood, salt, energy beverages, flavored water, powders for drinks, dairy products, such as milk, yogurt, cheese, or ice cream, plant based milks, products of plant based milk, puddings, cakes, shakes, malts, brownies, pastries, cookies, cheesecakes, fudge, pies, cobblers, parfaits, mousse, biscuits, custards, frosting, fruits, vegetables, condiments, dry cereal, oatmeal, granola bars, hard candy, soft candy, taffy, chocolates, sugarless candies, chewing gum, bubble gum, juices, teas, coffees, salsa, gel beads, film strips for breath, gelatin candies, pectin candies, starch candies, lozenges, cough drops, throat lozenges, throat sprays, toothpastes or mouth rinses.

[1246] In some embodiments of the aforementioned mixtures, the amount of component (a) in the mixture is at least 2 ppm, such as, 3, 4, 5, 7.5, 10, 20, 30, 40, 50, 60, 70, 80, 90, 100, 110, 120, 130, 140, 150, 160, 170, 180, 190, 200, 210, 220, 230, 240, 250, 260, 270, 280, 290, or 300 ppm or an amount within a range defined by any two of the aforementioned amounts, preferably 15-25 ppm, 12.5-40 ppm, 25-50 ppm, 25-60 ppm, 25-75 ppm, 50-90 ppm, 50-150 ppm, 100-150 ppm, 100-200 ppm, 150-200 ppm, 200-250 ppm, or 12-200 ppm.

[1247] In some embodiments of the aforementioned mixtures, component (a) is dissolved in food grade ethanol.

[1248] In some embodiments of the aforementioned mixtures, the food grade ethanol is at least 1%, such as 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 15, 20, 25, 30, 35, 40, 45, 50, 60, 70, 80, 85, 90, 95, or 100%, or with a range defined by any two of the aforementioned amounts, preferably 80, 90, or 95%.

EXAMPLES

[1249] The disclosure below provides examples of aspects of the invention described herein. The use of these and other examples in the specification is illustrative only,

and in no way limits the scope and meaning of the invention or of any exemplified form. Likewise, the invention is not limited to any particularly preferred embodiments described herein. Indeed, modifications and variations of the invention may be apparent to those skilled in the art upon reading this specification and can be made without departing from its spirit and scope. The invention is therefore to be limited only by the terms of the claims, along with the full scope of equivalents to which the claims are entitled.

Example 1 – Inherent Taste of *Silybum marianum* Extract with 80% Silymarin in Water

[1250] *Silybum marianum* extract was prepared with 80% silymarin in water. 6 evaluators assessed the following:

Control	SM Test Concentration	Sweetness/Taste Attributes of the SM
1.5% Sucrose in water	200 PPM of SM in water	No Sweetness/Slight Fruity taste
1.5% Sucrose in water	300 PPM of SM in water	No Sweetness/Fruity taste
1.5% Sucrose in water	500 PPM of SM in water	No Sweetness/Fruity taste

[1251] *Silybum marianum* extract therefore exhibited or did not contribute to inherent sweetness.

Example 2 – *Silybum marianum* (SM) Extract Sweetness Modulation

[1252] *Silybum marianum* extract (SM) was prepared with 80% silymarin in water. Six evaluators assessed a composition comprising *Silybum marianum* extract (80%) at 2.5%, water at 77.5%, and EtOH at 20%. The flavor profile of the composition was tested at varying ppm concentrations against sugar water (5%), stevia Reb A, stevia Reb M, Monk Fruit Extract, allulose, and commercially available lemonade. Flavor profile results were reported as the following:

Application	Dosage (ppm)	Sweetness Intensity	Mouthfeel	Other Characteristics Noticed
Sugar 5% in Water	50	Slightly sweeter	Not much difference	None
	100	Perceived to be sweeter	Viscosity slightly increased	None
	200	Noticeably sweeter, sweetness has sugar/ honey-like ending	Increased, sugar-like mouthfeel	None
	300	Noticeably sweeter, sweetness has sugar/ honey-like ending	Increased, more viscous, sugar-like mouthfeel	None

Application	Dosage (ppm)	Sweetness Intensity	Mouthfeel	Other Characteristics Noticed

Stevia Reb A 97% 200 ppm in water	50	Not much difference noticed	Slight Increase	None
	100	Slightly sweeter	Improved	Some masking of bitter and metallic off-note
	200	Sweetness is perceived to be increased	Mouthfeel is more viscous, sugar-like mouthfeel	Sweetness onset is faster, reduced bitter and metallic off-note, reduction in sweetness lingering.
	250	Improved sweetness, sugar/ honey like	More viscous, sugar-like mouthfeel	Sweetness profile closer to that of sugar, reduced bitter and metallic off-note, reduction in sweetness lingering.

Application	**Dosage (ppm)**	**Sweetness Intensity**	**Mouthfeel**	**Other Characteristics Noticed**
Stevia Reb M 150 ppm in water	50	Not much difference noticed. Sweetness peak seems to be more rounded	Not much difference noticed	None
	100	Slightly sweeter	Not much difference detected	Slight reduction in lingering
	200	Improved sweetness	Increased viscosity, sugar-like	Masking of lingering and sweetness onset is faster.
	300	Sweetness intensity is noticeably sweeter with sugar-like ending	Increased viscosity, sugar-like	Masking of lingering, sweetness onset is faster
Application	**Dosage (ppm)**	**Sweetness Intensity**	**Mouthfeel**	**Other Characteristics Noticed**
Monk Fruit Extract (luohan guo) 200 ppm in water	50	Not much difference noticed.	Not much difference noticed	None
	100	Slightly sweeter	Slight increased viscosity	Slight reduction in lingering
	200	Improved sweetness	Increased viscosity, more sugar-like	Masking of lingering and sweetness onset is faster.
	300	Sweetness is much more rounded with sugar-like ending	Increased viscosity, more sugar-like	Masking of lingering, sweetness onset is faster

Application	**Dosage (ppm)**	**Sweetness Intensity**	**Mouthfeel**	**Other Characteristics Noticed**
Allulose 75% (4.375% + Sugar 3%) in Water	100	Slightly sweeter	Not much difference noticed	None
	200	Perceived to be sweeter	Increase in viscosity	Sweetness onset is faster
	250	Perceived to be sweeter and has a sugar/ honey-like finish	Increase in viscosity, more sugar-like	Sweetness is more rounded, and finish is extended.

Application	Dosage (ppm)	Sweetness Intensity	Mouthfeel	Other Characteristics Noticed
Commercially Available Lemonade (Contains 28 grams of sugar and 11% lemon juice per 240 ml.)	100	Slightly sweeter	Not much difference detected	None
	200	Perceived to be sweeter	Increased, more viscous	Less sour
	250	Noticeably sweeter, sugar/ honey-like finish	Increased viscosity, Sugar-like mouthfeel	Less Sour

[1253] Compositions including the SM extract were noted to possess one or more of the following: enhanced sweetness intensity, increased viscosity, increased mouthfeel, sugar-like mouthfeel, decreased sourness, faster sweetness onset, longer sweetness perception, honey-like finish, reduction in lingering aftertaste, masking of lingering taste, or reduced bitter and metallic off-note flavors.

Example 3A – *Silybum marianum* (SM) Component Minimum Concentration Assessment

[1254] *Silybum marianum* extract (SM) was prepared with major constituent components isolated. Minimum PPM for each component was assessed in a 4% sugar solution according to the following:

Sample Tasted	PPM tasted in 4% Sugar Solution
Silychristin A	1
Silybin A	1
Silybin B	1
Isosilybin A	1
Combination of the four molecules	4 (1 ppm of each of the listed components above)
4% Sugar Solution	0

[1255] Results indicated that all assessed molecules showed an advantage over the control 4% sugar solution on both mouth feel and sweetness among all testers (n=5).

Example 3B – *Silybum marianum* (SM) Milk Thistle Extract Minimum Concentration Assessment

[1256] *Silybum marianum* milk thistle (SM) extract was prepared at a 2.5% stock solution with 97.5% of 95% food grade ethanol. Minimum PPM for the Milk Thistle extract was assessed in a 4% sugar solution according to the following:

Number	PPM tasted in 4% Sugar Solution
1	7.5
2	3.75
3	2
4	1
5	0.5
6	0.25

[1257] The 0.5 ppm sample was observed to have a beneficial impact on sweetness and mouthfeel among the five tasters (n=5) with impact increasing up to 7.5 ppm. Two out of five tasters were able to distinguish 0.25 ppm sample as superior in mouthfeel and sweetness when compared to 4% sugar solution. The impact of the SM milk thistle extract goes beyond 7.5 ppm, in some applications showing optimal mouthfeel and sweetness at 250 ppm.

Example 4 – *Asparagus racemosus* (AR) Extract Bitter Modulation

[1258] Compositions containing *Asparagus racemosus* (AR) extract and various bitter compounds were prepared. The component (A) formulation comprising *Asparagus racemosus* (Shatavari) extract at 3.0%, water at 77%, and propylene glycol at 20% was generated and mixed with various bitter compound formulations (component B). Six taste evaluators assessed the taste profile for the mixture of the component (A) formulation comprising the AR extract with the bitter compound formulations (component B), and compared the taste profile to that of component (A) having the AR extract alone and component B, being the bitter compound formulation alone. The experimental compositions comprising components (A) and (B) were prepared by mixing the component (A) having the AR extract at varying ppm concentrations with Caffeine, 500 ppm in water, Citrus Fiber, 1% in water, and grapefruit juice. The flavor profile of component (A) having the AR extract by

itself produced no noticeable change in bitterness. The flavor profile results for the experimental mixtures of components (A) and (B) were reported as the following:

Application	Dosage (ppm)	Bitterness Masking	Other Characteristics Noticed
Caffeine 500 ppm in water	20	No difference noticed	None
	50	Noticeable reduction in bitterness	None
	75	Noticeable reduction in bitterness	None
	100	Noticeable reduction in bitterness not much more masking than 50 ppm	None

Application	Dosage (ppm)	Bitterness Masking	Other Characteristics Noticed
Citrus Fiber 1% in water	10	No difference noticed	None
	30	No significant difference	None
	50	Noticeable reduction in bitterness	None
	65	Reduction in bitterness but not as effective as 50 ppm	None

Application	Dosage (ppm)	Bitterness Masking	Other Characteristics Noticed
Grapefruit Juice (100% ruby red grapefruit juice)	25	Mild reduction noticed	None
	50	Noticeable reduction noticed	Product tastes milder overall
	100	Reduction noticed but not as significant as 50 ppm	Product tastes milder overall

[1259] Accordingly, this example demonstrates that the addition of AR extract (component (A)) to a bitter compound formulation (component (B)) provides one or more of the following taste characteristics as compared to a bitter compound formulation lacking the AR extract: reduced bitterness perception, reduced bitterness intensity, and masking of bitter tastes.

Example 5 – *Asparagus racemosus* (AR) Extract Alcohol Modulation

[1260] Compositions containing *Asparagus racemosus* (AR) extract and an alcoholic beverage were prepared. The component (A) formulation comprising *Asparagus racemosus* (Shatavari) extract was generated and mixed with an alcoholic beverage (component B). Taste evaluators assessed the taste profile for the mixture of the component (A) formulation comprising the AR extract with the alcohol (component B), and compared the taste profile to that of component (A) having the AR extract alone and component B, being the alcoholic beverage alone. The experimental compositions comprising components (A) and (B) were prepared by mixing the component (A) having the AR extract at varying ppm concentrations with beer at varying concentrations and vodka 5.0% ABV in water. The flavor profile results for the experimental mixtures of components (A) and (B) were reported as the following:

Functionality	**Base**	**Dosage of Shatavari Extract.**	**Description**
Alcohol Modulation	Beer 0.0% ABV	25 – 100 ppm	Masked cooked and metallic taste, resulting in realistic beer flavor.
	Beer 0.5% ABV	25 – 100 ppm	Retro-nasal effect that simulates alcohol. Increased bitterness that also simulates alcohol.
	Beer 2.0% ABV	25 – 100 ppm	Noticeable retro-nasal enhancement. Increased bitterness.
	Beer 5.0% ABV	25 – 100 ppm	Reduced bitterness, alcohol enhancement not as obvious as with less ABV.
	Vodka + Water 5% ABV	25 – 100 ppm	Enhanced retro- nasal effect starting at 50 ppm. Stronger effect with increased dosage.

[1261] Accordingly, this example demonstrates that the addition of AR extract (component (A)) to an alcoholic beverage (component (B)) provides one or more of the following taste characteristics as compared to an alcoholic beverage lacking the RR extract: masked cooked tastes, masked metallic tastes, enhanced beer or alcohol flavor, enhanced retro-nasal effect, increased bitterness perception, and enhanced alcohol perception.

Example 6 – *Asparagus racemosus* (AR) Extract Spice Modulation

[1262] Compositions containing *Asparagus racemosus* (AR) extract and a spicy compound were prepared. The component (A) formulation comprising *Asparagus racemosus* (Shatavari) extract was generated and mixed with a spicy compound (component B). Taste evaluators assessed the taste profile for the mixture of the component (A) formulation comprising the AR extract with the spicy compound (component B), and compared the taste profile to that of component (A) having the AR extract alone and component B, being the spicy compound alone. The experimental compositions comprising components (A) and (B) were prepared by mixing the component (A) having the AR extract at varying ppm concentrations with hot sauce and wasabi sauce. The flavor profile results for the experimental mixtures of components (A) and (B) were reported as the following:

Functionality	**Base**	**Dosage of Shatavari Extract.**	**Description**
Spice Modulation	Hot Sauce	25 – 200 ppm	Enhanced spice intensity as dosage is increased. Sourness is also increased.
	Wasabi Sauce	25 – 100 ppm	Enhanced spice intensity as dosage is increased.

[1263] Accordingly, this example demonstrates that the addition of AR extract (component (A)) to a spicy compound (component (B)) provides one or more of the following taste characteristics as compared to a spicy compound lacking the AR extract: enhanced spice intensity, and increased sour perception.

Example 7 – *Asparagus racemosus* (AR) Extract Cooling Modulation

[1264] Compositions containing *Asparagus racemosus* (AR) extract and a cooling compound were prepared. The component (A) formulation comprising *Asparagus racemosus* (Shatavari) extract was generated and mixed with a cooling compound (component B). Taste evaluators assessed the taste profile for the mixture of the component (A) formulation comprising the AR extract with the cooling compound (component B), and compared the taste profile to that of component (A) having the AR extract alone and component B, being the cooling compound alone. The experimental compositions comprising components (A) and (B) were prepared by mixing the component (A) having the AR extract at varying ppm

concentrations with menthol 100 ppm in water. The flavor profile results for the experimental mixtures of components (A) and (B) were reported as the following:

Functionality	Base	Dosage of Shatavari Extract.	Description
Cooling Modulation	Menthol 100 ppm in water	25 – 100 ppm	Enhanced cooling intensity without increasing taste associated with menthol. Onset of cooling is faster and over taste is longer lasting.

[1265] Accordingly, this example demonstrates that the addition of AR extract (component (A)) to a cooling compound (component (B)) provides one or more of the following taste characteristics as compared to a cooling compound lacking the AR extract: enhanced cooling intensity, consistent menthol taste, faster onset of cooling sensation, and increased duration of taste.

Example 8 – *Asparagus racemosus* (AR) Extract Carbonation Modulation

[1266] Compositions containing *Asparagus racemosus* (AR) extract and carbonation were prepared. The component (A) formulation comprising *Asparagus racemosus* (Shatavari) extract was generated and mixed with carbonation (component B), such as a carbonated beverage. Taste evaluators assessed the taste profile for the mixture of the component (A) formulation comprising the AR extract with the carbonation (component B), and compared the taste profile to that of component (A) having the AR extract alone and component B, being the carbonation or carbonated beverage alone. The experimental compositions comprising components (A) and (B) were prepared by mixing the component (A) having the AR extract at varying ppm concentrations with beer 5.0% APV and cherry seltzer. The flavor profile results for the experimental mixtures of components (A) and (B) were reported as the following:

Functionality	Base	Dosage of Shatavari Extract.	Description
Carbonation Modulation	Heineken Beer 5% ABV	5 – 10 ppm	Number of bubbles are more than control. Bubble size is smaller. Taste is less stinging than control.

	Cherry Seltzer	5 – 10 ppm	Number of bubbles are similar to control. Taste is less stinging than control.

[1267] Accordingly, this example demonstrates that the addition of AR extract (component (A)) to carbonation (component (B)) provides one or more of the following taste characteristics as compared to carbonation lacking the AR extract: increased bubble quantity, reduced bubble size, and reduced stinging taste.

Example 9 – *Smilax China* (SC) Extract Sour and Astringency Modulation

[1268] Compositions containing *Smilax china* (SC) extract and various sour compounds were prepared. The component (A) formulation comprising *Smilax china* (SC) extract at 5.0%, Ethanol 190 proof at 20%, and propylene glycol at 75% was generated and mixed with various sour compound formulations (component B). Three to five taste evaluators assessed the taste profile for the mixture of the component (A) formulation comprising the SC extract with the sour compound formulations (component B), and compared the taste profile to that of component (A) having the SC extract alone and component B, being the sour compound formulations alone. The experimental compositions comprising components (A) and (B) were prepared by mixing the component (A) having the SC extract at varying ppm concentrations with citric acid 100%, 0.1% in water, latic acid 88%, 0.1% in water, lowfat milk 1%, 55% in water, and phosphoric acid 85%, 0.07% in water. The flavor profile of component (A) having the SC extract by itself produced no noticeable change in sour intensity. The flavor profile results for the experimental mixtures of components (A) and (B) were reported as the following:

Application	Extract	Dosage	Tasting Notes
Citric Acid 100% - 0.1% in water	MK6 5%	1	2/4 tasters were able to detect sourness masking at this dosage
		5	4/4 tasters were able to detect sourness masking at this dosage
		100	Initial and lingering sourness are reduced
		200	4/4 tasters chose this sample to be the most effective for masking sourness. Overall, this sample is milder in sourness masking the initial and lingering sourness.

		400	3/4 tasters did not see improved masking at this dosage compared to 200 ppm.

Application	Extract	Dosage	Tasting Notes
Lactic Acid 88% - 0.1% in water	MK6 5%	1	2/3 tasters were able to detect sourness masking at this dosage. Initial sourness is masked but lingering returns
		100	3/3 tasters were able to detect sourness masking. Initial sourness is noticeably reduced, lingering sourness is also reduced but returns.
		200	3/3 tasters were able to detect sourness masking. The initial sourness is noticeably milder but lingering sourness comes back. Not significantly different than 100 ppm. Some floral off-note detected.
		400	4/4 tasters did not see masking improvement at this dosage compared to 200 ppm.

Application	Extract	Dosage	Tasting Notes
Lowfat Milk 1% - 55% in water	MK6 5%	1	1/4 tasters were able to detect sourness masking at this dosage
		100	4/4 tasters thought this sample was less sour than the control. Upfront sourness is reduced some, lingering sourness remains. Astringency is also reduced.
		200	4/4 tasters thought this sample was less sour than the control. 2/4 preferred this dosage over 100 ppm. 2/4 tasters preferred 100 ppm because it was less astringent. Some floral-like off-note tasted in this sample

Application	Extract	Dosage	Tasting Notes
Phosphoric Acid 85% - 0.07% in water	MK6 5%	1	2/3 tasters were able to detect sourness masking at this dosage.
		100	3/3 tasters were able to detect sourness and astringency masking. Initial sourness is reduced, lingering sourness returns.
		200	3/3 tasters were able to detect sourness masking. The sourness is milder overall, initial sourness is noticeably reduced and astringency and less noticeable.

		400	4/5 tasters were able to detect sourness and astringency masking more effective than 200 ppm.

[1269] Accordingly, this example demonstrates that the addition of SC extract (component (A)) to a sour compound formulation (component (B)) provides one or more of the following taste characteristics as compared to a sour compound formulation lacking the SC extract: reduced sourness perception, reduced sourness intensity, reduced initial sourness, reduced lingering sourness, masking of sour tastes, reduced astringency, and masking of astringent tastes.

Example 10 – *Rehmannia glutinosa* (RG) Extract Astringency Taste Modulation

[1270] Compositions containing *Rehmannia glutinosa* (RG) root extract and various bitter compounds were prepared. The component (A) formulation comprising *Rehmannia glutinosa* root extract at 5.0%, water at 75%, and propylene glycol at 20% was generated and mixed with various astringent compound formulations (component B). Six taste evaluators assessed the taste profile for the mixture of the component (A) formulation comprising the RG root extract with the bitter compound formulations (component B), and compared the taste profile to that of component (A) having the RG root extract alone and component B, being the astringent compound formulation alone. The experimental compositions comprising components (A) and (B) were prepared by mixing the component (A) having the RG root extract at varying ppm concentrations with Tannic Acid, 150 ppm in water, Citric Acid, 0.1% in water, and Low fat Milk 1%. The flavor profile of component (A) having the RG root extract by itself produced no noticeable change in astringency. The flavor profile results for the experimental mixtures of components (A) and (B) were reported as the following:

Application	Dosage (ppm)	Astringency Masking	Other Characteristics Noticed
Tannic Acid 150 ppm in water	50	Moderate difference noticed	None
	100	Noticeable reduction in astringency	None

	200	Astringency is significantly reduced	None
	300	Astringency is reduced but difficult to tell if its more effective than 200 ppm	None

Application	Dosage (ppm)	Astringency Masking	Other Characteristics Noticed
Citric Acid 0.1% in water	50	No difference noticed	None
	100	No difference noticed	None
	200	Mild reduction in astringency	Slightly less acidic tasting
	300	Moderate reduction in astringency	Less acidic and less lingering

Application	Dosage (ppm)	Astringency Masking	Other Characteristics Noticed
Lowfat Milk 1%	50	No significant difference noticed	None
	100	mild reduction in astringency	None
	200	Moderate reduction in astringency	Product tastes creamier, fattier
	300	Astringency is significantly reduced	Product tastes creamier, fattier

[1271] Accordingly, this example demonstrates that the addition of RG root extract (component (A)) to an astringent compound formulation (component (B)) provides one or more of the following taste characteristics as compared to a bitter compound formulation lacking the RG root extract: reduced astringency perception, reduced astringency intensity, masking of astringency tastes, reduced acidic tastes, masking of acidic tastes, reduced lingering of acidic tastes, enhancement of creamy or fatty flavors or tastes, and increased creaminess or fattiness perception.

Example 11 – *Rehmannia glutinosa* (RG) Extract Astringency or Bitterness Taste Modulation

[1272] Compositions containing *Rehmannia glutinosa* (RG) root extract and various astringent or bitter compounds were prepared. The component (A) formulation

comprising *Rehmannia glutinosa* (RG) root extract at 5.0%, propylene glycol at 20%, and water at 75% was generated and mixed with various astringent or bitter compound formulations (component B). six taste evaluators assessed the taste profile for the mixture of the component (A) formulation comprising the RG root extract with the astringent or bitter compound formulations (component B), and compared the taste profile to that of component (A) having the RG root extract alone and component B, being the astringent or bitter compound formulations alone. The experimental compositions comprising components (A) and (B) were prepared by mixing the component (A) having the RG root extract at varying ppm concentrations with cranberry juice and grapefruit juice 100%. The flavor profile of component (A) having the RG root extract by itself produced no noticeable change in astringent or bitter intensity. The flavor profile results for the experimental mixtures of components (A) and (B) were reported as the following:

Application	**Dosage (ppm)**	**Astringency/ Bitterness Masking**	**Other Characteristics Noticed**
Cranberry Juice	50	Moderate reduction in bitterness and astringency noticed	None
	100	Noticeable reduction in astringency and bitterness	Product tastes fruitier
	200	Reduction in bitterness is more obvious	Product tastes fruitier
	300	Significant reduction in astringency and bitterness	Product tastes fruitier

Application	Dosage (ppm)	Astringency/ Bitterness Masking	Other Characteristics Noticed
Grapefruit Juice (100% ruby red grapefruit juice)	50	Mild Bitterness reduction	None
	100	Noticeable reduction in bitterness	None
	200	Reduction in bitterness is more obvious	Product tastes fruitier, brighter
	300	Significant reduction in bitterness	Product tastes fruitier, brighter

[1273] Accordingly, this example demonstrates that the addition of RG root extract (component (A)) to an astringent or bitter compound formulation (component (B)) provides one or more of the following taste characteristics as compared to a sour compound formulation lacking the RG root extract: reduced bitterness perception, reduced bitterness intensity, masking of bitter flavors, reduced astringent perception, reduced astringent intensity, masking of astringent flavors, enhanced fruity flavors, enhanced bright flavors, increased fruitiness or fruity perception, and increased brightness or bright perception.

Example 12 – *Rehmannia glutinosa* (RG) Modulation of an Acidic or Sour Taste Perception While Maintaining an Acidic pH

[1274] Compositions containing *Rehmannia glutinosa* (RG) root extract and an acidic or sour compound were prepared. The component (A) formulation comprising *Rehmannia glutinosa* (RG) root extract was generated and mixed with the acidic or sour compound formulation (component B). The experimental compositions comprising components (A) and (B) were prepared by mixing the component (A) having the RG root extract at varying ppm concentrations with citric acid 0.1%. The pH of each experimental composition was measured twice. The pH of a control composition including citric acid 0.1% alone was also measured twice. The measured results for the experimental mixtures of components (A) and (B) and the control composition were reported as the following:

Sample	pH	Average

	Trial 1	Trial 2	
Control: 0.1% citric acid	2.96	2.96	2.96
0.1% citric acid + RG extract 50 ppm	2.96	2.98	2.97
0.1% citric acid + RG extract 200 ppm	2.97	2.98	2.98

[1275] Accordingly, this example demonstrates that the addition of RG root extract (component (A)) to an astringent or sour compound formulation (component (B)) results in an insignificant change to the pH of the experimental mixtures of components (A) and (B) as compared to the pH of component (B) alone. This is beneficial as an acidic pH of a food or beverage provides a longer shelf life for the food or beverage than the same food or beverage having a basic pH. These results demonstrate that the addition of the RG root extract to a food or beverage does not meaningfully affect the pH or shelf-life of an acidic food or beverage, yet the RG root extract masks or diminishes a subject's taste perception of acidity or sourness of the acidic food or beverage.

Example 13 – *Selaginella tamariscina* (ST) Extract Alcohol Modulation

[1276] Compositions containing *Selaginella tamariscina* (ST) extract and an alcoholic beverage were prepared. The component (A) formulation comprising *Selaginella extract* at 1.0%, water at 79%, and propylene glycol at 20% was generated and mixed with various alcoholic beverages (component B). Six taste evaluators assessed the taste profile for the mixture of the component (A) formulation comprising the ST extract with the alcoholic beverages (component B), and compared the taste profile to that of component (A) having the ST extract alone and component B, being the alcoholic beverage alone. The experimental compositions comprising components (A) and (B) were prepared by mixing the component (A) having the ST extract at varying ppm concentrations with Vodka, 5% ABV in water, Whiskey 15% ABV in water, Vodka 8% ABV in cranberry juice, and Rum 6% ABV in a cola drink. The flavor profile of component (A) having the ST extract by itself produced no noticeable change in alcohol intensity. The flavor profile results for the experimental mixtures of components (A) and (B) were reported as the following:

Application	Dosage (ppm)	Alcohol Intensity Perception	Other Characteristics Noticed
Vodka 5% ABV in water	50	Increased alcohol perception, increased bitterness	None
	100	Increase is more significant, increased bitterness	Some retro nasal effect
	200	Increase is more significant, increased bitterness	Some retro nasal effect and some tongue tingling effect

Application	Dosage (ppm)	Alcohol Intensity	Other Characteristics Noticed
Whiskey 15% ABV in water	50	Increased alcohol perception, increased bitterness	None
	100	Increase is more significant, increased bitterness	Some retro nasal effect
	200	Increase is significant, increased bitterness	Some retro nasal effect

Application	Dosage (ppm)	Alcohol Intensity	Other Characteristics Noticed
Vodka 8% ABV in cranberry juice	50	Not much difference noticed	None
	100	Increase is more noticeable, increased bitterness	Some retro nasal effect
	200	Increase is significant, increased bitterness	Some retro nasal effect

Application	Dosage (ppm)	Alcohol Intensity	Other Characteristics Noticed
Rum 6% ABV in cola	50	Slight increase in perception	None
	100	Increase is more noticeable, increased bitterness	Some retro nasal effect

	200	Increase is significant, increased bitterness	Some retro nasal effect

[1277] Accordingly, this example demonstrates that the addition of ST extract (component (A)) to an alcohol containing beverage (component (B)) provides one or more of the following taste characteristics as compared to an alcohol containing beverage lacking the ST extract: enhanced alcohol intensity, increased alcohol perception, increased bitterness, increased tongue tingling effect and/or increased retro nasal effect.

Example 14 – *Selaginella tamariscina* (ST) Extract Spice Modulation

[1278] Compositions containing *Selaginella tamariscina* (ST) extract and various spices were prepared. The component (A) formulation comprising *Selaginella tamariscina* extract at 1.0%, water at 79%, and propylene glycol at 20% was generated and mixed with various liquid spice formulations (component B). Six taste evaluators assessed the taste profile for the mixture of the component (A) formulation comprising the ST extract with the liquid spice formulations (component B), and compared the taste profile to that of component (A) having the ST extract alone and component B, being the liquid spice formulations alone. The experimental compositions comprising components (A) and (B) were prepared by mixing the component (A) having the ST extract at varying ppm concentrations with piperine (20 ppm) in water, allyl isothiocyanate (15 ppm) in water, Pumpkin Spice Powder (1%) in water, and a Jalapeno Hot Sauce. The flavor profile of component (A) having the ST extract by itself produced no noticeable change in spice intensity. The flavor profile results for the experimental mixtures of components (A) and (B) were reported as the following:

Application	**Dosage (ppm)**	**Spice Intensity**	**Other Characteristics Noticed**
Piperine 20 ppm in water	25	Slightly more intensity	Has delayed spiciness effect
	50	Intensity is noticeably increased	Spice is longer lasting
	75	Increase is significant	Spice is longer lasting

Application	Dosage (ppm)	Spice Intensity	Other Characteristics Noticed
Allyl Isothiocyanate 15 ppm in water	25	Not much difference detected	None
	50	Intensity is increased	Spiciness is felt in the back of the throat
	75	Increase is significant	Spice is longer lasting

Application	Dosage (ppm)	Spice Intensity	Other Characteristics Noticed
Pumpkin Spice powder 1% in water. (Steeped for 3 minutes in hot water and filtered through coffee filter)	25	Moderate increase in spiciness	Some spice tingling sensation noticed
	50	Increase is significant	Tingling sensation like fresh ground spice, longer lasting
	100	Increase is significant	Tingling sensation like fresh ground spice, longer lasting

Application	Dosage (ppm)	Spice Intensity	Other Characteristics Noticed
Jalapeno Hot Sauce	25	Moderate increase in spiciness	None
	50	Increase is increased	Burn sensation is noticeable, spiciness longer lasting
	75	Increase is significant	Burn sensation is noticeable, spiciness longer lasting

[1279] Accordingly, this example demonstrates that the addition of ST extract (component (A)) to a spice formulation (component (B)) provides one or more of the following taste characteristics as compared to a spice formulation lacking the ST extract: enhanced spice intensity, increased spiciness, increased spice tingling sensation, increased burning sensation, and increased duration of spiciness sensation.

Example 15 – *Selaginella tamariscina* (ST) Extract Cooling Modulation

[1280] A composition containing *Selaginella tamariscina* (ST) extract and a cooling compound (WS-23) was prepared. The component (A) formulation comprising *Selaginella tamariscina* extract at 1.0%, water at 79%, and propylene glycol at 20% was generated and mixed with the cooling compound (component B). A taste evaluator assessed the taste profile for the mixture of the component (A) formulation comprising the ST extract with the cooling compound (component B), and compared the taste profile to that of component (A) having the ST extract alone and component B, being the cooling compound alone. The experimental compositions comprising components (A) and (B) were prepared by mixing the component (A) having the ST extract at varying ppm concentrations with WS-23 (40 ppm) in water. The flavor profile of component (A) having the ST extract by itself produced no noticeable change in cooling intensity. The flavor profile results for the experimental mixtures of components (A) and (B) were reported as the following:

Application	Dosage (ppm)	Cooling Intensity	Other Characteristics Noticed
WS-23 40 ppm in water	50	Mild increase	None
	100	Noticeable increase in cooling perception	Onset is faster and overall longer lasting
	200	Increase is significant	Onset is faster and overall longer lasting

[1281] Accordingly, this example demonstrates that the addition of ST extract (component (A)) to a formulation having a cooling compound (component (B)) provides one or more of the following taste characteristics as compared to a formulation having a cooling compound but lacking the ST extract: enhanced spice intensity, increased spiciness, increased spice tingling sensation, increased burning sensation, and increased duration of spiciness sensation.: enhanced cooling intensity, increased cooling perception, faster onset of cooling sensation, and increased duration of cooling sensation.

Example 16 – *Selaginella tamariscina* (ST) Extract Carbonation Modulation

[1282] Compositions containing *Selaginella tamariscina* (ST) extract and carbonated beverages were prepared. The component (A) formulation comprising *Selaginella tamariscina* extract at 1.0%, water at 79%, and propylene glycol at 20% was generated and mixed with the carbonated beverages (component B). Six taste evaluators assessed the carbonation profile for the mixture of the component (A) formulation comprising the ST extract with the carbonated beverages (component B), and compared the carbonation profile to that of component (A) having the ST extract alone and component B, being the carbonated beverages alone. The experimental compositions comprising components (A) and (B) were prepared by mixing the component (A) having the ST extract at varying ppm concentrations with a carbonated water or a beer. Component (A) having the ST extract by itself had no noticeable carbonation. The carbonation profile results for the experimental mixtures of components (A) and (B) were reported as the following:

Application	Dosage (ppm)	Bubble Amount	Bubble Size	Other Characteristics Noticed
Carbonated Water	10	Moderate Increase	Smaller	Taste is more "fizzy"
	20	Noticeable increase	Smaller	Taste is more "fizzy"
	40	Mild Increase	Not much difference noticed	Taste is more "fizzy"

Application	Dosage (ppm)	Bubble Amount	Bubble Size	Other Characteristics Noticed
Beer	10	Moderate Increase	Smaller	Taste is more "frothy" and less harsh
	20	Moderate Increase	Smaller	Taste is more "frothy" and less harsh
	40	Mild Increase	Not much difference noticed	Closer to control

[1283] Accordingly, this example demonstrates that the addition of ST extract (component (A)) to a carbonated beverage (component (B)) provides one or more of the

following carbonation characteristics as compared to a carbonated beverage lacking the ST extract: increased frothy perception, increased fizzy perception, and/or a decrease in the harshness experienced.

[1284] Additionally, the compositions including the ST extract were noted to possess increased carbonation bubble amounts and decreased carbonation bubble size when compared to the carbonated beverages absent the ST extract (component (A)). Figures 1A-1D show carbonation bubble amounts and carbonation bubble sizes of a carbonated water alone and after mixture with the ST extract (Component (A) at varying ppm concentrations. As seen in Figures 1A-1D, the carbonation bubble amount of the compositions including the ST extract (component (A) is increased when compared to the control. The carbonation bubble size of the compositions with the ST mixture at concentrations of 10 ppm and 20 ppm, as seen in Figures 1B and 1C, is decreased when compared to the control bubble size, as seen in Figure 1D. The carbonation bubble size of the composition of the mixture at a concentration of 40 ppm, as seen in Figure 1D, is comparable to the control bubble size, as seen in Figure 1A.

[1285] Figures 2A-2D show the carbonation bubble amounts and carbonation bubble sizes of beer alone and when combined with the ST extract (component (A) at varying ppm concentrations. As seen in Figures 2A-2D, the carbonation bubble amount of the compositions including the ST extract is increased when compared to the control. The carbonation bubble size of the composition with the ST mixture at concentrations of 10 ppm and 20 ppm is decreased, as seen in Figures 2B and 2C, when compared to the control bubble size, as seen in Figure 2A. The carbonation bubble size of the composition of the mixture at a concentration of 40 ppm, as seen in Figure 2D, is comparable to the control bubble size, as seen in Figure 2A.

Example 17 – *Garcinia indicia* (GI) Extract Salt Modulation

[1286] Compositions containing *Garcinia indicia* (GI) extract and salt were prepared. The component (A) formulation comprising *Garcinia indicia* at 5.0%, ethanol at 75%, and propylene glycol at 20% was generated and mixed with a salt (component B). Up to five taste evaluators assessed the taste profile for the mixture of the component (A) formulation comprising the GI extract with the salt (component B), and compared the taste profile to that of component (A) having the GI extract alone and component B, being the salt alone. The experimental compositions comprising components (A) and (B) were prepared by mixing the

component (A) having the GI extract at varying ppm concentrations and having various concentrations of polyisoprenylated benzophenones (such garcinol and iso-garcinol) with salt (0.7%) in water. The flavor profile of component (A) having the GI extract by itself produced no noticeable change in salt perception. The flavor profile results for the experimental mixtures of components (A) and (B) were reported as the following:

Application	Extract	Dosage (ppm)	Saltiness Perception	Other Characteristics Noticed
0.7% Salt in Water	*Garcinia Indica* 5%	2.5	Higher salt impact noticed by 2/5 tasters. Initial salt impact has more of an impact that control.	None
		20 - 50	Most intense salt impact noticed by 4/5 tasters. Initial salt impact is noticeably increased.	Enhanced saltiness with a taste that can be described as slightly metallic
		300	Most intense enhancement noticed here by 1/5 tasters.	Enhanced saltiness with a taste that can be described as slightly metallic

Application	Molecule	Dosage (ppm)	Saltiness Perception	Other Characteristics Noticed
0.7% Salt in Water	Garcinol ≥95%	1	Increase in salt intensity noticed by 2/3 tasters	
		5	Increase in salt intensity noticed by 4/4 tasters	Enhanced saltiness with a taste that can be described as slightly metallic
	Iso-Garcinol ≥95%	1	Slight increase in salt intensity noticed by 2/3 tasters	
		5	Increase in salt intensity noticed by 4/4 tasters	Enhanced saltiness with a taste that can be described as slightly metallic
	Garcinol + Iso-Garcinol	2.5 + 2.5	Increase in salt intensity noticed by 4/4 tasters. Majority of tasters agreed this was more intense than individual molecules.	Enhanced saltiness with a taste that can be described as slightly metallic

[1287] Accordingly, this example demonstrates that the addition of GI extract (component (A)) to a salt (component (B)) provides one or more of the following taste

characteristics as compared to a salt lacking the GI extract: enhanced saltiness perception, increased salt impact, increased salt intensity and/or increased metallic taste.

[1288] Additionally, this example demonstrates that adding a GI extract (component (A)) with garcinol, iso-garcinol, or a combination of garcinol and iso-garcinol to a salt (component (B)) provides one or more of the following taste characteristics as compared to a salt lacking the GI extract: enhanced saltiness perception, increased salt impact, increased salt intensity and/or increased metallic taste.

Example 18 – *Garcinia indicia* (GI) Extract Spice Modulation

[1289] Compositions containing *Garcinia indicia* (GI) extract and spice were prepared. The component (A) formulation comprising *Garcinia indicia* at 5.0%, ethanol at 75%, and propylene glycol at 20% was generated and mixed with a spice containing compound (component B). up to four taste evaluators assessed the taste profile for the mixture of the component (A) formulation comprising the GI extract with the spice containing compound (component B), and compared the taste profile to that of component (A) having the GI extract alone and component B, being the spice containing compound alone. The experimental compositions comprising components (A) and (B) were prepared by mixing the component (A) having the GI extract at varying ppm concentrations and having various concentrations of polyisoprenylated benzophenones (such garcinol and iso-garcinol) with hot sauce. The flavor profile of component (A) having the GI extract by itself produced no noticeable change in spice perception. The flavor profile results for the experimental mixtures of components (A) and (B) were reported as the following:

Application	Extract	Dosage (ppm)	Spice Perception	Other Characteristics Noticed
Hot Sauce	*Garcinia Indica* 5%	1	Faster spice onset compared to control, increased spice intensity. (4/4 tasters)	Increase in salt and sour notes. Improved chili flavor
		50	Fast initial onset, increased spice intensity compared to 1 ppm. Spiciness is long lasting. (4/4 tasters)	Increase in salt and sour notes. Improved chili flavor
		150	Fast initial onset, increased spice intensity compared to 50 ppm. Spiciness is long lasting. (4/4 tasters)	Increase in salt and sour notes.

		300	Faster onset, spice intensity is only slightly spicier if not as spicy as 150 ppm. Long lasting effect. (4/4 tasters)	Increase in salt and sour notes.

Application	Molecule	Dosage (ppm)	Spice Perception	Other Characteristics Noticed
Hot Sauce	Garcinol ≥95%	1	Fast initial onset, increased spice intensity. (3/3 tasters)	Some increase in salt and sour notes
		5	Fast initial onset, increased spice intensity compared to 1 ppm. Spiciness is long lasting. (4/4 tasters)	Some increase in salt and sour notes
	Iso-Garcinol ≥95%	1	Initial onset is faster than control, slightly delayed compared to Garcinol. Spice intensity is similar to Garcinol at this dosage. (3/3 tasters)	Some increase in salt and sour notes
		5	Fast initial onset, increased spice intensity compared to 1 ppm. Spiciness is long lasting. (4/4 tasters)	Some increase in salt and sour notes
	Garcinol + Iso-Garcinol	2.5 + 2.5	Faster onset of spiciness. Has the most intense spice intensity. Long lasting effect. (4/4 tasters)	Some increase in salt and sour notes

[1290] Accordingly, this example demonstrates that the addition of GI extract (component (A)) to a spice (component (B)) provides one or more of the following taste characteristics as compared to a spice containing compound lacking the GI extract: enhanced spice perception, faster onset of spice sensation, increased spice intensity, longer duration of spice sensation, increased salt and sour taste, and/or improved chili flavor.

[1291] Additionally, this example demonstrates that adding a GI extract (component (A)) with garcinol, iso-garcinol, or a combination of garcinol and iso-garcinol to a spice (component (B)) provides one or more of the following taste characteristics as compared to a spice containing compound lacking the GI extract: enhanced spice perception, faster onset of spice sensation, increased spice intensity, longer duration of spice sensation, increased salt and sour taste, and/or improved chili flavor.

Example 19– *Garcinia indicia* (GI) Extract Alcohol Modulation

[1292] Compositions containing *Garcinia indicia* (GI) extract and an alcohol containing beverage were prepared. The component (A) formulation comprising *Garcinia indicia* at 5.0%, ethanol at 75%, and propylene glycol at 20% was generated and mixed with

an alcoholic beverage (component B). Up to four taste evaluators assessed the taste profile for the mixture of the component (A) formulation comprising the GI extract with the alcohol containing beverage (component B), and compared the taste profile to that of component (A) having the GI extract alone and component B, being the alcohol containing beverage alone. The experimental compositions comprising components (A) and (B) were prepared by mixing the component (A) having the GI extract at varying ppm concentrations and having various concentrations of polyisoprenylated benzophenones (such garcinol and iso-garcinol) with Vodka 5% ABV in water and Vodka 1% ABV in water. The flavor profile of component (A) having the GI extract by itself produced no noticeable change in alcohol perception. The flavor profile results for the experimental mixtures of components (A) and (B) were reported as the following:

Application	Extract	Dosage (ppm)	Alcohol Perception	Other Characteristics Noticed
Vodka in water 5% ABV	*Garcinia Indica* 5%	1	Increased authentic alcohol taste, alcohol bitterness, and retro-nasal effect (1/4 tasters)	None
		100	Strongest alcohol taste increase, increase in alcohol bitterness, and retro-nasal effect. (2/4 tasters)	Some tingling effect
		200	Increase in authentic alcohol taste and retro-nasal effect. (4/4 tasters)	Some bitter masking noticed. Slight herbal off-note.
		300	Increase in authentic alcohol taste and retro-nasal effect. (2/4 tasters)	Some bitter masking noticed. Herbal off-note

Application	Extract	Dosage (ppm)	Alcohol Perception	Other Characteristics Noticed
Vodka in water 1% ABV	*Garcinia Indica* 5%	1	Slight increase in alcoholic taste noticed. Faster onset. (2/4 tasters)	None
		5	Slightly more alcoholic than 1 ppm, slightly delayed onset (2/4 tasters). Can taste a difference but unsure if more alcoholic (2/4 tasters)	None

Application	Molecule	Dosage (ppm)	Alcohol Perception	Other Characteristics Noticed
Vodka in water 5% ABV	Garcinol ≥95%	1	Increased authentic alcohol taste, alcohol bitterness, and retro-nasal effect. (2/3 tasters)	None
		5	Increase in authentic alcohol taste, alcohol bitterness, and retro-nasal effect. (4/4 tasters)	None
	Iso-Garcinol ≥95%	1	Increased authentic alcohol taste, alcohol bitterness, and retro-nasal effect. (2/3 tasters)	None
		5	Increase in authentic alcohol taste, alcohol bitterness, and retro-nasal effect. (4/4 tasters)	None
	Garcinol + Iso-Garcinol	2.5 + 2.5	Highest increase in alcohol taste, alcohol bitterness, and retro-nasal effect (4/4 tasters)	None

[1293] Accordingly, this example demonstrates that the addition of GI extract (component (A)) to an alcohol (component (B)) provides one or more of the following taste characteristics as compared to an alcohol containing beverage lacking the GI extract: enhanced alcohol perception, increased alcoholic bitterness, increased retro-nasal effect, increased authentic alcohol taste, increased tingling effect, increased masking of bitter tastes, and faster onset of alcohol sensation.

[1294] Additionally, this example demonstrates that adding a GI extract (component (A)) with garcinol, iso-garcinol, or a combination of garcinol and iso-garcinol to a salt (component (B)) provides one or more of the following taste characteristics as compared to an alcohol containing beverage lacking the GI extract: enhanced alcohol perception, increased alcoholic bitterness, increased retro-nasal effect, increased authentic alcohol taste, increased tingling effect, increased masking of bitter tastes, and faster onset of alcohol sensation.

Example 20– *Garcinia indicia* (GI) Extract Cooling Modulation

[1295] Compositions containing *Garcinia indicia* (GI) extract and a cooling agent or compound were prepared. The component (A) formulation comprising *Garcinia indicia* at 5.0%, ethanol at 75%, and propylene glycol at 20% was generated and mixed with a cooling agent or compound (component B). Up to four taste evaluators assessed the taste profile for

the mixture of the component (A) formulation comprising the GI extract with the cooling agent or compound (component B), and compared the taste profile to that of component (A) having the GI extract alone and component B, being the cooling agent or compound alone. The experimental compositions comprising components (A) and (B) were prepared by mixing the component (A) having the GI extract at varying ppm concentrations and having various concentrations of polyisoprenylated benzophenones (such garcinol and iso-garcinol) with WS-23 (40 ppm) in water. The flavor profile of component (A) having the GI extract by itself produced no noticeable change in cooling perception. The flavor profile results for the experimental mixtures of components (A) and (B) were reported as the following:

Application	Extract	Dosage (ppm)	Cooling Perception	Other Characteristics Noticed
WS-23 in water (40 ppm)	*Garcinia Indica* 5%	1	Increased cooling and retro-nasal effect. (3/4 tasters)	None
		50	Further increased cooling and retro-nasal, and longer lasting effect (4/4 tasters)	None
		150	Further increased cooling and retro-nasal, and longer lasting effect (4/4 tasters) Highest effect from 1/ 4 tasters	Some herbal off-note,
		300	Further increased cooling and retro-nasal, and longer lasting effect (3/4 tasters)	Some herbal off-note,

Application	Molecule	Dosage (ppm)	Cooling Perception	Other Characteristics Noticed
WS-23 in water (40 ppm)	Garcinol ≥95%	1	Increased cooling and retro-nasal effect. (3/3 tasters)	None
		5	Further increased cooling and retro-nasal, and longer lasting effect (4/4 tasters)	None
	Iso-Garcinol ≥95%	1	Increased cooling and retro-nasal effect. (3/3 tasters)	None
		5	Further increased cooling and retro-nasal, and longer lasting effect (4/4 tasters)	None

	Garcinol + Iso-Garcinol	2.5 + 2.5	Highest increase in cooling intensity, retro-nasal effect, and long-lasting effect (4/4 tasters)	None

[1296] Accordingly, this example demonstrates that the addition of GI extract (component (A)) to a cooling agent or compound (component (B)) provides one or more of the following taste characteristics as compared to a cooling agent or compound lacking the GI extract: enhanced cooling perception, increased cooling sensation, increased cooling intensity, increased retro-nasal effect, and increased duration of cooling effect.

[1297] Additionally, this example demonstrates that adding a GI extract (component (A)) with garcinol, iso-garcinol, or a combination of garcinol and iso-garcinol to a salt (component (B)) provides one or more of the following taste characteristics as compared to a cooling agent or compound lacking the GI extract: enhanced cooling perception, increased cooling sensation, increased cooling intensity, increased retro-nasal effect, and increased duration of cooling effect.

Example 21– *Garcinia indicia* (GI) Extract Tingling/Numbing Modulation

[1298] Compositions containing *Garcinia indicia* (GI) extract and a tingling or numbing agent or compound were prepared. The component (A) formulation comprising *Garcinia indicia* at 5.0%, ethanol at 75%, and propylene glycol at 20% was generated and mixed with a tingling or numbing agent or compound (component B). Up to four taste evaluators assessed the taste profile for the mixture of the component (A) formulation comprising the GI extract with the cooling agent or compound (component B), and compared the taste profile to that of component (A) having the GI extract alone and component B, being the tingling or numbing agent or compound alone. The experimental compositions comprising components (A) and (B) were prepared by mixing the component (A) having the GI extract at varying ppm concentrations and having various concentrations of polyisoprenylated benzophenones (such garcinol and iso-garcinol) with Jambu oleoresin (45 ppm) in water and WS-23 (40 ppm) in water. The flavor profile of component (A) having the GI extract by itself produced no noticeable change in tingling or numbing perception. The flavor profile results for the experimental mixtures of components (A) and (B) were reported as the following:

Application	Extract	Dosage (ppm)	Tingling/ Numbing Perception	Other Characteristics Noticed
Jambu Oleoresin in water (45 ppm)	*Garcinia Indica* 5%	1	Faster onset of tingling, intensity it increased (4/4 tasters)	Cooling is enhanced
		50	Faster onset of tingling. Further increased tingling, numbing effect. Increase in intensity and longer lasting. (4/4 tasters)	Cooling is enhanced, masked Jambu off-note
		150	Faster onset of tingling. Further increased tingling, numbing effect. Increase in intensity and longer lasting. (4/4 tasters)	Cooling is enhanced, masked Jambu off-note
		300	Faster onset of tingling. Highest impact of tingling, numbing, and longer lasting effect. (4/4 tasters)	Cooling is enhanced, masked Jambu off-note

Application	Molecule	Dosage (ppm)	Cooling Perception	Other Characteristics Noticed
WS-23 in water (40 ppm)	Garcinol ≥95%	1	Faster onset, increased intensity of tingling and numbing. Longer lasting. (3/3 tasters)	Cooling is enhanced
		5	Faster onset of tingling. Further increased tingling, numbing effect. Increase in intensity and longer lasting. (4/4 tasters)	Cooling is enhanced
	Iso-Garcinol ≥95%	1	Faster onset, increased intensity of tingling and numbing. Longer lasting. (3/3 tasters)	Cooling is enhanced
		5	Faster onset of tingling. Further increased tingling, numbing effect. Increase in intensity and longer lasting. (4/4 tasters)	Cooling is enhanced
	Garcinol + Iso-Garcinol	2.5 + 2.5	Highest intensity of tingling and numbing effect. Longest lasting (4/4 tasters)	Cooling is enhanced

[1299] Accordingly, this example demonstrates that the addition of GI extract (component (A)) to a tingling or numbing agent or compound (component (B)) provides one or more of the following taste characteristics as compared to a tingling or numbing agent or compound lacking the GI extract: enhanced tingling or numbing perception, faster onset of tingling or numbing sensation, increased tingling or numbing intensity, increased tingling or numbing sensation, increased duration of tingling or numbing sensation, enhanced cooling sensation, and increased masking of jambu off-tastes, herbal off-tastes or bitter off-tastes.

[1300] Additionally, this example demonstrates that adding a GI extract (component (A)) with garcinol, iso-garcinol, or a combination of garcinol and iso-garcinol to a tingling or numbing agent or compound (component (B)) provides one or more of the following taste characteristics as compared to a tingling or numbing agent or compound lacking the GI extract: enhanced tingling or numbing perception, faster onset of tingling or numbing sensation, increased tingling or numbing intensity, increased tingling or numbing sensation, increased duration of tingling or numbing sensation, enhanced cooling sensation, and increased masking of jambu off-tastes, herbal off-tastes or bitter off-tastes.

Example 22– *Garcinia indicia* (GI) Extract Carbonation Modulation

[1301] Compositions containing *Garcinia indicia* (GI) extract and a carbonated beverage were prepared. The component (A) formulation comprising *Garcinia indicia* at 5.0%, ethanol at 75%, and propylene glycol at 20% was generated and mixed with a carbonated beverage (component B). Up to four taste evaluators assessed the taste profile for the mixture of the component (A) formulation comprising the GI extract with the carbonated beverage (component B), and compared the taste profile to that of component (A) having the GI extract alone and component B, being the carbonated beverage alone. The experimental compositions comprising components (A) and (B) were prepared by mixing the component (A) having the GI extract at varying ppm concentrations with carbonated water. The flavor profile of component (A) having the GI extract by itself produced no noticeable change in carbonation perception. The flavor profile results for the experimental mixtures of components (A) and (B) were reported as the following:

Application	Extract	Dosage (ppm)	Carbonation Perception	Other Characteristics Noticed
Carbonated Water	*Garcinia Indica* 5%	1	Difficult to determine if there is an effect (4/4 tasters)	None
		25	The smaller bubbles feel less harsh and stinging from carbonation on the tongue. Slightly delayed effect (4/4 tasters) More bubbles noticed here, smaller bubble size	
		50	Further decrease in harsh stinging from carbonation. (4/4 tasters). More bubbles noticed here, smaller bubble size.	None

		150	Further decrease in harsh stinging from carbonation. (4/4 tasters) More bubbles noticed here, smaller bubble size.	Some herbal off-note
		300	Further decrease in harsh stinging from carbonation. (4/4 tasters) More bubbles noticed here, smaller bubble size.	Some herbal off-note

[1302] Accordingly, this example demonstrates that the addition of GI extract (component (A)) to a carbonated beverage (component (B)) provides one or more of the following taste characteristics as compared to a carbonated beverage lacking the GI extract: increased carbonation perception, decreased harshness sensation and decreased stinging sensation.

[1303] Additionally, the compositions including the GI extract were noted to possess increased carbonation bubble amounts and decreased carbonation bubble size when compared to the carbonated beverage (component (B)) absent the GI extract (component (A)). Figures 3A and 3B show carbonation bubble amounts and carbonation bubble sizes of a carbonated water alone and after mixture with the GI extract (component (A)) at varying ppm concentrations. As seen in Figures 3A and 3B, the carbonation bubble amount of the compositions including the GI extract (component (A)) is increased when compared to the control.

Example 23– *Garcinia indicia* (GI) Extract Umami Modulation

[1304] Compositions containing *Garcinia indicia* (GI) extract and an umami compound were prepared. The component (A) formulation comprising *Garcinia indicia* at 5.0%, ethanol at 75%, and propylene glycol at 20% was generated and mixed with an umami compound (component B). Up to five taste evaluators assessed the taste profile for the mixture of the component (A) formulation comprising the GI extract with the umami compound (component B), and compared the taste profile to that of component (A) having the GI extract alone and component B, being the umami compound alone. The experimental compositions comprising components (A) and (B) were prepared by mixing the component (A) having the GI extract at varying ppm concentrations with monosodium glutamate (2000 pm) in water. The flavor profile of component (A) having the GI extract by itself produced no noticeable change

in umami perception. The flavor profile results for the experimental mixtures of components (A) and (B) were reported as the following:

Application	Extract	Dosage (ppm)	Umami Perception	Other Characteristics Noticed
Monosodium Glutamate (min. 98.5%) – 2000 ppm in water	*Garcinia Indica* 5%	1	More umami than control. (3/5 tasters)	Mouth-watering effect
		50	Initial impact of umami is more intense, longer lasting compared to control. (5/5 tasters)	Mouth-watering and smooth mouthfeel effect noticed.
		100	Most intense out of all the dosages and long lasting. (5/5 tasters)	Mouth-watering and smooth mouthfeel effect noticed.
		300	Umami enhancement is perceived but it is not as intense as 100 ppm. (4/5)	Mouth-watering and smooth mouthfeel effect noticed.

[1305] Accordingly, this example demonstrates that the addition of GI extract (component (A)) to an umami compound (component (B)) provides one or more of the following taste characteristics as compared to an umami compound lacking the GI extract: enhanced umami perception, increased umami impact, increased umami duration, increased umami intensity, increased mouth-watering effect, and increased smooth mouthfeel effect.

Example 24– *Garcinia indicia* (GI) Extract Sourness Modulation

[1306] Compositions containing *Garcinia indicia* (GI) extract and a sour compound were prepared. The component (A) formulation comprising *Garcinia indicia* at 5.0%, ethanol at 75%, and propylene glycol at 20% was generated and mixed with a sour compound (component B). Up to five taste evaluators assessed the taste profile for the mixture of the component (A) formulation comprising the GI extract with the sour compound (component B), and compared the taste profile to that of component (A) having the GI extract alone and component B, being the sour compound alone. The experimental compositions comprising components (A) and (B) were prepared by mixing the component (A) having the GI extract at varying ppm concentrations with citric acid (0.07% and 0.10%) in water. The flavor profile of component (A) having the GI extract by itself produced no noticeable change in sourness perception. The flavor profile results for the experimental mixtures of components (A) and (B) were reported as the following:

Application	Extract	Dosage (ppm)	Sourness Perception	Other Characteristics Noticed
Citric Acid 0.07% in water	*Garcinia Indica* 5%	1	Enhanced sourness compared to control. (5/5 tasters)	
		50	Enhanced sourness was noticed. (3/5 tasters)	Mouthwatering effect and reduction in astringency.
		100	Most intense out of all the dosages. (4/5 tasters)	Mouthwatering effect and reduction in astringency.
		300	Further sourness enhancement was noticed. (4/5 tasters)	Mouthwatering effect and reduction in astringency.

Application	Extract	Dosage (ppm)	Sourness Perception	Other Characteristics Noticed
Citric Acid 0.10% in water	*Garcinia Indica* 5%	1	Enhanced sourness compared to control. (3/5 tasters)	
		50	Enhanced sourness was noticed. (5/5 tasters)	Mouthwatering effect and reduction in astringency.
		100	Enhanced sourness was noticed. (5/5 tasters).	Mouthwatering effect and reduction in astringency.
		300	Further sourness enhancement was noticed. (5/5 tasters)	Mouthwatering effect and reduction in astringency.

[1307] Accordingly, this example demonstrates that the addition of GI extract (component (A)) to a sour compound (component (B)) provides one or more of the following taste characteristics as compared to a sour compound lacking the GI extract: enhanced sourness perception, increased sourness intensity, increased mouthwatering effect, and decreased astringency sensation.

Example 25– Glycosides of *Rhodiola rosea* (RR) Extract Fruit Modulation

[1308] Compositions containing glycosides obtained from *Rhodiala rosea* (RR) extract and compounds containing a fruit were prepared. Taste evaluators assessed the taste profile for the mixture of the component with a glycoside or a combination of glycosides with the compound containing a fruit (component B), and compared the taste profile to that of

component B, being the compound containing a fruit alone. The experimental compositions comprising components (A) and (B) were prepared by mixing the component (A) having the glycosides with grapefruit juice, strawberry yogurt, or mango nectar. The flavor profile results for the experimental mixtures of components (A) and (B) were reported as the following:

Citrus —Grapefruit juice	
Compound	Attributes
Salidroside	Adds ripeness
Rosavin	Main contributor to juiciness and mouthfeel
Rosarin	Enhances juiciness
Rosin	Enhances juiciness, mouthfeel, and ripeness
Combination	All molecules are synergistically working together to enhance overall juiciness.

Berries —Strawberry yogurt	
Compound	Attributes
Salidroside	Adds ripeness, and some mouthfeel
Rosavin	Enhances juiciness
Rosarin	Ripeness, and good mouthfeel
Rosin	Juiciness and good mouthfeel
Combination	All molecules are synergistically working together to enhance overall juiciness.

Tropical —Mango Nectar	
Compound	Attributes
Salidroside	Adds ripeness, mouthfeel, and juiciness
Rosavin	Mouthfeel, ripeness, juiciness
Rosarin	Enhances mouthfeel
Rosin	Juiciness
Combination	All molecules are synergistically working together to enhance overall juiciness.

[1309] Accordingly, this example demonstrates that the addition of glycosides from *Rhodiola rosea* (RR) extract (component (A)) to a compound containing fruits (component (B)) provides one or more of the following taste characteristics as compared to a fruit or compound containing a fruit lacking the glycosides: enhanced juiciness perception, enhanced ripeness perception, and enhanced mouthfeel.

Example 26– Glycosides of *Rhodiola rosea* (RR) Extract Brown and White Flavor Modulation

[1310] Compositions containing glycosides obtained from *Rhodiala rosea* (RR) extract and compound with white or dark flavors were prepared. Taste evaluators assessed the taste profile for the mixture of the component with a glycoside or a combination of glycosides

with the compound with white or brown flavors (component B), and compared the taste profile to that of component B, being the compound with a white or brown flavor alone. The experimental compositions comprising components (A) and (B) were prepared by mixing the component (A) having the glycosides with chocolate milk or milk with a 0.4% vanilla extract. The flavor profile results for the experimental mixtures of components (A) and (B) were reported as the following:

Chocolate —Chocolate Milk	
Compound	Attributes
Salidroside	Enhances cocoa flavor
Rosavin	Sweetness, creaminess
Rosarin	Mouthfeel enhancement, dark cocoa
Rosin	Cocoa
Combination	All molecules are enhancing cocoa flavor and bettering mouthfeel

Vanilla — 2% Milk with 0.4% Vanilla Extract	
Compound	Attributes
Salidroside	Enhances cinnamic notes
Rosavin	Enhances brown notes, and honey notes
Rosarin	Adds cinnamic notes and honey notes
Rosin	Adds brown notes, honey notes, cinnamic notes
Combination	All molecules are enhancing cinnamic, brown, and honey notes

[1311] Accordingly, this example demonstrates that the addition of glycosides from *Rhodiola rosea* (RR) extract (component (A)) to a compound with white or brown flavors(component (B)) provides one or more of the following taste characteristics as compared to compound containing a fruit lacking the glycosides: enhanced cocoa flavor, enhanced sweetness perception, enhanced creaminess perception, enhanced mouthfeel, enhanced dark cocoa flavors, enhanced cinnamic notes, enhanced brown notes, and enhanced honey notes.

Example 27–*Rhodiola rosea* (RR) Extract Fruit Modulation

[1312] Compositions containing *Rhodiola rosea* (RR) extract and a compound containing a fruit were prepared. The component (A) formulation comprising *Rhodiola rosea* at 10.0%, water at 70%, and propylene glycol at 20% was generated and mixed with a compound containing a fruit (component B). Up to five taste evaluators assessed the taste profile for the mixture of the component (A) formulation comprising the RR extract with the compound containing a fruit (component B), and compared the taste profile to that of

component (A) having the RR extract alone and component B, being the compound containing a fruit alone. The experimental compositions comprising components (A) and (B) were prepared by mixing the component (A) having the RR extract at varying ppm concentrations with an orange beverage (see composition below), a grapefruit sports drink, mango nectar 70% in water, peach yogurt, or strawberry yogurt. The flavor profile results for the experimental mixtures of components (A) and (B) were reported as the following:

Base:	**Dosage (ppm)**	**Tasting Notes:**
Orange Beverage *	15 - 25	Taste is more fresh, fruity, and juicy
Grapefruit Sports Drink	12.5 – 40	Taste is more fresh, fruity, and juicy
Mango Nectar (70:30) in water	25 – 60	Syrup-like mouthfeel, riper and juicier, add depth of flavor. Freshness is improved.
Peach Yogurt	25 – 60	Taste is more fresh, fruity, and juicy
Strawberry Yogurt	25 – 60	Taste is more fresh, fruity, and juicy

*Orange Beverage Composition:

Ingredient	**%**
Orange Oil 5-Fold 10% Wash Extract	0.06
Citric Acid	0.09
Sugar	4
Water	95.85

[1313] Accordingly, this example demonstrates that the addition of RR extract (component (A)) to a compound containing a fruit (component (B)) provides one or more of the following taste characteristics as compared to a compound containing a fruit lacking the RR extract: enhanced freshness perception, enhanced fruity flavors, enhanced juiciness perception, syrup-like mouthfeel, enhanced ripeness perception, and enhanced flavor depth.

Example 28–*Rhodiola rosea* (RR) Extract Brown and White Flavor Modulation

[1314] Compositions containing *Rhodiola rosea* (RR) extract and a compound with brown or white flavors were prepared. The component (A) formulation comprising *Rhodiola rosea* at 10.0%, water at 70%, and propylene glycol at 20% was generated and mixed with a compound with white or brown flavors (component B). Up to five taste evaluators assessed the taste profile for the mixture of the component (A) formulation comprising the RR extract with the compound with a white or brown flavor (component B), and compared the taste profile

to that of component (A) having the RR extract alone and component B, being the compound having a white or brown flavor alone. The experimental compositions comprising components (A) and (B) were prepared by mixing the component (A) having the RR extract at varying ppm concentrations with 2% chocolate milk, a vanilla milk (see composition below), or black coffee. The flavor profile results for the experimental mixtures of components (A) and (B) were reported as the following:

Base:	**Dosage (ppm)**	**Tasting Notes:**
Chocolate Milk 2%	25 – 50	Adds more cocoa note. More dark cocoa
Vanilla Milk *	25 - 50	Adds beany note associated with higher quality vanilla. Also adds some sweetness
Black Coffee	50 - 90	Adds roasted coffee note, dark roasted coffee flavor profile. Fresher profile.

*Vanilla Milk Composition:

Ingredient	**%**
Milk 2% Fat	95.86
Sugar	4
Vanilla Extract Indonesian 10-Fold	0.14

[1315] Accordingly, this example demonstrates that the addition of RR extract (component (A)) to a compound with a white or brown flavor (component (B)) provides one or more of the following taste characteristics as compared to a compound with a white or brown flavor lacking the RR extract: enhanced cocoa notes, enhanced dark cocoa notes or flavors, enhanced vanilla bean notes or flavors, enhanced sweetness perception, enhanced roasted coffee flavors or notes, enhanced dark roasted coffee flavor profile or notes and enhanced freshness perception.

Example 29–*Rhodiola rosea* (RR) Extract Pungency, Burn Sensation, Harshness, or Bitterness Modulation

[1316] Compositions containing *Rhodiola rosea* (RR) extract and a compound with a pungent compound, a burning compound, a harsh compound or a bitter compound were prepared. The component (A) formulation comprising *Rhodiola rosea* at 10.0%, water at 70%, and propylene glycol at 20% was generated and mixed with a pungent compound, a burning

compound, a harsh compound or a bitter compound (component B). Up to five taste evaluators assessed the taste profile for the mixture of the component (A) formulation comprising the RR extract with the pungent compound, the burning compound, the harsh compound or the bitter compound (component B), and compared the taste profile to that of component (A) having the RR extract alone and component B, being the pungent compound, the burning compound, the harsh compound or the bitter compound alone. The experimental compositions comprising components (A) and (B) were prepared by mixing the component (A) having the RR extract at varying ppm concentrations with vodka 5% ABV in water, brandy VS 16% ABV in water, a nicotine solution (see composition below), a 35 ppm menthol solution, or a capsicum solution (see composition below). The flavor profile results for the experimental mixtures of components (A) and (B) were reported as the following:

Base:	**Dosage (ppm)**	**Tasting Notes:**
Vodka 5% ABV in water	100 - 150	Initial pungency and burn are reduced. Overall, milder. Able to mask around 6% ABV
Brandy VS 16% ABV in water	200 - 250	Initial pungency and burn are reduced. Overall, milder. Can taste aged fruit notes of brandy more sharply.
Nicotine Solution*	150 – 200	Initial tingling/ burning sensation is delayed, overall sensation in milder. Burning dissipates quicker.
Menthol Solution (35 ppm)	50 – 150	Less harshness and bitterness.
Capsicum Solution*	150 – 200	Delays spice burn, overall spice intensity is reduced.

*Nicotine Solution:

Ingredient	%
Nicotine 6mg Pouch	1.33
Water	98.67

*Capsicum Solution:

Ingredient	%
Capsicum Clearcap 1% OH	0.25
water	99.75

[1317] Accordingly, this example demonstrates that the addition of RR extract (component (A)) to a pungent compound, a burning compound, a harsh compound or a bitter compound (component (B)) provides one or more of the following taste characteristics as compared to a pungent compound, a burning compound, a harsh compound or a bitter compound flavor lacking the RR extract: reduced or masked initial pungency perception, reduced or masked initial burn sensation, milder perception of sensations, sharper aged fruit notes, quicker dissipation of burning sensation, delay of initial tingling sensation, delay of initial burning sensation, reduced harshness perception, reduced bitterness perception, delayed onset of spice burn sensation, and reduced spice intensity.

Example 30–*Rhodiola rosea* (RR) Extract Aging Effect Modulation

[1318] Compositions containing *Rhodiola rosea* (RR) extract and an alcohol were prepared. The component (A) formulation comprising *Rhodiola rosea* at 10.0%, water at 70%, and propylene glycol at 20% was generated and mixed with an alcohol (component B). Up to five taste evaluators assessed the taste profile for the mixture of the component (A) formulation comprising the RR extract with the alcohol (component B), and compared the taste profile to that of component (A) having the RR extract alone and component B, being the alcohol alone. The experimental compositions comprising components (A) and (B) were prepared by mixing the component (A) having the RR extract at varying ppm concentrations with scotch whisky 16% ABV in water. The flavor profile results for the experimental mixtures of components (A) and (B) were reported as the following:

Base:	**Dosage (ppm)**	**Tasting Notes:**
Scotch Whisky 16% ABV in water	100-200	Initial pungency and burn of alcohol are reduced. The wood notes, brown, sweet, and caramel notes are more present like a longer barrel aged product.

[1319] Accordingly, this example demonstrates that the addition of RR extract (component (A)) to an alcohol (component (B)) provides one or more of the following taste characteristics as compared to an alcohol lacking the RR extract: reduced or masked initial pungency perception, reduced or masked initial burn sensation, enhanced wood notes or

flavors, enhanced brown notes or flavors, enhanced sweet notes or flavors, enhanced caramel notes or flavors, and enhanced barred aged product taste.

Example 31–*Rhodiola rosea* (RR) Extract Oak Modulation

[1320] Compositions containing *Rhodiola rosea* (RR) extract and a compound containing oak extract were prepared. The component (A) formulation comprising *Rhodiola rosea* at 10.0%, water at 70%, and propylene glycol at 20% was generated and mixed with a compound containing oak extract (component B). Up to five taste evaluators assessed the taste profile for the mixture of the component (A) formulation comprising the RR extract with the compound containing oak extract (component B), and compared the taste profile to that of component (A) having the RR extract alone and component B, being the compound containing oak extract alone. The experimental compositions comprising components (A) and (B) were prepared by mixing the component (A) having the RR extract at varying ppm concentrations with 0.5% Oak American extract in water. The flavor profile results for the experimental mixtures of components (A) and (B) were reported as the following:

Base:	**Dosage (ppm)**	**Tasting Notes:**
Oak American Extract 0.5% in water	25 – 75	Adds woodiness similar to wood shavings, more astringent.

[1321] Accordingly, this example demonstrates that the addition of RR extract (component (A)) to a compound containing oak extract (component (B)) provides one or more of the following taste characteristics as compared to a compound containing oak extract lacking the RR extract: increased woodiness, and enhanced astringency perception.

Example 32–*Rhodiola rosea* (RR) Extract Safron Modulation

[1322] Compositions containing *Rhodiola rosea* (RR) extract and a compound containing saffron were prepared. The component (A) formulation comprising *Rhodiola rosea* at 10.0%, water at 70%, and propylene glycol at 20% was generated and mixed with a compound containing saffron (component B). Four taste evaluators assessed the taste profile for the mixture of the component (A) formulation comprising the RR extract with the compound containing saffron (component B), and compared the taste profile to that of component (A) having the RR extract alone and component B, being the compound containing

saffron alone. The experimental compositions comprising components (A) and (B) were prepared by mixing the component (A) having the RR extract at varying ppm concentrations with 4% sucrose milk in 2% milk fat with 25 ppm Saffron extract and 4% sucrose milk in 2% milk fat with safranal at varying ppm concentrations. The flavor profile results for the experimental mixtures of components (A) and (B) were reported as the following:

25 ppm Saffron

RR Concentration in Application (ppm)	Participant Preference/Comments
25	Taste profile very similar to control
50	Enhancement of hay note, brown notes and, overall, a more complex sample.
100	Most preferred sample for saffron taste enhancement, without any added off notes.

Safranal

RR Concentration in Application (ppm)	Participant Preference/Comments
25	Low impact
50	Added complexity
75	Best overall sample for added complexity
100	Good enhancement but some add herbal off note

[1323] Accordingly, this example demonstrates that the addition of RR extract (component (A)) to a compound containing saffron (component (B)) provides one or more of the following taste characteristics as compared to a compound containing saffron lacking the RR extract: enhanced hay flavors or notes, enhanced brown flavors or notes, enhanced sweet notes or flavors, enhanced floral flavors or notes, enhanced honey flavors or notes, enhanced complexity of taste, reduced or masked off-notes, or enhanced saffron taste.

Example 33– *Trigonella foenum graecum L.* Extract Bitterness Modulation

[1324] Compositions containing *Trigonella foenum graecum L.* (Fenugreek) extract and a bitter compound were prepared. The component (A) formulation comprising a Fenugreek seed extract with 50% steroidal saponins at 10.0% and propylene glycol at 90% was generated and mixed with a bitter compound (component B). Taste evaluators assessed the

taste profile for the mixture of the component (A) formulation comprising the Fenugreek seed extract with the bitter compound (component B), and compared the taste profile to that of component (A) having the Fenugreek seed extract alone and component B, being the bitter compound alone. The experimental compositions comprising components (A) and (B) were prepared by mixing the component (A) having the Fenugreek seed extract at 50 ppm with caffeine at 500 ppm in water and with grapefruit juice. The flavor profile results for the experimental mixtures of components (A) and (B) were reported as the following:

Control:	**Dosage (ppm)**	**Tasting Notes:**
Caffeine 500 ppm in water	50	Initial bitterness is perceived to be reduced, lingering bitterness returns.

Control:	**Dosage (ppm)**	**Triangle Test Results:**	**Notes:**
Grapefruit Juice	50	4/5 panelists were able to differentiate between the modulated sample vs control	Those who were able to differentiate the samples noted that they either saw bitter (2/4)masking or bitter enhancing (2/4) properties.

[1325] Accordingly, this example demonstrates that the addition of Fenugreek seed extract (component (A)) to a bitter compound (component (B)) provides one or more of the following taste characteristics as compared to a bitter compound lacking the Fenugreek seed extract: reduced bitterness perception, reduced initial bitterness perception, masking of bitterness, or enhanced bitterness.

Example 34– *Trigonella foenum graecum L.* Extract Sourness Modulation

[1326] Compositions containing *Trigonella foenum graecum L.* (Fenugreek) extract and a sour compound were prepared. The component (A) formulation comprising a Fenugreek seed extract with 50% steroidal saponins at 10.0% and propylene glycol at 90% was generated and mixed with a sour compound (component B). Taste evaluators assessed the taste profile for the mixture of the component (A) formulation comprising the Fenugreek seed extract with the sour compound (component B), and compared the taste profile to that of

component (A) having the Fenugreek seed extract alone and component B, being the sour compound alone. The experimental compositions comprising components (A) and (B) were prepared by mixing the component (A) having the Fenugreek seed extract at varying ppm concentrations with citric acid at 0.075% in water and with kefir in water (60/40 mix). The flavor profile results for the experimental mixtures of components (A) and (B) were reported as the following:

Control:	**Dosage (ppm)**	**Notes:**
Citric Acid 0.075% in water	50	Lingering sourness is perceived to be reduced and dismisses faster.

Control:	**Dosage (ppm)**	**Triangle Test Results:**	**Notes:**
Kefir in water 60/40	40	2/5 panelists were able to differentiate between the modulated sample and control.	Those who were able to differentiate between the samples noted that the initial sourness was perceived to be reduced.

[1327] Accordingly, this example demonstrates that the addition of Fenugreek seed extract (component (A)) to a sour compound (component (B)) provides one or more of the following taste characteristics as compared to a sour compound lacking the Fenugreek seed extract: reduced sourness perception, reduced lingering sourness perception, reduced duration of lingering sourness, or reduced initial sourness perception.

Example 34– *Trigonella foenum graecum L.* Extract Sourness Modulation

[1328] Compositions containing *Trigonella foenum graecum L.* (Fenugreek) extract and a sour compound were prepared. The component (A) formulation comprising a Fenugreek seed extract with 50% steroidal saponins at 10.0% and propylene glycol at 90% was generated and mixed with a sour compound (component B). Taste evaluators assessed the taste profile for the mixture of the component (A) formulation comprising the Fenugreek seed extract with the sour compound (component B), and compared the taste profile to that of component (A) having the Fenugreek seed extract alone and component B, being the sour compound alone. The experimental compositions comprising components (A) and (B) were

prepared by mixing the component (A) having the Fenugreek seed extract at varying ppm concentrations with citric acid at 0.075% in water and with kefir in water (60/40 mix). The flavor profile results for the experimental mixtures of components (A) and (B) were reported as the following:

Control:	**Dosage (ppm)**	**Notes:**
Citric Acid 0.075% in water	50	Lingering sourness is perceived to be reduced and dismisses faster.

Control:	**Dosage (ppm)**	**Triangle Test Results:**	**Notes:**
Kefir in water 60/40	40	2/5 panelists were able to differentiate between the modulated sample and control.	Those who were able to differentiate between the samples noted that the initial sourness was perceived to be reduced.

[1329] Accordingly, this example demonstrates that the addition of Fenugreek seed extract (component (A)) to a sour compound (component (B)) provides one or more of the following taste characteristics as compared to a sour compound lacking the Fenugreek seed extract: reduced sourness perception, reduced lingering sourness perception, reduced duration of lingering sourness, or reduced initial sourness perception.

Example 35– *Trigonella foenum graecum L.* Extract Astringency Modulation

[1330] Compositions containing *Trigonella foenum graecum L.* (Fenugreek) extract and an astringent compound were prepared. The component (A) formulation comprising a Fenugreek seed extract with 50% steroidal saponins at 10.0% and propylene glycol at 90% was generated and mixed with an astringent compound (component B). Taste evaluators assessed the taste profile for the mixture of the component (A) formulation comprising the Fenugreek seed extract with the astringent compound (component B), and compared the taste profile to that of component (A) having the Fenugreek seed extract alone and component B, being the astringent compound alone. The experimental compositions comprising components (A) and (B) were prepared by mixing the component (A) having the

Fenugreek seed extract at 25 ppm with cranberry juice. The flavor profile results for the experimental mixtures of components (A) and (B) were reported as the following:

Control:	Dosage (ppm)	Triangle Test Results:	Notes:
Cranberry Cocktail Juice	25	1 out of 4 panelists were able to differentiate between the modulated sample and control.	The modulated sample was perceived to be milder and easier to drink.

[1331] Accordingly, this example demonstrates that the addition of Fenugreek seed extract (component (A)) to an astringent compound (component (B)) provides one or more of the following taste characteristics as compared to an astringent compound lacking the Fenugreek seed extract: reduced astringency perception, enhanced mildness perception, or enhanced mouthfeel.

Example 36– *Trigonella foenum graecum L.* Extract Plant Protein Modulation

[1332] Compositions containing *Trigonella foenum graecum L.* (Fenugreek) extract and a compound containing a plant protein were prepared. The component (A) formulation comprising a Fenugreek seed extract with 50% steroidal saponins at 10.0% and propylene glycol at 90% was generated and mixed with a compound containing a plant protein (component B). Taste evaluators assessed the taste profile for the mixture of the component (A) formulation comprising the Fenugreek seed extract with the compound containing a plant protein (component B), and compared the taste profile to that of component (A) having the Fenugreek seed extract alone and component B, being the compound containing a plant protein alone. The experimental compositions comprising components (A) and (B) were prepared by mixing the component (A) having the Fenugreek seed extract at 50 ppm with pea milk. The flavor profile results for the experimental mixtures of components (A) and (B) were reported as the following:

Control:	Dosage (ppm)	Triangle Test Results:	Notes:
Pea Milk	50	2/6 panelists were able to differentiate between the modulated sample and control.	The modulated sample was perceived to be milder, less beany, and less gritty.

[1333] Accordingly, this example demonstrates that the addition of Fenugreek seed extract (component (A)) to a compound containing a plant protein (component (B)) provides one or more of the following taste characteristics as compared to a compound containing a plant protein lacking the Fenugreek seed extract: enhanced mildness perception, reduced beany flavors or tastes, or reduced grittiness perception.

Example 37– *Trigonella foenum graecum L.* Extract Spice Modulation

[1334] Compositions containing *Trigonella foenum graecum L.* (Fenugreek) extract and a spice or spicy compound were prepared. The component (A) formulation comprising a Fenugreek seed extract with 50% steroidal saponins at 10.0% and propylene glycol at 90% was generated and mixed with a spice or spicy compound (component B). Taste evaluators assessed the taste profile for the mixture of the component (A) formulation comprising the Fenugreek seed extract with the spice or spicy compound (component B), and compared the taste profile to that of component (A) having the Fenugreek seed extract alone and component B, being the spice or spicy compound alone. The experimental compositions comprising components (A) and (B) were prepared by mixing the component (A) having the Fenugreek seed extract at 40 ppm with hot sauce. The flavor profile results for the experimental mixtures of components (A) and (B) were reported as the following:

Control:	**Dosage (ppm)**	**Triangle Test Results:**	**Notes:**
Hot Sauce	40	3/4 panelists were able to differentiate between the modulated sample and control.	The modulated sample was perceived to have a higher spice intensity, longer lasting effect, and increased sourness. The effect was noticed to be slightly delayed.

[1335] Accordingly, this example demonstrates that the addition of Fenugreek seed extract (component (A)) to a spice or spicy compound (component (B)) provides one or more of the following taste characteristics as compared to a spice or spicy compound lacking the

Fenugreek seed extract: enhanced spiciness perception, enhanced spice intensity, increased duration of spice effect or spiciness perception enhanced sourness perception, or delayed onset of spiciness perception.

Example 38– *Trigonella foenum graecum L.* Extract Alcohol Modulation

[1336] Compositions containing *Trigonella foenum graecum L.* (Fenugreek) extract and a compound containing an alcohol or non-alcoholic beverage were prepared. The component (A) formulation comprising a Fenugreek seed extract with 50% steroidal saponins at 10.0% and propylene glycol at 90% was generated and mixed with a compound containing an alcohol or non-alcoholic beverage (component B). Taste evaluators assessed the taste profile for the mixture of the component (A) formulation comprising the Fenugreek seed extract with the compound containing an alcohol or non-alcoholic beverage (component B), and compared the taste profile to that of component (A) having the Fenugreek seed extract alone and component B, being the compound containing an alcohol or non-alcoholic beverage alone. The experimental compositions comprising components (A) and (B) were prepared by mixing the component (A) having the Fenugreek seed extract at 50 ppm with vodka at 5% ABV in water. The flavor profile results for the experimental mixtures of components (A) and (B) were reported as the following:

Control:	**Dosage (ppm)**	**Notes:**
Vodka in water 5% ABV	50	An increase in bitterness was perceived which is an attribute of higher ABV products.

[1337] Accordingly, this example demonstrates that the addition of Fenugreek seed extract (component (A)) to a compound containing an alcohol or non-alcoholic beverage (component (B)) provides one or more of the following taste characteristics as compared to a compound containing an alcohol or non-alcoholic beverage lacking the Fenugreek seed extract: enhanced bitterness perception or increased alcohol perception.

WHAT IS CLAIMED IS:

1. A method for modulating a taste perception in a subject, such as sweetness and/or mouthfeel, or for masking the off-taste of a compound in a subject, the method comprising:

providing a subject a mixture comprising a first composition comprising a sweetener admixed with a second composition comprising one or more flavonolignans, such as silibinin, silychristin, silydianin, dehydrosilybin, deoxysilycistin, deoxysilydianin, silandrin, silybinome, silyhermin or neosilyhermin, preferably, wherein the mixture is provided in a food or beverage or granule, powder or liquid formulation and, optionally, wherein the mixture comprises one or more preservatives, such as a sulphite, sorbic acid, a sorbate compound, benzoic acid, benzoate, propionic acid, propionate, ascorbic acid, ascorbate, or citric acid or derivatives thereof.

2. The method of claim 1, wherein the one or more flavonolignans comprises one or more of: isosilychristin B, silychristin A, silychristin B, silydianin, silybin A, silybin B, isosilybin A, isosilybin B, or 2,3-Dehydrosilybin-der1 or a derivative thereof.

3. The method of any one of claims 1 or 2, wherein the one or more flavonolignans comprises a glucosylated flavonoligan or an aglycone of a flavonoligans.

4. The method of any one of claims 1-3, wherein the sweetener comprises one or more of: a sugar, acesulfame potassium, advantame, alitame, aspartame, cyclamate, erythritol, isomalt, maltitol, lactitol, mannitol, neotame, saccharin, sucralose, sorbitol, xylitol, glycerol, thaumatin, glycyrrhizin, stevioside, luo han guo, stevia or a derivative thereof.

5. The method of any one of claims 1-4, wherein the second composition comprises:

(a) an extract of *Silybum marianum* or sylimarin, such as an extract from *Silybum marianum (L) Gaertn* or *Silybum eburneum Coss. & Dur.*, preferably an extract from *Silybum marianum (L.) Gaertn. var.marianum*, or *Silybum marianum (L.) Gaertn. var.albiflorum*;

(b) an extract of *Iryanthera grandis* (Myristicaceae), *Iryanthera sagotiana*, or *Iryanthera lancifolia*; and/or

(c) an extract from a plant comprising Sylimarin and/or one or more of its components.

6. The method of any one of claims 1-5, wherein the mixture provides a sugar like or sugary mouthfeel sensation in the subject or sensation of an increase in viscosity when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when the sweetener is provided to the subject in the absence of the second composition.

7. The method of any one of claims 1-6, wherein the mixture provides a taste perception in the subject of an increase in sweetness or sweetness intensity when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when the sweetener is provided to the subject in the absence of the second composition.

8. The method of any one of claims 1-7, wherein the mixture provides a taste perception in the subject of a faster onset of sweetness when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when the sweetener is provided to the subject in the absence of the second composition.

9. The method of any one of claims 1-8, wherein the mixture provides a taste perception in the subject that masks a sour taste, lingering sweetness, metallic taste, or a bitter taste when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when the sweetener is provided to the subject in the absence of the second composition.

10. The method of any one of claims 1-9, wherein the food or beverage or granule, powder, or liquid formulation is selected from a sugar substitute, carbonated fruit beverage, sport beverage, carbonated cola drink, wine cooler, cordial, flavored water, powders for drinks, hard candy, soft candy, taffy, chocolates, sugarless candies, chewing gum, bubble gum, condiments, spices and/or seasonings, dry cereal, oatmeal, granola bars, alcoholic beverages, energy beverages, juices, teas, coffees, salsa, gel beads, film strips for breath, gelatin candies, pectin candies, starch candies, lozenges, cough drops, throat lozenges, throat sprays, toothpastes or mouth rinses.

11. The method of any one of claims 1-10, wherein the amount of the one or more flavonolignans or the amount of the second composition in the mixture is at least 0.5 ppm, such as 0.5, 1, 2, 3, 4, 5, 6, 7, 7.5 10, 20, 30, 40, 50, 60, 70, 80, 90, 100, 110, 120, 130, 140, 150,

160, 170, 180, 190, 200, 210, 220, 230, 240, 250, 260, 270, 280, 290, or 300 ppm or within a range defined by any two of the aforementioned amounts, preferably 7.5-150 ppm, 50-100 ppm, 50-200 ppm, or 50-300 ppm.

12. The method of any one of claims 1-11 further comprising selecting or identifying a subject to receive a composition, which modulates taste perception in a subject, such as sweetness, onset of sweetness, sugar like or sugary mouthfeel sensation, or which masks the off-taste of a compound, such as sourness, bitterness, lingering sweetness, or a metallic taste.

13. The method of any one of claims 1-12 further comprising determining or analyzing the sweetness, sugar like or sugary mouthfeel sensation, the time of onset of sweetness, sweetness intensity, the masking of a sour, bitter, or metallic taste, or the masking of a lingering of sweetness or any combination thereof of the subject after consuming said mixture.

14. A method of making a composition, which modulates a taste perception of a subject, such as sweetness and/or mouthfeel, or which masks the off-taste of a compound comprising:

admixing a first component comprising a sweetener with a second component comprising one or more flavonolignans, such as silibinin, silychristin, silydianin, dehydrosilybin, deoxysilycistin, deoxysilydianin, silandrin, silybinome, silyhermin or neosilyhermin, so as to prepare said composition, preferably, wherein the composition is incorporated into a food or beverage or granule, powder or liquid formulation and, optionally, wherein the composition comprises one or more preservatives, such as a sulphite, sorbic acid, a sorbate compound, benzoic acid, benzoate, propionic acid, propionate, ascorbic acid, ascorbate, or citric acid or derivatives thereof.

15. The method of claim 14, wherein the one or more flavonolignans comprises one or more of: isosilychristin B, silychristin A, silychristin B, silydianin, silybin A, silybin B, isosilybin A, isosilybin B, or 2,3-Dehydrosilybin-der1 or a derivative thereof.

16. The method of any one of claims 14 or 15, wherein the one or more flavonolignans comprise a glucosylated flavonoligan or an aglycones of a flavonoligan.

17. The method of any one of claims 14-16, wherein the sweetener comprises one or more of: a sugar, acesulfame potassium, advantame, alitame, aspartame, cyclamate,

erythritol, isomalt, maltitol, lactitol, mannitol, neotame, saccharin, sucralose, sorbitol, xylitol, glycerol, thaumatin, glycyrrhizin, stevioside, luo han guo, stevia or a derivative thereof.

18. The method of any one of claims 14-17, wherein the second component comprises:

(a) an extract of *Silybum marianum* or sylimarin, such as an extract from *Silybum marianum (L) Gaertn* or *Silybum eburneum Coss. & Dur.*, preferably an extract from *Silybum marianum (L.) Gaertn. var.marianum*, or *Silybum marianum (L.) Gaertn. var.albiflorum*;

(b) an extract of *Iryanthera grandis* (Myristicaceae), *Iryanthera sagotiana*, or *Iryanthera lancifolia*; and/or

(c) an extract from a plant comprising Sylimarin and/or one or more of its components.

19. The method of any one of claims 14-18, wherein the composition provides a sugar like or sugary mouthfeel sensation in the subject or sensation of an increase in viscosity when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when the sweetener is provided to the subject in the absence of the second composition.

20. The method of any one of claims 14-19, wherein the composition provides a taste perception in the subject of an increase in sweetness, a faster onset of sweetness, or a sugar like or a sugary mouthfeel sensation when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when the sweetener is provided to the subject in the absence of the second composition.

21. The method of any one of claims 14-20, wherein the composition provides a taste perception in the subject that masks a lingering sweetness, a sourness, or a metallic or a bitter taste when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when the sweetener is provided to the subject in the absence of the second composition.

22. The method of any one of claims 14-21, wherein the food or beverage or granule, powder, or liquid formulation is selected from a sugar substitute, carbonated fruit beverage, sport beverage, carbonated cola drink, wine cooler, cordial, flavored water, powders for drinks, hard candy, soft candy, taffy, chocolates, sugarless candies, chewing gum, bubble gum, condiments, spices and/or seasonings, dry cereal, oatmeal, granola bars, alcoholic beverages, energy beverages, juices, teas, coffees, salsa, gel beads, film strips for breath, gelatin candies, pectin candies, starch candies, lozenges, cough drops, throat lozenges, throat sprays, toothpastes or mouth rinses.

23. The method of any one of claims 14-22, wherein the amount of the one or more flavonolignans or the amount of the second component in the mixture is at least 0.5 ppm, such as 0.5, 1, 2, 3, 4, 5, 6, 7, 7.5 10, 20, 30, 40, 50, 60, 70, 80, 90, 100, 110, 120, 130, 140, 150, 160, 170, 180, 190, 200, 210, 220, 230, 240, 250, 260, 270, 280, 290, or 300 ppm or within a range defined by any two of the aforementioned amounts, preferably 7.5-150 ppm, 50-100 ppm, 50-200 ppm, or 50-300 ppm.

24. A composition obtained by the method of any one of claims 14-23.

25. Use of a composition comprising one or more flavonolignans for modulating a taste perception in a subject, such as sweetness and/or mouthfeel, or for masking the off-taste of a compound in a subject.

26. The use of claim 25, wherein the subject is provided a mixture comprising a first composition comprising a sweetener admixed with a second composition comprising the one or more flavonolignans, such as silibinin, silychristin, silydianin, dehydrosilybin, deoxysilycistin, deoxysilydianin, silandrin, silybinome, silyhermin or neosilyhermin, preferably, wherein the mixture is provided in a food or beverage or granule, powder or liquid formulation and, optionally, wherein the mixture comprises one or more preservatives, such as a sulphite, sorbic acid, a sorbate compound, benzoic acid, benzoate, propionic acid, propionate, ascorbic acid, ascorbate, or citric acid or derivatives thereof.

27. The use of any one of claims 25 or 26, wherein the one or more flavonolignans comprises one or more of: isosilychristin B, silychristin A, silychristin B, silydianin, silybin A, silybin B, isosilybin A, isosilybin B, or 2,3-Dehydrosilybin-der1 or a derivative thereof.

28. The method of any one of claims 25-27, wherein the one or more flavonolignans comprise a glucosylated flavonoligan or an aglycone of a flavonoligan.

29. The use of any one of claims 26-27, wherein the sweetener comprises one or more of: a sugar, acesulfame potassium, advantame, alitame, aspartame, cyclamate, erythritol, isomalt, maltitol, lactitol, mannitol, neotame, saccharin, sucralose, sorbitol, xylitol, glycerol, thaumatin, glycyrrhizin, stevioside, luo han guo, stevia or a derivative thereof.

30. The use of any one of claims 26-29, wherein the second composition comprises:

(a) an extract of *Silybum marianum* or sylimarin, such as an extract from *Silybum marianum (L) Gaertn* or *Silybum eburneum Coss. & Dur.*, preferably an extract from *Silybum marianum (L.) Gaertn. var.marianum*, or *Silybum marianum (L.) Gaertn. var.albiflorum*;

(b) an extract of *Iryanthera grandis* (Myristicaceae), *Iryanthera sagotiana*, or *Iryanthera lancifolia*; and/or

(c) an extract from a plant comprising Sylimarin and/or one or more of its components.

31. The use of any one of claims 25-30, wherein the composition or mixture provides a sugar like or sugary mouthfeel sensation in the subject or sensation of an increase in viscosity when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when the sweetener is provided to the subject in the absence of the second composition.

32. The use of any one of claims 25-31, wherein the composition or mixture provides a taste perception in the subject of an increase in sweetness or sweetness intensity when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when the sweetener is provided to the subject in the absence of the second composition.

33. The use of any one of claims 25-32, wherein the composition or mixture provides a taste perception in the subject that masks a metallic or a bitter taste when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when the sweetener is provided to the subject in the absence of the second composition.

34. The use of any one of claims 25-33, wherein the food or beverage or granule, powder, or liquid formulation is selected from a sugar substitute, alcoholic beverage, carbonated fruit beverage, sport beverage, carbonated cola drink, wine cooler, cordial, flavored

water, powders for drinks, hard candy, soft candy, taffy, chocolates, sugarless candies, chewing gum, bubble gum, condiments, spices and/or seasonings, dry cereal, oatmeal, granola bars, alcoholic beverages, energy beverages, juices, teas, coffees, salsa, gel beads, film strips for breath, gelatin candies, pectin candies, starch candies, lozenges, cough drops, throat lozenges, throat sprays, toothpastes or mouth rinses.

35. The use of any one of claims 25-34, wherein the amount of the one or more flavonolignans or the amount of the second composition in the mixture is at least 0.5 ppm, such as 0.5, 1, 2, 3, 4, 5, 6, 7, 7.5 10, 20, 30, 40, 50, 60, 70, 80, 90, 100, 110, 120, 130, 140, 150, 160, 170, 180, 190, 200, 210, 220, 230, 240, 250, 260, 270, 280, 290, or 300 ppm or within a range defined by any two of the aforementioned amounts, preferably 7.5-150 ppm, 50-100 ppm, 50-200 ppm, or 50-300 ppm.

36. The use of any one of claims 25-35 further comprising selecting or identifying a subject to receive a composition, which modulates taste perception in a subject, such as sweetness, onset of sweetness, sugar like or sugary mouthfeel sensation, or which masks the off-taste of a compound, such as bitterness, lingering sweetness, or a metallic taste.

37. The use of any one of claims 25-36 further comprising determining or analyzing the sweetness, sugar like or sugary mouthfeel sensation, the time of onset of sweetness, sweetness intensity, the masking of a sour, bitter, or metallic taste, or the masking of a lingering of sweetness or any combination thereof of the subject after consuming said mixture.

38. The use of any one of claims 25-35, wherein the composition is dissolved in food grade ethanol.

39. The use of claim 38, wherein the food grade ethanol is at least 50%, such as 50, 60, 70, 80, 85, 90, 95, or 100%, or with a range defined by any two of the aforementioned amounts, preferably 80, 90, or 95%.

40. A method for modulating a subject's taste perception of alcohol, spice, cooling, carbonation, astringency, bitterness or sourness or for masking off-tastes, the method comprising:

providing a subject a mixture that comprises at least two components (a) and (b):

(a) a steroidal saponin or analog thereof (for example, a glycosylation molecule of an aglycone, an aglycone of a glycosylated molecule, or a further glycosylated molecule of a glycosylated molecule) or an extract of a plant

that comprises a steroidal saponin or an analog thereof, such as an *Asparagus racemosus* rhizome extract, a *Trigonella foenum graecum L.* extract or a *Smilax china* extract; and

(b) a composition comprising an alcohol, a spice, a cooling compound, carbonation, an astringent compound, a bitter compound, a sour compound, or a compound with an off-taste; wherein component (a) is admixed with component (b);

wherein the mixture is preferably provided in a food, beverage, granule, powder or liquid formulation; and

optionally, wherein the mixture comprises one or more preservatives or antioxidants, such as a sulphite, sorbic acid, a sorbate compound, benzoic acid, benzoate, propionic acid, propionate, ascorbic acid, ascorbate, citric acid, a tocopherol, a retinol, a polyphenol, a phenolic acid, a flavonoid, lipoic acid, N-acetylcysteine, butylated hydroxyanisole, butylated hydroxytoluene or derivatives thereof, preferably, wherein the one or more preservatives or antioxidants improve the shelf-life, flavor profile, or reduce spoilage of the mixture; and/or

optionally, selecting a composition that comprises an alcohol, a spice, a cooling compound, carbonation, an astringent compound, a bitter compound, a sour compound, or a compound with an off-taste for receiving an agent that modulates the taste perception of a subject of astringency, bitterness or sourness or masks off-tastes and providing said selected composition component (a); and/or

optionally, evaluating the modulation of a subject's taste perception of alcohol, spice, cooling, carbonation, astringency, bitterness, or sourness or evaluating the masking of off-tastes after providing the subject the mixture.

41. The method of claim 40, wherein the steroidal saponin has one of the following sapogenin structures: spirostane, isospirostane, furostane, pregnane, or cholestane.

42. The method of any one of claims 40 or 41, wherein the steroidal saponin or extract of a plant that comprises a steroidal saponin or an analog thereof comprises saponins selected from one or more of the following: Shatavarin I, Shatavarin VIII, Protodioscin, Shatavarin IV, Shatarvain IX, Asparagoside A, Asparenydiol, Asparacosin A, Asparoside B,

Sarsasapogenin, Schidigera saponin D5, Shatavarin VI, Immunoside, Shatavarin VII, Shatavarin X, Aspoligonin A, Prosapogenin A, Methyl gracillin, Methyl protodioscin, Neotigogenin-3-*O*-*α*-l-rhamnopyranosyl-(1 → 6)-*β*-d-glucopyranoside, Neotigogenin-3-*O*-*β*-d-glucopyranosyl-(1 → 4)-*O*-[*α*-l-rhamnopyranosyl-(1 → 6)]-*β*-d-glucopyranoside, Neotigogenin-3-*O*-*β*-d-glucopyranoside, Smilanippin A, Neotigogenin-3-*O*-*β*-d-glucopyranosyl-(1 → 4)-*O*-[*α*-l-arabinopyranosyl-(1 → 6)]-*β*-d-glucopyranoside, Sarsasapogenin-3-*O*-*β*-d-glucopyranosyl-(1 → 4)-[*α*-l-arabinopyranosyl- (1 → 6)]-*β*-d-glucopyranoside, (25S)-5*β*-Spirostane-3*β*-ol-3-*O*-*α*-l-rhamnopyranosyl-(1 → 2)-*β*-d-glucopyranosyl-(1 → 2)-*β*-d-glucopyranoside, Curillin G, Parillin, (25*S*)-Spirostan-6*β*-ol-3-*O*-*β*-d-glucopyranosyl-(1 → 4)-*O*-[*α*-l-arabinopyranosyl-(1 → 6)]-*β*-d-glucopyranoside, Trinervuloside C, Diosgenin-3-*O*-*α*-l-rhamnopyranoside, Dioscin, Diosgenin-3-*O*-[*α*-l-rhamnopyranosyl-(l → 4)]-*β*-d-glucopyranoside, Diosgenin-3-*O*-[*α*-l-rhamnopyranosyl-(l → 2)]-*β*-d-glucopyranoside, (25*R*)-Spirostan-5-en-3-*O*-*α*-l-rhamnopyranosyl-(l → 2)-[*α*-l-rhamnopyranosyl-(l → 4)-*α*-l-rhamnopyranosyl-(l → 4)]-*O*-*β*-d-glucopyranoside, Gracillin, Parisyunnanoside C, Parisyunnanoside D, Parisyunnanoside E, Paris D, Paris H, (25*R*)-Spirost-5-en-3*β*,17*α*,27-triol-3-*O*-*α*-l-rhamnopyranosyl-(l → 2)-[*α*-l-rhamnopyranosyl-(l → 4)]-*β*-d-glucopyranoside, (25*S*)-Spirostan-5-en-3*β*,17*α*,27-triol-3-*O*-*α*-l-arabinopyranosyl-(1 → 6)-*β*-d-glucopyranoside, (25*S*)-Spirostan-5-en-3*β*,17*α*,27-triol-3-*O*-*β*-d-glucopyranosyl-(1 → 4)-[*α*-l-arabinopyranosyl-(1 → 6)]-*β*-d-glucopyranoside, (25*S*)-spirost-5-ene-3*β*,17*α*,27-triol-3-*O*-*α*-l-rhamnopyranosyl-(l → 4)-*β*-d-glucopyranoside, (25*S*)-Spirost-5-en-3*β*,17*α*,27-triol-3-*O*-*β*-d-galactopyranoside, (25*S*)-Spirostan-5-en-3*β*,27-diol-3-*O*-*α*-l-arabinopyranosyl-(1 → 6)-*β*-d- glucopyranoside, Isonarthogenin3-*O*-*α*-l-rhamnopyranosyl-(l → 2)-*O*-[*α*-l-rhamnopyranosyl-(l → 4)]-*β*-d-glucopyranoside, Smilscobinoside A, Sieboldiin A, Sieboldiin B, Sieboldogenin, (25*R*)-5*α*-Spirostan-3*β*-ol-6-one-3-*O*-[*α*-l-arabinopyranosyl-(l → 4)]-*β*-d-glucopyranoside, Smilaxin A, Smilaxin B, Parisvietnaside A, Smilaxin C, (25*R*)-5*α*-Spirostan-3*β*,6*β*-diol-3-*O*-*β*-d-glucopyranosyl-(1 → 4)-[*α*-l-arabinopyranosyl-(1 → 6)]-*β*-d-glucopyranoside, Smilscobinoside B, (25*R*)-5*α*-Spirostan-3*β*,17*α*,27-triol-3-*O*-*β*-d-glucopyranosyl-(1 → 4)-[*α*-l-arabinopyranosyl-(1 → 6)]-*β*-d-glucopyranosie, (25*R*)-5*β*Spirostan-3*β*-ol-3-*O*-*β*-d-glucopyranosyl-(1 → 6)-[*β*-d-glucopyranosyl-(1 → 4)]-*β*-d-glucopyranoside, (25*R*)-5*β*-Spirostan-3*β*-ol-3-*O*-*β*-d-glucopyranosyl-(1 → 6)-[*β*-d-glucopyranosyl-(1 → 2)]-[*β*-d-glucopyranosyl-(1 → 4)]-*β*-d-

glucopyranoside, Disporoside A, (25*R*)-5*β*-Spirostan-3*β*-ol-3-*O*-*β*-d-glucopyranosyl-(1 → 6)-*β*-d-glucopyranoside, (25*R*)-5*β*-Spirostan-3*β*-ol-3-*O*-*β*-d-glucopyranosyl-(1 → 6)-[*β*-d-glucopyranosyl-(1 → 2)]-[*α*-l-rhamnopyranosyl-(1 → 4)]-*β*-d-glucopyranoside, Smilagenin 3-*O*-*β*-d-glucopyranoside, Methylprotodioscin, 26-*O*-*β*-d-Glucopyranosyl-(25*R*)-furostan-5-en-3*β*,26-diol-22-methoxy-3-*O*-*α*-l-rhamnopyranosyl-(1 → 2)-*β*-d-glucopyranoside, 26-*O*-*β*-d-Glucopyranosyl-22*α*-*O*-methyl-(25*R*)-furost-5-en-3*β*,26-diol-3-*O*-*α*-l-rhamnopyranosyl-(1 → 4)-*α*-l-rhamnopyranosyl-(1 → 4)-[*α*-l-rhamnopyranosyl-(1 → 2)]-*β*-d-glucopyranoside, Protodiosgenin-3-*O*-*α*-l-rhamnopyranosyl-(1 → 4)-*α*-l-rhamnopyranosyl(1 → 4)-[*α*-l-rhamnopyranosyl(1 → 2)]-*β*-d-glucopyranoside, 26-*O*-*β*-d-Glucopyranosyl-22*α*-hydroxy-(25*R*)-furost-5-en-3*β*,26-diol-3-*O*-[4-*O*-acetyl-*α*-l-rhamnopyranosyl]-(1 → 2)-[*α*-l-rhamnopyranosyl-(1 → 4)]-*β*-d-glucopyranoside, 26-*O*-*β*-d-Glucopyranosyl-22*α*-hydroxy-(25*R*)-furost-5-en-3*β*,26-diol-3-*O*-[2-*O*-acetyl-*α*-l-rhamnopyranosyl]-(1 → 2)-[*α*-l-rhamnopyranosyl-(1 → 4)]-*β*-d-glucopyranoside, 26-*O*-*β*-d-Glucopyranosyl-22*α*-hydroxy-(25*R*)-furost-5-en-3*β*,26-diol-3-*O*-[3-*O*-acetyl-*α*-l-rhamnopyranosyl]-(1 → 2)-[*α*-l-rhamnopyranosyl-(1 → 4)]-*β*-d-glucopyranoside, 26-*O*-*β*-d-Glucopyranosyl-(25*R*)-furostan-5-en-3*β*,17*α*-diol-3-*O*-*α*-l-rhamnopyranosyl-(1 → 2)-*α*-l-rhamnopyranoside, Protogracillin, Parisaponin I, Parisyunnanoside A, Pseudoprotodioscin, 26-*O*-*β*-d-Glucopyranosyl-(25*R*)-furostan-5,20(22)-dien-3*β*,26-diol-3-*O*-*α*-l-rhamnopyranosyl-(1 → 2)-*β*-d-glucopyranoside, 15-Hydroxypseudoprotodioscin, 15-Methoxypseudoprotodioscin, 23-Oxopseudoprotodioscin, 26-*O*-*β*-d-Glucopyranosyl-(25*S*)-5-furosa-20(22)-en-3*β*,26-diol-3-*O*-*α*-l-rhamnopyranosyl-(1 → 2)-*O*-[*α*-l-rhamnopyranosyl-(1 → 6)]-*β*-d-glucopyranoside, Pseudoproto-pb, 26-*O*-*β*-d-Glucopyranosyl-(25*R*)-5*α*-furostan-3β,22,26-triol-6-one-3-*O*-*α*-l-arabinopyranosyl-(1 → 6)-*β*-d-glucopyranoside, 26-*O*-*β*-d-Glucopyranosyl-(25*R*)-5*α*-furostan-3*β*,22,26-triol-6-one-3-*O*-*β*-d-glucopyranosyl-(1 → 4)-[*α*-l-arabinopyranosyl-(1 → 6)]-*β*-d-glucopyranoside, 26-*O*-*β*-d-Glucopyranosyl-(25*R*)-5*α*-furostan-3*β*,26-diol-22-methoxyl-6-one-3-*O*-*α*-l-arabinopyranosyl-(1 → 6)-*β*-d-glucopyranoside, 26-*O*-*β*-d-Glucopyranosyl-(25*R*)-5*α*-furostan-3*β*,26-diol-22-methoxyl-6-one, 26-*O*-*β*-d-Glucopyranosyl-(25*S*)-5*β*-furostan-3*β*,26-diol-22*α*-methoxy-3-*O*-*β*-d-glucopyranosyl-(1 → 6)-[*β*-d-glucopyranosyl-(1 → 2)]-[*β*-d-glucopyranosyl-(1 → 4)]-*β*-d-glucopyranoside, (25*S*)-26-*O*-*β*-d-glucopyranosyl-3*β*,5*β*,22*α*-furostan-3,22,26-triol-3-*O*-*α*-l-rhamnopyranosyl-(1 → 2)-*O*-*β*-d-glucopyranosyl-(1 → 2)-*O*-*β*-d-glucopyranoside, Asparagoside E, Asparoside

A, Asparoside B, 26-*O*-*β*-d-Glucopyranosyl-(25*S*)-5*β*-furostan-3*β*,22*α*-diol-3-*O*-*α*-l-arabinopyranosyl-(1 → 6)-[*β*-d-glucopyranosyl-(1 → 4)]-*β*-d-glucopyranosidc, 26-*O*-*β*-d-Glucopyranosyl-(25*S*)-5*α*-furostan-3*β*,22*α*-diol-3-*O*-*α*-l-arabinopyranosyl-(1 → 6)-[*β*-d-glucopyranosyl-(1 → 4)]-*β*-d-glucopyranoside, 26-*O*-*β*-d-Glucopyranosyl-(25*S*)-5*α*-furostan-3*β*,6*β*,22*α*-tetraol-3-*O*-*α*-l-arabinopyranosyl-(1 → 6)-[*β*-d-glucopyranosyl-(1 → 4)]-*β*-d-glucopyranoside, Sarsaparilloside B, Sarsaparilloside C, Sarsaparilloside, $\Delta^{20(22)}$-Sarsaparilloside, Riparoside A, Smilaxchinoside A, (25*R*)-Smilaxchinoside A, Smilaxchinoside B, Smilaxchinoside C, Dioscoreside E, (25*R*)-5*α*-Furostan-3*β*,26-diol-20(22)-en-6-one-26-*O*-*β*-d-glucopyranoside, (23*R*,25*R*)-5*α*-Furostan-3*β*,23,26-triol-20(22)-en-6-one-26-*O*-*β*-d-glucopyranoside, 26-*O*-*β*-d-Glucopyranosyl-(25*R*)-5*α*-furostan-3*β*,26-diol-20(22)-en-6-one-3-*O*-*α*-l-arabinopyranosyl-(1 → 6)-*β*-d-glucopyranoside, (25*S*)-5*β*-Furostan-1*β*,2*β*,3*β*,5*β*,22*α*,26-hexaol-26-*O*-*β*-d-glucopyranoside, 26-*O*-*β*-d-Glucopyranosyl-(25*S*)-5*β*-furostan-1*β*,3*β*,22*α*,26-tetraol-1-*O*-*β*-d-glucopyranoside, Trinervuloside A, Riparoside B, Timosaponin J, Timosaponin K, Trinervuloside B, Pregna-5,16-diene-3*β*-ol-20-one-3-*O*-*α*-l-rhamnopyranosyl-(1 → 2)-*O*-[*α*-l-rhamnopyranosyl-(1 → 4)]-*β*-d-glucopyranoside, Pregna-5,16-diene-3*β*-ol-20-one-3-*O*-*α*-l-rhamnopyranosyl-(1 → 4)-*α*-l-rhamnopyranosyl-(1 → 4)-[*α*-l-rhamnopyranosyl-(1 → 2)]-*β*-d-glucopyranoside, Pregna-5,16-diene-3*β*-ol-20-one-3-*O*-*α*-l-rhamnopyranosyl-(1 → 2)-[*α*-l-rhamnopyranosyl-(1 → 4)]-*α*-l-rhamnopyranosyl-(1 → 2)-*β*-d-glucopyranoside, Pallidfloside D, Anguivioside XV, Yamogenin, Diosgenin, Smilagenin, Sarsasapogenin, Tigogenin, Neotigogenin, Gitogenin, Yuccagenin, Saponaretin or Smilaxchinoside D.

43. The method of any one of claims 40-42, wherein the steroidal saponin or analog thereof or extract of a plant that comprises a steroidal saponin or an analog thereof comprises a glucosylated steroidal saponins or an aglycone of a steroidal sanponin.

44. The method of any one of claims 40-43, wherein the composition is an alcoholic or non-alcoholic beverage, a carbonated beverage, a spice or spicy compound, such as a chili, wasabi, horseradish, mustard, ginger, black pepper, cinnamon, pumpkin spice, Szechuan pepper, allspice or any combination thereof, an astringent compound, such as phenolic compounds, tannins, gallic acid, zinc oxide, zinc sulfate, tannic acid, potassium permanganate, silver nitrate, tincture of benzoin, potassium alum, caftaric acid, acacia, yarrow, sage, witch hazel, vinegar, tea, fruits, vegetables, dairy products, herbs, nuts or any combination thereof, a

bitter compound, such as Absinthin, Aloin, Alpha acid, Amarogentin, Andrographolide, Brucine, Caffeine, Denatonium, Eugenin, Hesperidin, Humulone, Isohumulone, Kaempferol 3-O-rutinoside, 6-Methoxymellein, Naringin, Papaverine, Phenylthiocarbamide, Propylthiouracil, Quassin, Quinidine, Quinine, Salicin, Strychnine, Sucrose octaacetate, Sucrose octapropionate, Theobromine, Theophylline, vegetables, tea, chocolate, fruits or any combination thereof, a sour compound, such as acetic acid, citric acid, hydrochloric acid, lactic acid, malic acid, nitric acid, fumaric acid, sulfuric acid, tartaric acid, phosphoric acid, other acid or any combination thereof, a cooling compound, such as Menthol, Cyclohexanecarboxamide,N-Ethyl-5-Methyl-2-(1- Methylethyl) (WS-3), N-(Ethoxycarbonylmethyl)-3-p-menthanecarboxamide (WS-5), (1R,2S,5R)-N-(4-Methoxyphenyl)-5-methyl-2-(1- methylethyl)cyclohexanecarboxamide (WS-12), Butanamide, N,2,3-trimethyl-2-(1-methylethyl) (WS-23), or Menthyl Lactate or any combination thereof, a compound with an off-taste, such as plant-based milks or products of plant-based milks, dairy products, fruits, juices, proteins, plant protein, whole grain products or any combination thereof.

45. The method of claim 44, wherein the dairy product, plant-based milk, or product of plant-based milk comprises a milk, such as whole milk, nonfat milk, lactose-free milk, buttermilk, condensed milk, cashew milk, goat milk, rick milk, soy milk, oat milk, almond milk, coconut milk, a yogurt, cheese, frosting, pudding, chocolate, custard, ice cream, gelato, sherbet, sorbet, frozen yogurt or any combination thereof.

46. The method of any one of claims 40-45, wherein the plant extract comprising a steroidal saponin is obtained from a plant from any one or more of the following families or genera: Asparagaceae, Amaryllidaceae, Dioscoreaceae, Liliaceae, Costaceae, Melanthiaceae, Plantaginaceae, Fabaceae, Asteraceae, Asparagus, Tupistra, Anemarrhena, Sansevieria, Polygonatum, Nolina, Convallaria, Ophipogon, Hosta, Ornithogalum, Ruscus, Agapanthus, Dioscorea, Fritillaria, Lilium, Costus, Paris, Digitalis, Trigonella, Smilax, or Vernonia.

47. The method of any one of claims 40-46, wherein the plant extract comprising a steroidal saponin is obtained from a plant from any one or more of the following species: *Smilax riparia*, *Smilax lanceaefolia*, *Smilax nipponica*, *Smilax nigrescens*, *Smilax officinalis*, *Smilax aspera subsp. Mauritanica*, *Smilax aristolochiifolia*, *Smilax ornate*, *Smilax glabra*, *Smilax china*, *Smilax menispermoides*, *Smilax lebrunii*, *Smilax stans*, *Smilax bockii*, *Smilax*

excelsa, *Smilax microphylla*, *Smilax scobinicaulis*, *Smilax sieboldii*, *Smilax krausiana*, *Smilax medica*, *Asparagus acutifolius*, *Asparagus aethiopicus*, *Asparagus africanus*, *Asparagus asparagoides*, *Asparagus burchellii*, *Asparagus cochinchinensis*, *Asparagus declinatus*, *Asparagus capensis*, *Asparagus curillus*, *Asparagus densiflorus*, *Asparagus exuvialis*, *Asparagus falcatus*, *Asparagus fallax*, *Asparagus flagellaris*, *Asparagus horridus*, *Asparagus krebsianus*, *Asparagus laricinus*, *Asparagus lignosus*, *Asparagus macowanii*, *Asparagus mariae*, *Asparagus maritimus*, *Asparagus mucronatus*, *Asparagus multiflorus*, *Asparagus nesiotes*, *Asparagus officinalis*, *Asparagus ovatus*, *Asparagus pastorianus*, *Asparagus persicus*, *Asparagus racemosus*, *Asparagus retrofractus*, *Asparagus rubicundus*, *Asparagus scandens*, *Asparagus schoberioides*, *Asparagus scoparius*, *Asparagus setaceus*, *Asparagus striatus*, *Asparagus suaveolens*, *Asparagus tenuifolius*, *Asparagus umbellatus*, *Asparagus vaginellatus*, *Trigonella foenum graecum* or *Asparagus virgatus*.

48. The method of any one of claims 40-47, wherein the mixture provides a taste perception in the subject of a reduction in bitterness or bitterness perception, a masking of bitter tastes or bitterness, a reduction in sourness or sourness perception, a masking of sour tastes or sourness, a reduction in initial sourness perception or lingering sourness perception, a reduction in astringency or astringency perception, a masking of astringency, or a masking of off tastes when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

49. The method of any one of claims 40-48, wherein the mixture provides a taste perception in the subject of masked cooked tastes, masked metallic tastes, enhanced beer flavor, enhanced alcohol flavor, enhanced retro-nasal effect, increased bitterness perception, enhanced alcohol perception, enhanced spice intensity, increased sour perception, enhanced cooling intensity, faster onset of cooling sensation, increased duration of taste, or reduced stinging taste when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

50. The method of any one of claims 40-49, wherein the mixture increases the amount of carbonation bubbles or reduces the carbonation bubble size of a beverage when the mixture is provided to the subject, such as when the mixture is incorporated in a beverage that

is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

51. The method of any one of claims 40-50, wherein the food or beverage or granule, powder, or liquid formulation is selected from water, a carbonated beverage, such as a carbonated fruit beverage, carbonated cola drink or carbonated water, alcoholic beverages, alcohol-free beverages, spices and/or seasonings, such as chili, wasabi, horseradish, mustard, ginger, black pepper, or cinnamon, energy beverages, flavored water, powders for drinks, dairy products, such as milk, yogurt, cheese, or ice cream, plant based milks, products of plant based milk, puddings, cakes, shakes, malts, brownies, pastries, cookies, cheesecakes, fudge, pies, cobblers, parfaits, mousse, biscuits, custards, frosting, fruits, vegetables, hard candy, soft candy, taffy, chocolates, sugarless candies, chewing gum, bubble gum, juices, teas, coffees, salsa, gel beads, film strips for breath, gelatin candies, pectin candies, starch candies, lozenges, cough drops, throat lozenges, throat sprays, toothpastes or mouth rinses.

52. The method of any one of claims 40-51, wherein the amount of component (a) in the mixture is at least 2 ppm, such as, 3, 4, 5, 7.5, 10, 20, 30, 40, 50, 60, 70, 80, 90, 100, 110, 120, 130, 140, 150, 160, 170, 180, 190, 200, 210, 220, 230, 240, 250, 260, 270, 280, 290, or 300 ppm or an amount within a range defined by any two of the aforementioned amounts, preferably 2-40 ppm, 6-75 ppm, 6-100 ppm, or 12-200 ppm.

53. The method of any one of claims 40-52 further comprising selecting or identifying a subject to receive a composition, which modulates a taste perception in a subject, such as alcohol, spice, cooling carbonation, bitterness, sourness, or astringency, or which masks off-tastes in a subject, such as bitter or sour tastes.

54. The method of any one of claims 40-53 further comprising determining or analyzing the alcohol perception, bitterness perception, bitterness intensity, the masking of bitterness, the sourness perception, sourness intensity, the masking of sourness, astringency perception, astringency intensity, the masking of astringency, or the masking of off-tastes or any combination thereof of the subject after consuming said mixture or determining or analyzing the increase of carbonation bubbles, the reduction of carbonation bubble size of a carbonated beverage after providing composition component (a) .

55. The method of any one of claims 40-54, wherein component (a) is dissolved in food grade ethanol.

56. The method of claim 55, wherein the food grade ethanol is at least 1%, such as 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 15, 20, 25, 30, 35, 40, 45, 50, 60, 70, 80, 85, 90, 95, or 100%, or with a range defined by any two of the aforementioned amounts, preferably 80, 90, or 95%.

57. A method of making a mixture, which modulates a subject's taste perception of alcohol, spice, cooling, carbonation, astringency, bitterness, or sourness or which masks off-tastes, the method comprising the method comprising:

admixing a component (a) with a component (b) to form said mixture:

(a) a steroidal saponin or analog thereof (for example, a glycosylation molecule of an aglycone, an aglycone of a glycosylated molecule, or a further glycosylated molecule of a glycosylated molecule) or an extract of a plant that comprises a steroidal saponin or an analog thereof, such as an *Asparagus racemosus* rhizome extract, a *Trigonella foenum graecum L.* extract or a *Smilax china* extract; and

(b) a composition comprising an alcohol, a spice, a cooling compound, carbonation, an astringent compound, a bitter compound, a sour compound, or a compound with an off-taste; wherein component (a) is admixed with component (b);

wherein the mixture is preferably provided in a food, beverage, granule, powder or liquid formulation; and

optionally, wherein the composition comprises one or more preservatives or antioxidants, such as a sulphite, sorbic acid, a sorbate compound, benzoic acid, benzoate, propionic acid, propionate, ascorbic acid, ascorbate, citric acid, a tocopherol, a retinol, a polyphenol, a phenolic acid, a flavonoid, lipoic acid, N-acetylcysteine, butylated hydroxyanisole, butylated hydroxytoluene or derivatives thereof, preferably, wherein the one or more preservatives or antioxidants improve the shelf-life, flavor profile, or reduce spoilage of the mixture.

58. The method of claim 57, wherein the steroidal saponin has one of the following sapogenin structures: spirostane, isospirostane, furostane, pregnane, or cholestane.

59. The method of any one of claims 57 or 58, wherein the steroidal saponin or extract of a plant that comprises a steroidal saponin or an analog thereof comprises saponins

selected from one or more of the following: Shatavarin I, Shatavarin VIII, Protodioscin, Shatavarin IV, Shatarvain IX, Asparagoside A, Asparenydiol, Asparacosin A, Asparoside B, Sarsasapogenin, Schidigera saponin D5, Shatavarin VI, Immunoside, Shatavarin VII, Shatavarin X, Aspoligonin A, Prosapogenin A, Methyl gracillin, Methyl protodioscin, Neotigogenin-3-*O*-*α*-l-rhamnopyranosyl-(1 → 6)-*β*-d-glucopyranoside, Neotigogenin-3-*O*-*β*-d-glucopyranosyl-(1 → 4)-*O*-[*α*-l-rhamnopyranosyl-(1 → 6)]-*β*-d-glucopyranoside, Neotigogenin-3-*O*-*β*-d-glucopyranoside, Smilanippin A, Neotigogenin-3-*O*-*β*-d-glucopyranosyl-(1 → 4)-*O*-[*α*-l-arabinopyranosyl-(1 → 6)]-*β*-d-glucopyranoside, Sarsasapogenin-3-*O*-*β*-d-glucopyranosyl-(1 → 4)-[*α*-l-arabinopyranosyl- (1 → 6)]-*β*-d-glucopyranoside, (25S)-5*β*-Spirostane-3*β*-ol-3-*O*-*α*-l-rhamnopyranosyl-(1 → 2)-*β*-d-glucopyranosyl-(1 → 2)-*β*-d-glucopyranoside, Curillin G, Parillin, (25*S*)-Spirostan-6*β*-ol-3-*O*-*β*-d-glucopyranosyl-(1 → 4)-*O*-[*α*-l-arabinopyranosyl-(1 → 6)]-*β*-d-glucopyranoside, Trinervuloside C, Diosgenin-3-*O*-*α*-l-rhamnopyranoside, Dioscin, Diosgenin-3-*O*-[*α*-l-rhamnopyranosyl-(1 → 4)]-*β*-d-glucopyranoside, Diosgenin-3-*O*-[*α*-l-rhamnopyranosyl-(1 → 2)]-*β*-d-glucopyranoside, (25*R*)-Spirostan-5-en-3-*O*-*α*-l-rhamnopyranosyl-(1 → 2)-[*α*-l-rhamnopyranosyl-(1 → 4)-*α*-l-rhamnopyranosyl-(1 → 4)]-*O*-*β*-d-glucopyranoside, Gracillin, Parisyunnanoside C, Parisyunnanoside D, Parisyunnanoside E, Paris D, Paris H, (25*R*)-Spirost-5-en-3*β*,17*α*,27-triol-3-*O*-*α*-l-rhamnopyranosyl-(1 → 2)-[*α*-l-rhamnopyranosyl-(1 → 4)]-*β*-d-glucopyranoside, (25*S*)-Spirostan-5-en-3*β*,17*α*,27-triol-3-*O*-*α*-l-arabinopyranosyl-(1 → 6)-*β*-d-glucopyranoside, (25*S*)-Spirostan-5-en-3*β*,17*α*,27-triol-3-*O*-*β*-d-glucopyranosyl-(1 → 4)-[*α*-l-arabinopyranosyl-(1 → 6)]-*β*-d-glucopyranoside, (25*S*)-spirost-5-ene-3*β*,17*α*,27-triol-3-*O*-*α*-l-rhamnopyranosyl-(1 → 4)-*β*-d-glucopyranoside, (25*S*)-Spirost-5-en-3*β*,17*α*,27-triol-3-*O*-*β*-d-galactopyranoside, (25*S*)-Spirostan-5-en-3*β*,27-diol-3-*O*-*α*-l-arabinopyranosyl-(1 → 6)-*β*-d- glucopyranoside, Isonarthogenin3-*O*-*α*-l-rhamnopyranosyl-(1 → 2)-*O*-[*α*-l-rhamnopyranosyl-(1 → 4)]-*β*-d-glucopyranoside, Smilscobinoside A, Sieboldiin A, Sieboldiin B, Sieboldogenin, (25*R*)-5*α*-Spirostan-3*β*-ol-6-one-3-*O*-[*α*-l-arabinopyranosyl-(1 → 4)]-*β*-d-glucopyranoside, Smilaxin A, Smilaxin B, Parisvietnaside A, Smilaxin C, (25*R*)-5*α*-Spirostan-3*β*,6*β*-diol-3-*O*-*β*-d-glucopyranosyl-(1 → 4)-[*α*-l-arabinopyranosyl-(1 → 6)]-*β*-d-glucopyranoside, Smilscobinoside B, (25*R*)-5*α*-Spirostan-3*β*,17*α*,27-triol-3-*O*-*β*-d-glucopyranosyl-(1 → 4)-[*α*-l-arabinopyranosyl-(1 → 6)]-*β*-d-glucopyranosie, (25*R*)-5*β*Spirostan-3*β*-ol-3-*O*-*β*-d-glucopyranosyl-(1 → 6)-[*β*-d-

glucopyranosyl-(1 → 4)]-*β*-d-glucopyranoside, (25*R*)-5*β*-Spirostan-3*β*-ol-3-*O*-*β*-d-glucopyranosyl-(1 → 6)-[*β*-d-glucopyranosyl-(1 → 2)]-[*β*-d-glucopyranosyl-(1 → 4)]-*β*-d-glucopyranoside, Disporoside A, (25*R*)-5*β*-Spirostan-3*β*-ol-3-*O*-*β*-d-glucopyranosyl-(1 → 6)-*β*-d-glucopyranoside, (25*R*)-5*β*-Spirostan-3*β*-ol-3-*O*-*β*-d-glucopyranosyl-(1 → 6)-[*β*-d-glucopyranosyl-(1 → 2)]-[*α*-l-rhamnopyranosyl-(l → 4)]-*β*-d-glucopyranoside, Smilagenin 3-*O*-*β*-d-glucopyranoside, Methylprotodioscin, 26-*O*-*β*-d-Glucopyranosyl-(25*R*)-furostan-5-en-3*β*,26-diol-22-methoxy-3-*O*-*α*-l-rhamnopyranosyl-(l → 2)-*β*-d-glucopyranoside, 26-*O*-*β*-d-Glucopyranosyl-22*α*-*O*-methyl-(25*R*)-furost-5-en-3*β*,26-diol-3-*O*-*α*-l-rhamnopyranosyl-(l → 4)-*α*-l-rhamnopyranosyl-(l → 4)-[*α*-l-rhamnopyranosyl-(l → 2)]-*β*-d-glucopyranoside, Protodiosgenin-3-*O*-*α*-l-rhamnopyranosyl-(1 → 4)-*α*-l-rhamnopyranosyl(1 → 4)-[*α*-l-rhamnopyranosyl(1 → 2)]-*β*-d-glucopyranoside, 26-*O*-*β*-d-Glucopyranosyl-22*α*-hydroxy-(25*R*)-furost-5-en-3*β*,26-diol-3-*O*-[4-*O*-acetyl-*α*-l-rhamnopyranosyl]-(l → 2)-[*α*-l-rhamnopyranosyl-(l → 4)]-*β*-d-glucopyranoside, 26-*O*-*β*-d-Glucopyranosyl-22*α*-hydroxy-(25*R*)-furost-5-en-3*β*,26-diol-3-*O*-[2-*O*-acetyl-*α*-l-rhamnopyranosyl]-(l → 2)-[*α*-l-rhamnopyranosyl-(l → 4)]-*β*-d-glucopyranoside, 26-*O*-*β*-d-Glucopyranosyl-22*α*-hydroxy-(25*R*)-furost-5-en-3*β*,26-diol-3-*O*-[3-*O*-acetyl-*α*-l-rhamnopyranosyl]-(l → 2)-[*α*-l-rhamnopyranosyl-(l → 4)]-*β*-d-glucopyranoside, 26-*O*-*β*-d-Glucopyranosyl-(25*R*)-furostan-5-en-3*β*,17*α*-diol-3-*O*-*α*-l-rhamnopyranosyl-(l → 2)-*α*-l-rhamnopyranoside, Protogracillin, Parisaponin I, Parisyunnanoside A, Pseudoprotodioscin, 26-*O*-*β*-d-Glucopyranosyl-(25*R*)-furostan-5,20(22)-dien-3*β*,26-diol-3-*O*-*α*-l-rhamnopyranosyl-(l → 2)-*β*-d-glucopyranoside, 15-Hydroxypseudoprotodioscin, 15-Methoxypseudoprotodioscin, 23-Oxopseudoprotodioscin, 26-*O*-*β*-d-Glucopyranosyl-(25*S*)-5-furosa-20(22)-en-3*β*,26-diol-3-*O*-*α*-l-rhamnopyranosyl-(l → 2)-*O*-[*α*-l-rhamnopyranosyl-(l → 6)]-*β*-d-glucopyranoside, Pseudoproto-pb, 26-*O*-*β*-d-Glucopyranosyl-(25*R*)-5*α*-furostan-3β,22,26-triol-6-one-3-*O*-*α*-l-arabinopyranosyl-(1 → 6)-*β*-d-glucopyranoside, 26-*O*-*β*-d-Glucopyranosyl-(25*R*)-5*α*-furostan-3*β*,22,26-triol-6-one-3-*O*-*β*-d-glucopyranosyl-(1 → 4)-[*α*-l-arabinopyranosyl-(1 → 6)]-*β*-d-glucopyranoside, 26-*O*-*β*-d-Glucopyranosyl-(25*R*)-5*α*-furostan-3*β*,26-diol-22-methoxyl-6-one-3-*O*-*α*-l-arabinopyranosyl-(1 → 6)-*β*-d-glucopyranoside, 26-*O*-*β*-d-Glucopyranosyl-(25*R*)-5*α*-furostan-3*β*,26-diol-22-methoxyl-6-one, 26-*O*-*β*-d-Glucopyranosyl-(25*S*)-5*β*-furostan-3*β*,26-diol-22*α*-methoxy-3-*O*-*β*-d-glucopyranosyl-(1 → 6)-[*β*-d-glucopyranosyl-(1 → 2)]-[*β*-d-glucopyranosyl-(1 → 4)]-*β*-d-glucopyranoside,

(25*S*)-26-*O*-*β*-d-glucopyranosyl-3*β*,5*β*,22*α*-furostan-3,22,26-triol-3-*O*-*α*-l-rhamnopyranosyl-(1 → 2)-*O*-*β*-d-glucopyranosyl-(1 → 2)-*O*-*β*-d-glucopyranoside, Asparagoside E, Asparoside A, Asparoside B, 26-*O*-*β*-d-Glucopyranosyl-(25*S*)-5*β*-furostan-3*β*,22*α*-diol-3-*O*-*α*-l-arabinopyranosyl-(1 → 6)-[*β*-d-glucopyranosyl-(1 → 4)]-*β*-d-glucopyranoside, 26-*O*-*β*-d-Glucopyranosyl-(25*S*)-5*α*-furostan-3*β*,22*α*-diol-3-*O*-*α*-l-arabinopyranosyl-(1 → 6)-[*β*-d-glucopyranosyl-(1 → 4)]-*β*-d-glucopyranoside, 26-*O*-*β*-d-Glucopyranosyl-(25*S*)-5*α*-furostan-3*β*,6*β*,22*α*-tetraol-3-*O*-*α*-l-arabinopyranosyl-(1 → 6)-[*β*-d-glucopyranosyl-(1 → 4)]-*β*-d-glucopyranoside, Sarsaparilloside B, Sarsaparilloside C, Sarsaparilloside, $\Delta^{20(22)}$-Sarsaparilloside, Riparoside A, Smilaxchinoside A, (25*R*)-Smilaxchinoside A, Smilaxchinoside B, Smilaxchinoside C, Dioscoreside E, (25*R*)-5*α*-Furostan-3*β*,26-diol-20(22)-en-6-one-26-*O*-*β*-d-glucopyranoside, (23*R*,25*R*)-5*α*-Furostan-3*β*,23,26-triol-20(22)-en-6-one-26-*O*-*β*-d-glucopyranoside, 26-*O*-*β*-d-Glucopyranosyl-(25*R*)-5*α*-furostan-3*β*,26-diol-20(22)-en-6-one-3-*O*-*α*-l-arabinopyranosyl-(1 → 6)-*β*-d-glucopyranoside, (25*S*)-5*β*-Furostan-1*β*,2*β*,3*β*,5*β*,22*α*,26-hexaol-26-*O*-*β*-d-glucopyranoside, 26-*O*-*β*-d-Glucopyranosyl-(25*S*)-5*β*-furostan-1*β*,3*β*,22*α*,26-tetraol-1-*O*-*β*-d-glucopyranoside, Trinervuloside A, Riparoside B, Timosaponin J, Timosaponin K, Trinervuloside B, Pregna-5,16-diene-3*β*-ol-20-one-3-*O*-*α*-l-rhamnopyranosyl-(1 → 2)-*O*-[*α*-l-rhamnopyranosyl-(1 → 4)]-*β*-d-glucopyranoside, Pregna-5,16-diene-3*β*-ol-20-one-3-*O*-*α*-l-rhamnopyranosyl-(1 → 4)-*α*-l-rhamnopyranosyl-(1 → 4)-[*α*-l-rhamnopyranosyl-(1 → 2)]-*β*-d-glucopyranoside, Pregna-5,16-diene-3*β*-ol-20-one-3-*O*-*α*-l-rhamnopyranosyl-(1 → 2)-[*α*-l-rhamnopyranosyl-(1 → 4)]-*α*-l-rhamnopyranosyl-(1 → 2)-*β*-d-glucopyranoside, Pallidfloside D, Anguivioside XV, Yamogenin, Diosgenin, Smilagenin, Sarsasapogenin, Tigogenin, Neotigogenin, Gitogenin, Yuccagenin, Saponaretin or Smilaxchinoside D.

60. The method of any one of claims 57-59, wherein the steroidal saponin or analog thereof or extract of a plant that comprises a steroidal saponin or an analog thereof comprises a glucosylated steroidal saponins or an aglycone of a steroidal saponin.

61. The method of any one of claims 57-60, wherein the composition is an alcoholic or non-alcoholic beverage, a carbonated beverage, a spice or spicy compound, such as a chili, wasabi, horseradish, mustard, ginger, black pepper, cinnamon, pumpkin spice, Szechuan pepper, allspice or any combination thereof, an astringent compound, such as phenolic compounds, tannins, gallic acid, zinc oxide, zinc sulfate, tannic acid, potassium permanganate,

silver nitrate, tincture of benzoin, potassium alum, caftaric acid, acacia, yarrow, sage, witch hazel, vinegar, tea, fruits, vegetables, dairy products, herbs, nuts or any combination thereof, a bitter compound, such as Absinthin, Aloin, Alpha acid, Amarogentin, Andrographolide, Brucine, Caffeine, Denatonium, Eugenin, Hesperidin, Humulone, Isohumulone, Kaempferol 3-O-rutinoside, 6-Methoxymellein, Naringin, Papaverine, Phenylthiocarbamide, Propylthiouracil, Quassin, Quinidine, Quinine, Salicin, Strychnine, Sucrose octaacetate, Sucrose octapropionate, Theobromine, Theophylline, vegetables, tea, chocolate, fruits or any combination thereof, a sour compound, such as acetic acid, citric acid, hydrochloric acid, lactic acid, malic acid, nitric acid, fumaric acid, sulfuric acid, tartaric acid, phosphoric acid, other acid or any combination thereof, a cooling compound, such as Menthol, Cyclohexanecarboxamide,N-Ethyl-5-Methyl-2-(1- Methylethyl) (WS-3), N-(Ethoxycarbonylmethyl)-3-p-menthanecarboxamide (WS-5), (1R,2S,5R)-N-(4-Methoxyphenyl)-5-methyl-2-(1- methylethyl)cyclohexanecarboxamide (WS-12), Butanamide, N,2,3-trimethyl-2-(1-methylethyl) (WS-23), or Menthyl Lactate or any combination thereof, a compound with an off-taste, such as plant-based milks or products of plant-based milks, dairy products, fruits, juices, proteins, plant protein, whole grain products or any combination thereof.

62. The method of claim 61, wherein the dairy product, plant-based milk, or product of plant-based milk comprises a milk, such as whole milk, nonfat milk, lactose-free milk, buttermilk, condensed milk, cashew milk, goat milk, rick milk, soy milk, oat milk, almond milk, coconut milk, a yogurt, cheese, frosting, pudding, chocolate, custard, ice cream, gelato, sherbet, sorbet, frozen yogurt or any combination thereof.

63. The method of any one of claims 57-62, wherein the plant extract comprising a steroidal saponin is obtained from a plant from any one or more of the following families or genera: Asparagaceae, Amaryllidaceae, Dioscoreaceae, Liliaceae, Costaceae, Melanthiaceae, Plantaginaceae, Fabaceae, Asteraceae, Asparagus, Tupistra, Anemarrhena, Sansevieria, Polygonatum, Nolina, Convallaria, Ophipogon, Hosta, Ornithogalum, Ruscus, Agapanthus, Dioscorea, Fritillaria, Lilium, Costus, Paris, Digitalis, Trigonella, Smilax, or Vernonia.

64. The method of any one of claims 57-63, wherein the plant extract comprising a steroidal saponin is obtained from a plant from any one or more of the following species: *Smilax riparia*, *Smilax lanceaefolia*, *Smilax nipponica*, *Smilax nigrescens*, *Smilax officinalis*,

Smilax aspera subsp. Mauritanica, *Smilax aristolochiifolia*, *Smilax ornate*, *Smilax glabra*, *Smilax china*, *Smilax menispermoides*, *Smilax lebrunii*, *Smilax stans*, *Smilax bockii*, *Smilax excelsa*, *Smilax microphylla*, *Smilax scobinicaulis*, *Smilax sieboldii*, *Smilax krausiana*, *Smilax medica*, *Asparagus acutifolius*, *Asparagus aethiopicus*, *Asparagus africanus*, *Asparagus asparagoides*, *Asparagus burchellii*, *Asparagus cochinchinensis*, *Asparagus declinatus*, *Asparagus capensis*, *Asparagus curillus*, *Asparagus densiflorus*, *Asparagus exuvialis*, *Asparagus falcatus*, *Asparagus fallax*, *Asparagus flagellaris*, *Asparagus horridus*, *Asparagus krebsianus*, *Asparagus laricinus*, *Asparagus lignosus*, *Asparagus macowanii*, *Asparagus mariae*, *Asparagus maritimus*, *Asparagus mucronatus*, *Asparagus multiflorus*, *Asparagus nesiotes*, *Asparagus officinalis*, *Asparagus ovatus*, *Asparagus pastorianus*, *Asparagus persicus*, *Asparagus racemosus*, *Asparagus retrofractus*, *Asparagus rubicundus*, *Asparagus scandens*, *Asparagus schoberioides*, *Asparagus scoparius*, *Asparagus setaceus*, *Asparagus striatus*, *Asparagus suaveolens*, *Asparagus tenuifolius*, *Asparagus umbellatus*, *Asparagus vaginellatus*, *Trigonella foenum graecum* or *Asparagus virgatus*.

65. The method of any one of claims 57-64, wherein the mixture provides a taste perception in the subject of a reduction in bitterness or bitterness perception, a masking of bitter tastes or bitterness, a reduction in sourness or sourness perception, a masking of sour tastes or sourness, a reduction in initial sourness perception or lingering sourness perception, a reduction in astringency or astringency perception, a masking of astringency, or a masking of off tastes when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

66. The method of any one of claims 57-65, wherein the mixture provides a taste perception in the subject of masked cooked tastes, masked metallic tastes, enhanced beer flavor, enhanced alcohol flavor, enhanced retro-nasal effect, increased bitterness perception, enhanced alcohol perception, enhanced spice intensity, increased sour perception, enhanced cooling intensity, faster onset of cooling sensation, increased duration of taste, or reduced stinging taste when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

67. The method of any one of claims 57-66, wherein the mixture increases the amount of carbonation bubbles or reduces the carbonation bubble size of a beverage when the mixture is provided to the subject, such as when the mixture is incorporated in a beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

68. The method of any one of claims 57-67, wherein the food or beverage or granule, powder, or liquid formulation is selected from water, a carbonated beverage, such as a carbonated fruit beverage, carbonated cola drink or carbonated water, alcoholic beverages, alcohol-free beverages, spices and/or seasonings, such as chili, wasabi, horseradish, mustard, ginger, black pepper, or cinnamon, energy beverages, flavored water, powders for drinks, dairy products, such as milk, yogurt, cheese, or ice cream, plant based milks, products of plant based milk, puddings, cakes, shakes, malts, brownies, pastries, cookies, cheesecakes, fudge, pies, cobblers, parfaits, mousse, biscuits, custards, frosting, fruits, vegetables, hard candy, soft candy, taffy, chocolates, sugarless candies, chewing gum, bubble gum, juices, teas, coffees, salsa, gel beads, film strips for breath, gelatin candies, pectin candies, starch candies, lozenges, cough drops, throat lozenges, throat sprays, toothpastes or mouth rinses.

69. The method of any one of claims 57-68, wherein the amount of component (a) in the mixture is at least 2 ppm, such as, 3, 4, 5, 7.5, 10, 20, 30, 40, 50, 60, 70, 80, 90, 100, 110, 120, 130, 140, 150, 160, 170, 180, 190, 200, 210, 220, 230, 240, 250, 260, 270, 280, 290, or 300 ppm or an amount within a range defined by any two of the aforementioned amounts, preferably 2-40 ppm, 6-75 ppm, 6-100 ppm, or 12-200 ppm.

70. The method of any one of claims 57-69, wherein component (a) is dissolved in food grade ethanol.

71. The method of claim 70, wherein the food grade ethanol is at least 1%, such as 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 15, 20, 25, 30, 35, 40, 45, 50, 60, 70, 80, 85, 90, 95, or 100%, or with a range defined by any two of the aforementioned amounts, preferably 80, 90, or 95%.

72. A composition obtained or obtainable by the method of any one of claims 57-71.

73. A mixture suitable for modulating a subject's taste perception of alcohol, spice, cooling, carbonation, astringency, bitterness, or sourness or for masking off-tastes, wherein the mixture comprises at least two components (a) and (b):

(a) a steroidal saponin or analog thereof (for example, a glycosylation molecule of an aglycone, an aglycone of a glycosylated molecule, or a further glycosylated molecule of a glycosylated molecule) or an extract of a plant that comprises a steroidal saponin or an analog thereof, such as an *Asparagus racemosus* rhizome extract, a *Trigonella foenum graecum L.* extract or a *Smilax china* extract; and

(b) a composition comprising an alcohol, a spice, a cooling compound, carbonation, an astringent compound, a bitter compound, a sour compound, or a compound with an off-taste; wherein component (a) is admixed with component (b);

preferably, wherein the mixture is provided in a food, beverage, granule, powder or liquid formulation; and

optionally, wherein the mixture comprises one or more preservatives or antioxidants, such as a sulphite, sorbic acid, a sorbate compound, benzoic acid, benzoate, propionic acid, propionate, ascorbic acid, ascorbate, citric acid, a tocopherol, a retinol, a polyphenol, a phenolic acid, a flavonoid, lipoic acid, N-acetylcysteine, butylated hydroxyanisole, butylated hydroxytoluene or derivatives thereof, preferably, wherein the one or more preservatives or antioxidants improve the shelf-life, flavor profile, or reduce spoilage of the mixture.

74. The mixture of claim 73, wherein the steroidal saponin has one of the following sapogenin structures: spirostane, isospirostane, furostane, pregnane, or cholestane.

75. The mixture of any one of claims 73 or 74, wherein the steroidal saponin or extract of a plant that comprises a steroidal saponin or an analog thereof comprises saponins selected from one or more of the following: Shatavarin I, Shatavarin VIII, Protodioscin, Shatavarin IV, Shatarvain IX, Asparagoside A, Asparenydiol, Asparacosin A, Asparoside B, Sarsasapogenin, Schidigera saponin D5, Shatavarin VI, Immunoside, Shatavarin VII, Shatavarin X, Aspoligonin A, Prosapogenin A, Methyl gracillin, Methyl protodioscin, Neotigogenin-3-*O*-α-l-rhamnopyranosyl-(1 → 6)-β-d-glucopyranoside, Neotigogenin-3-*O*-β-d-glucopyranosyl-(1 → 4)-*O*-[α-l-rhamnopyranosyl-(1 → 6)]-β-d-glucopyranoside, Neotigogenin-3-*O*-β-d-glucopyranoside, Smilanippin A, Neotigogenin-3-*O*-β-d-

glucopyranosyl-(1 → 4)-*O*-[α-l-arabinopyranosyl-(1 → 6)]-β-d-glucopyranoside, Sarsasapogenin-3-*O*-β-d-glucopyranosyl-(1 → 4)-[α-l-arabinopyranosyl- (1 → 6)]-β-d-glucopyranoside, (25S)-5β-Spirostane-3β-ol-3-*O*-α-l-rhamnopyranosyl-(1 → 2)-β-d-glucopyranosyl-(1 → 2)-β-d-glucopyranoside, Curillin G, Parillin, (25*S*)-Spirostan-6β-ol-3-*O*-β-d-glucopyranosyl-(1 → 4)-*O*-[α-l-arabinopyranosyl-(1 → 6)]-β-d-glucopyranoside, Trinervuloside C, Diosgenin-3-*O*-α-l-rhamnopyranoside, Dioscin, Diosgenin-3-*O*-[α-l-rhamnopyranosyl-(l → 4)]-β-d-glucopyranoside, Diosgenin-3-*O*-[α-l-rhamnopyranosyl-(l → 2)]-β-d-glucopyranoside, (25*R*)-Spirostan-5-en-3-*O*-α-l-rhamnopyranosyl-(l → 2)-[α-l-rhamnopyranosyl-(l → 4)-α-l-rhamnopyranosyl-(l → 4)]-*O*-β-d-glucopyranoside, Gracillin, Parisyunnanoside C, Parisyunnanoside D, Parisyunnanoside E, Paris D, Paris H, (25*R*)-Spirost-5-en-3β,17α,27-triol-3-*O*-α-l-rhamnopyranosyl-(l → 2)-[α-l-rhamnopyranosyl-(l → 4)]-β-d-glucopyranoside, (25*S*)-Spirostan-5-en-3β,17α,27-triol-3-*O*-α-l-arabinopyranosyl-(1 → 6)-β-d-glucopyranoside, (25*S*)-Spirostan-5-en-3β,17α,27-triol-3-*O*-β-d-glucopyranosyl-(1 → 4)-[α-l-arabinopyranosyl-(1 → 6)]-β-d-glucopyranoside, (25*S*)-spirost-5-ene-3β,17α,27-triol-3-*O*-α-l-rhamnopyranosyl-(l → 4)-β-d-glucopyranoside, (25*S*)-Spirost-5-en-3β,17α,27-triol-3-*O*-β-d-galactopyranoside, (25*S*)-Spirostan-5-en-3β,27-diol-3-*O*-α-l-arabinopyranosyl-(1 → 6)-β-d- glucopyranoside, Isonarthogenin3-*O*-α-l-rhamnopyranosyl-(l → 2)-*O*-[α-l-rhamnopyranosyl-(l → 4)]-β-d-glucopyranoside, Smilscobinoside A, Sieboldiin A, Sieboldiin B, Sieboldogenin, (25*R*)-5α-Spirostan-3β-ol-6-one-3-*O*-[α-l-arabinopyranosyl-(l → 4)]-β-d-glucopyranoside, Smilaxin A, Smilaxin B, Parisvietnaside A, Smilaxin C, (25*R*)-5α-Spirostan-3β,6β-diol-3-*O*-β-d-glucopyranosyl-(1 → 4)-[α-l-arabinopyranosyl-(1 → 6)]-β-d-glucopyranoside, Smilscobinoside B, (25*R*)-5α-Spirostan-3β,17α,27-triol-3-*O*-β-d-glucopyranosyl-(1 → 4)-[α-l-arabinopyranosyl-(1 → 6)]-β-d-glucopyranosie, (25*R*)-5βSpirostan-3β-ol-3-*O*-β-d-glucopyranosyl-(1 → 6)-[β-d-glucopyranosyl-(1 → 4)]-β-d-glucopyranoside, (25*R*)-5β-Spirostan-3β-ol-3-*O*-β-d-glucopyranosyl-(1 → 6)-[β-d-glucopyranosyl-(1 → 2)]-[β-d-glucopyranosyl-(1 → 4)]-β-d-glucopyranoside, Disporoside A, (25*R*)-5β-Spirostan-3β-ol-3-*O*-β-d-glucopyranosyl-(1 → 6)-β-d-glucopyranoside, (25*R*)-5β-Spirostan-3β-ol-3-*O*-β-d-glucopyranosyl-(1 → 6)-[β-d-glucopyranosyl-(1 → 2)]-[α-l-rhamnopyranosyl-(l → 4)]-β-d-glucopyranoside, Smilagenin 3-*O*-β-d-glucopyranoside, Methylprotodioscin, 26-*O*-β-d-Glucopyranosyl-(25*R*)-furostan-5-en-3β,26-diol-22-methoxy-3-*O*-α-l-rhamnopyranosyl-(l → 2)-β-d-glucopyranoside, 26-*O*-β-d-

Glucopyranosyl-22α-*O*-methyl-(25*R*)-furost-5-en-3β,26-diol-3-*O*-α-l-rhamnopyranosyl-(l → 4)-α-l-rhamnopyranosyl-(l → 4)-[α-l-rhamnopyranosyl-(l → 2)]-β-d-glucopyranoside, Protodiosgenin-3-*O*-α-l-rhamnopyranosyl-(1 → 4)-α-l-rhamnopyranosyl(1 → 4)-[α-l-rhamnopyranosyl(1 → 2)]-β-d-glucopyranoside, 26-*O*-β-d-Glucopyranosyl-22α-hydroxy-(25*R*)-furost-5-en-3β,26-diol-3-*O*-[4-*O*-acetyl-α-l-rhamnopyranosyl]-(l → 2)-[α-l-rhamnopyranosyl-(l → 4)]-β-d-glucopyranoside, 26-*O*-β-d-Glucopyranosyl-22α-hydroxy-(25*R*)-furost-5-en-3β,26-diol-3-*O*-[2-*O*-acetyl-α-l-rhamnopyranosyl]-(l → 2)-[α-l-rhamnopyranosyl-(l → 4)]-β-d-glucopyranoside, 26-*O*-β-d-Glucopyranosyl-22α-hydroxy-(25*R*)-furost-5-en-3β,26-diol-3-*O*-[3-*O*-acetyl-α-l-rhamnopyranosyl]-(l → 2)-[α-l-rhamnopyranosyl-(l → 4)]-β-d-glucopyranoside, 26-*O*-β-d-Glucopyranosyl-(25*R*)-furostan-5-en-3β,17α-diol-3-*O*-α-l-rhamnopyranosyl-(l → 2)-α-l-rhamnopyranoside, Protogracillin, Parisaponin I, Parisyunnanoside A, Pseudoprotodioscin, 26-*O*-β-d-Glucopyranosyl-(25*R*)-furostan-5,20(22)-dien-3β,26-diol-3-*O*-α-l-rhamnopyranosyl-(l → 2)-β-d-glucopyranoside, 15-Hydroxypseudoprotodioscin, 15-Methoxypseudoprotodioscin, 23-Oxopseudoprotodioscin, 26-*O*-β-d-Glucopyranosyl-(25*S*)-5-furosa-20(22)-en-3β,26-diol-3-*O*-α-l-rhamnopyranosyl-(l → 2)-*O*-[α-l-rhamnopyranosyl-(l → 6)]-β-d-glucopyranoside, Pseudoproto-pb, 26-*O*-β-d-Glucopyranosyl-(25*R*)-5α-furostan-3β,22,26-triol-6-one-3-*O*-α-l-arabinopyranosyl-(1 → 6)-β-d-glucopyranoside, 26-*O*-β-d-Glucopyranosyl-(25*R*)-5α-furostan-3β,22,26-triol-6-one-3-*O*-β-d-glucopyranosyl-(1 → 4)-[α-l-arabinopyranosyl-(1 → 6)]-β-d-glucopyranoside, 26-*O*-β-d-Glucopyranosyl-(25*R*)-5α-furostan-3β,26-diol-22-methoxyl-6-one-3-*O*-α-l-arabinopyranosyl-(1 → 6)-β-d-glucopyranoside, 26-*O*-β-d-Glucopyranosyl-(25*R*)-5α-furostan-3β,26-diol-22-methoxyl-6-one, 26-*O*-β-d-Glucopyranosyl-(25*S*)-5β-furostan-3β,26-diol-22α-methoxy-3-*O*-β-d-glucopyranosyl-(1 → 6)-[β-d-glucopyranosyl-(1 → 2)]-[β-d-glucopyranosyl-(1 → 4)]-β-d-glucopyranoside, (25*S*)-26-*O*-β-d-glucopyranosyl-3β,5β,22α-furostan-3,22,26-triol-3-*O*-α-l-rhamnopyranosyl-(l → 2)-*O*-β-d-glucopyranosyl-(l → 2)-*O*-β-d-glucopyranoside, Asparagoside E, Asparoside A, Asparoside B, 26-*O*-β-d-Glucopyranosyl-(25*S*)-5β-furostan-3β,22α-diol-3-*O*-α-l-arabinopyranosyl-(l → 6)-[β-d-glucopyranosyl-(1 → 4)]-β-d-glucopyranoside, 26-*O*-β-d-Glucopyranosyl-(25*S*)-5α-furostan-3β,22α-diol-3-*O*-α-l-arabinopyranosyl-(l → 6)-[β-d-glucopyranosyl-(1 → 4)]-β-d-glucopyranoside, 26-*O*-β-d-Glucopyranosyl-(25*S*)-5α-furostan-3β,6β,22α-tetraol-3-*O*-α-l-arabinopyranosyl-(l → 6)-[β-d-glucopyranosyl-(1 → 4)]-β-d-

glucopyranoside, Sarsaparilloside B, Sarsaparilloside C, Sarsaparilloside, $\Delta^{20(22)}$-Sarsaparilloside, Riparosidc A, Smilaxchinosidc A, (25*R*)-Smilaxchinosidc A, Smilaxchinoside B, Smilaxchinoside C, Dioscoreside E, (25*R*)-5α-Furostan-3β,26-diol-20(22)-en-6-one-26-*O*-β-d-glucopyranoside, (23*R*,25*R*)-5α-Furostan-3β,23,26-triol-20(22)-en-6-one-26-*O*-β-d-glucopyranoside, 26-*O*-β-d-Glucopyranosyl-(25*R*)-5α-furostan-3β,26-diol-20(22)-en-6-one-3-*O*-α-l-arabinopyranosyl-(1 → 6)-β-d-glucopyranoside, (25*S*)-5β-Furostan-1β,2β,3β,5β,22α,26-hexaol-26-*O*-β-d-glucopyranoside, 26-*O*-β-d-Glucopyranosyl-(25*S*)-5β-furostan-1β,3β,22α,26-tetraol-1-*O*-β-d-glucopyranoside, Trinervuloside A, Riparoside B, Timosaponin J, Timosaponin K, Trinervuloside B, Pregna-5,16-diene-3β-ol-20-one-3-*O*-α-l-rhamnopyranosyl-(1 → 2)-*O*-[α-l-rhamnopyranosyl-(1 → 4)]-β-d-glucopyranoside, Pregna-5,16-diene-3β-ol-20-one-3-*O*-α-l-rhamnopyranosyl-(1 → 4)-α-l-rhamnopyranosyl-(1 → 4)-[α-l-rhamnopyranosyl-(1 → 2)]-β-d-glucopyranoside, Pregna-5,16-diene-3β-ol-20-one-3-*O*-α-l-rhamnopyranosyl-(1 → 2)-[α-l-rhamnopyranosyl-(1 → 4)]-α-l-rhamnopyranosyl-(1 → 2)-β-d-glucopyranoside, Pallidfloside D, Anguivioside XV, Yamogenin, Diosgenin, Smilagenin, Sarsasapogenin, Tigogenin, Neotigogenin, Gitogenin, Yuccagenin, Saponaretin or Smilaxchinoside D.

76. The mixture for use of any one of claims 73-75, wherein the steroidal saponin or analog thereof or extract of a plant that comprises a steroidal saponin or an analog thereof comprises a glucosylated steroidal saponin or an aglycone of a steroidal sanponin.

77. The mixture of any one of claims 73-76, wherein the composition is an alcoholic or non-alcoholic beverage, a carbonated beverage, a spice or spicy compound, such as a chili, wasabi, horseradish, mustard, ginger, black pepper, cinnamon, pumpkin spice, Szechuan pepper, allspice or any combination thereof, an astringent compound, such as phenolic compounds, tannins, gallic acid, zinc oxide, zinc sulfate, tannic acid, potassium permanganate, silver nitrate, tincture of benzoin, potassium alum, caftaric acid, acacia, yarrow, sage, witch hazel, vinegar, tea, fruits, vegetables, dairy products, herbs, nuts or any combination thereof, a bitter compound, such as Absinthin, Aloin, Alpha acid, Amarogentin, Andrographolide, Brucine, Caffeine, Denatonium, Eugenin, Hesperidin, Humulone, Isohumulone, Kaempferol 3-O-rutinoside, 6-Methoxymellein, Naringin, Papaverine, Phenylthiocarbamide, Propylthiouracil, Quassin, Quinidine, Quinine, Salicin, Strychnine, Sucrose octaacetate, Sucrose octapropionate, Theobromine, Theophylline, vegetables, tea,

chocolate, fruits or any combination thereof, a sour compound, such as acetic acid, citric acid, hydrochloric acid, lactic acid, malic acid, nitric acid, fumaric acid, sulfuric acid, tartaric acid, phosphoric acid, other acid or any combination thereof, a cooling compound, such as Menthol, Cyclohexanecarboxamide,N-Ethyl-5-Methyl-2-(1- Methylethyl) (WS-3), N-(Ethoxycarbonylmethyl)-3-p-menthanecarboxamide (WS-5), (1R,2S,5R)-N-(4-Methoxyphenyl)-5-methyl-2-(1- methylethyl)cyclohexanecarboxamide (WS-12), Butanamide, N,2,3-trimethyl-2-(1-methylethyl) (WS-23), or Menthyl Lactate or any combination thereof, a compound with an off-taste, such as plant-based milks or products of plant-based milks, dairy products, fruits, juices, proteins, plant protein, whole grain products or any combination thereof.

78. The mixture of claim 77, wherein the dairy product, plant-based milk, or product of plant-based milk comprises a milk, such as whole milk, nonfat milk, lactose-free milk, buttermilk, condensed milk, cashew milk, goat milk, rick milk, soy milk, oat milk, almond milk, coconut milk, a yogurt, cheese, frosting, pudding, chocolate, custard, ice cream, gelato, sherbet, sorbet, frozen yogurt or any combination thereof.

79. The mixture of any one of claims 73-78, wherein the plant extract comprising a steroidal saponin is obtained from a plant from any one or more of the following families or genera: Asparagaceae, Amaryllidaceae, Dioscoreaceae, Liliaceae, Costaceae, Melanthiaceae, Plantaginaceae, Fabaceae, Asteraceae, Asparagus, Tupistra, Anemarrhena, Sansevieria, Polygonatum, Nolina, Convallaria, Ophipogon, Hosta, Ornithogalum, Ruscus, Agapanthus, Dioscorea, Fritillaria, Lilium, Costus, Paris, Digitalis, Trigonella, Smilax or Vernonia.

80. The mixture of any one of claims 73-79, wherein the plant extract comprising a steroidal saponin is obtained from a plant from any one or more of the following species: *Smilax riparia*, *Smilax lanceaefolia*, *Smilax nipponica*, *Smilax nigrescens*, *Smilax officinalis*, *Smilax aspera subsp. Mauritanica*, *Smilax aristolochiifolia*, *Smilax ornate*, *Smilax glabra*, *Smilax china*, *Smilax menispermoides*, *Smilax lebrunii*, *Smilax stans*, *Smilax bockii*, *Smilax excelsa*, *Smilax microphylla*, *Smilax scobinicaulis*, *Smilax sieboldii*, *Smilax krausiana*, *Smilax medica*, *Asparagus acutifolius*, *Asparagus aethiopicus*, *Asparagus africanus*, *Asparagus asparagoides*, *Asparagus burchellii*, *Asparagus cochinchinensis*, *Asparagus declinatus*, *Asparagus capensis*, *Asparagus curillus*, *Asparagus densiflorus*, *Asparagus exuvialis*, *Asparagus falcatus*, *Asparagus fallax*, *Asparagus flagellaris*, *Asparagus horridus*, *Asparagus*

krebsianus, *Asparagus laricinus*, *Asparagus lignosus*, *Asparagus macowanii*, *Asparagus mariae*, *Asparagus maritimus*, *Asparagus mucronatus*, *Asparagus multiflorus*, *Asparagus nesiotes*, *Asparagus officinalis*, *Asparagus ovatus*, *Asparagus pastorianus*, *Asparagus persicus*, *Asparagus racemosus*, *Asparagus retrofractus*, *Asparagus rubicundus*, *Asparagus scandens*, *Asparagus schoberioides*, *Asparagus scoparius*, *Asparagus setaceus*, *Asparagus striatus*, *Asparagus suaveolens*, *Asparagus tenuifolius*, *Asparagus umbellatus*, *Asparagus vaginellatus*, *Trigonella foenum graecum* or *Asparagus virgatus*.

81. The mixture of any one of claims 73-80, wherein the mixture provides a taste perception in the subject of a reduction in bitterness or bitterness perception, a masking of bitter tastes or bitterness, a reduction in sourness or sourness perception, a masking of sour tastes or sourness, a reduction in initial sourness perception or lingering sourness perception, a reduction in astringency or astringency perception, a masking of astringency, or a masking of off tastes when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

82. The mixture of any one of claims 73-81, wherein the mixture provides a taste perception in the subject of masked cooked tastes, masked metallic tastes, enhanced beer flavor, enhanced alcohol flavor, enhanced retro-nasal effect, increased bitterness perception, enhanced alcohol perception, enhanced spice intensity, increased sour perception, enhanced cooling intensity, faster onset of cooling sensation, increased duration of taste, or reduced stinging taste when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

83. The mixture of any one of claims 57-82, wherein the mixture increases the amount of carbonation bubbles or reduces the carbonation bubble size of a beverage when the mixture is provided to the subject, such as when the mixture is incorporated in a beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

84. The mixture of any one of claims 73-83, wherein the food or beverage or granule, powder, or liquid formulation is selected from water, a carbonated beverage, such as a carbonated fruit beverage, carbonated cola drink or carbonated water, alcoholic beverages,

alcohol-free beverages, spices and/or seasonings, such as chili, wasabi, horseradish, mustard, ginger, black pepper, or cinnamon, energy beverages, flavored water, powders for drinks, dairy products, such as milk, yogurt, cheese, or ice cream, plant based milks, products of plant based milk, puddings, cakes, shakes, malts, brownies, pastries, cookies, cheesecakes, fudge, pies, cobblers, parfaits, mousse, biscuits, custards, frosting, fruits, vegetables, hard candy, soft candy, taffy, chocolates, sugarless candies, chewing gum, bubble gum, juices, teas, coffees, salsa, gel beads, film strips for breath, gelatin candies, pectin candies, starch candies, lozenges, cough drops, throat lozenges, throat sprays, toothpastes or mouth rinses.

85. The mixture of any one of claims 73-84, wherein the amount of component (a) in the mixture is at least 2 ppm, such as, 3, 4, 5, 7.5, 10, 20, 30, 40, 50, 60, 70, 80, 90, 100, 110, 120, 130, 140, 150, 160, 170, 180, 190, 200, 210, 220, 230, 240, 250, 260, 270, 280, 290, or 300 ppm or an amount within a range defined by any two of the aforementioned amounts, preferably 2-40 ppm, 6-75 ppm, 6-100 ppm, or 12-200 ppm.

86. The mixture of any one of claims 73-85 further comprising selecting or identifying a subject to receive a composition, which modulates a taste perception in a subject, such as alcohol, spice, cooling carbonation, bitterness, sourness, or astringency, or which masks off-tastes in a subject, such as bitter or sour tastes.

87. The mixture of any one of claims 73-86 further comprising determining or analyzing the alcohol perception, bitterness perception, bitterness intensity, the masking of bitterness, the sourness perception, sourness intensity, the masking of sourness, astringency perception, astringency intensity, the masking of astringency, or the masking of off-tastes or any combination thereof of the subject after consuming said mixture or determining or analyzing the increase of carbonation bubbles, the reduction of carbonation bubble size of a carbonated beverage after providing composition component (a).

88. The mixture of claims 73-87, wherein component (a) is dissolved in food grade ethanol.

89. The mixture of claim 88, wherein the food grade ethanol is at least 1%, such as 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 15, 20, 25, 30, 35, 40, 45, 50, 60, 70, 80, 85, 90, 95, or 100%, or with a range defined by any two of the aforementioned amounts, preferably 80, 90, or 95%.

90. A method for modulating a subject's taste perception of astringency, bitterness, acidity, or sourness or masking off-tastes, the method comprising:

providing a subject a mixture that comprises at least two components (a) and (b):

(a) an iridoid glycoside or analog thereof (for example, a glycosylation molecule of an aglycone, an aglycone of a glycosylated molecule, or a further glycosylated molecule of a glycosylated molecule) or an extract of a plant that comprises an iridoid glycoside or an analog thereof, such as a *Rehmannia glutinosa* root extract; and

(b) a composition comprising an astringent compound, a bitter compound, a sour compound, an acidic compound, or a compound with an off-taste; wherein component (a) is admixed with component (b);

wherein the mixture is preferably provided in a food, beverage, granule, powder or liquid formulation; and

optionally, wherein the mixture comprises one or more preservatives or antioxidants, such as a sulphite, sorbic acid, a sorbate compound, benzoic acid, benzoate, propionic acid, propionate, ascorbic acid, ascorbate, citric acid, a tocopherol, a retinol, a polyphenol, a phenolic acid, a flavonoid, lipoic acid, N-acetylcysteine, butylated hydroxyanisole, butylated hydroxytoluene or derivatives thereof, preferably, wherein the one or more preservatives or antioxidants improve the shelf-life, flavor profile, or reduce spoilage of the mixture; and/or

optionally, selecting a composition that comprises an astringent compound, a bitter compound, a sour compound, an acidic compound, or a compound with an off-taste for receiving an agent that modulates the taste perception of a subject of astringency, bitterness, acidity, or sourness or masks off-tastes and providing said selected composition component (a); and/or

optionally, evaluating the modulation of a subject's taste perception of astringency, bitterness, acidity, or sourness or evaluating the masking of off-tastes after providing the subject the mixture.

91. The method of claim 90, wherein the iridoid glycoside or extract of a plant that comprises an iridoid glycoside comprises iridoid glycosides selected from one or more of the following: Aucubin, Catalpol, Rehmannioside A, Rehmannioside B, Rehmannioside C, Rehmannioside D, Rehmannioside E, or Rehmannioside F.

92. The method of any one of claims 90 or 91, wherein the iridoid glycoside or analog thereof or extract of a plant that comprises an iridoid glycoside or analog thereof comprises a glucosylated iridoid glycoside or an aglycones of an iridoid glycoside.

93. The method of any one of claims 90-92, wherein the composition is an alcoholic or non-alcoholic beverage, an astringent compound, such as phenolic compounds, tannins, tannic acid, citric acid, gallic acid, zinc oxide, zinc sulfate, tannic acid, potassium permanganate, silver nitrate, tincture of benzoin, potassium alum, caftaric acid, acacia, yarrow, sage, witch hazel, vinegar, tea, fruits, vegetables, dairy products, herbs, nuts or any combination thereof, a bitter compound, such as Absinthin, Aloin, Alpha acid, Amarogentin, Andrographolide, Brucine, Caffeine, Denatonium, Eugenin, Hesperidin, Humulone, Isohumulone, Kaempferol 3-O-rutinoside, 6-Methoxymellein, Naringin, Papaverine, Phenylthiocarbamide, Propylthiouracil, Quassin, Quinidine, Quinine, Salicin, Strychnine, Sucrose octaacetate, Sucrose octapropionate, Theobromine, Theophylline, vegetables, tea, chocolate, fruits or any combination thereof, a sour compound, such as acetic acid, citric acid, hydrochloric acid, lactic acid, malic acid, nitric acid, fumaric acid, sulfuric acid, tartaric acid, phosphoric acid, other acid or any combination thereof, a compound with an off-taste, such as plant-based milks or products of plant-based milks, dairy products, fruits, juices, proteins, plant protein, whole grain products or any combination thereof.

94. The method of claim 93, wherein the dairy product, plant-based milk, or product of plant-based milk comprises a milk, such as whole milk, nonfat milk, lactose-free milk, buttermilk, condensed milk, cashew milk, goat milk, rick milk, soy milk, oat milk, almond milk, coconut milk, a yogurt, cheese, frosting, pudding, chocolate, custard, ice cream, gelato, sherbet, sorbet, frozen yogurt or any combination thereof.

95. The method of any one of claims 90-94, wherein the plant extract comprising an iridoid glycoside is obtained from a plant from any one or more of the following families or genera: Cornaceae, Gentianaceae, Eucommiaceae, Scrophulariaceae, Rubiaceae, Lamiaceae, Pedaliaceae, Verbenaceae, Bignoniaceae, Gentiana, Rehmannia, or Antirrhinum.

96. The method of any one of claims 90-95, wherein the plant extract comprising an iridoid glycoside is obtained from a plant from any one or more of the following species: *Coronus officinalis*, *Eucommia ulmoides*, *Gardenia jasminoides*, *Stachys betonica*, *Harpagophytum procumbens*, *Rehmannia glutinosa*, *Rehmannia chingii*, *Rehmannia*

chrysantha, *Rehmannia henryi*, *Rehmannia japonica*, *Rehmannia piasezkii*, *Rehmannia solanifolia*, *Verbena officinalis*, or *Kigelia pinnata*.

97. The method of any one of claims 90-96, wherein the mixture provides a taste perception in the subject of a reduction in bitterness or bitterness perception, a masking of bitter tastes or bitterness, a reduction in sourness or sourness perception, a masking of sour tastes or sourness, a reduction in initial sourness perception or lingering sourness perception, a reduction in acidic taste or acidic taste perception, a reduction in lingering acidic taste perception, a reduction in astringency or astringency perception, a masking of astringency, a masking of acidic tastes, or a masking of off tastes when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

98. The method of any one of claims 90-97, wherein the mixture provides a taste perception in the subject of an enhancement of creaminess, creamy flavor, or creaminess perception, an enhancement of fattiness, fatty flavor, or fattiness perception, an enhancement in fruitiness, fruity flavor, or fruitiness perception, an enhancement of brightness, bright flavor, or bright perception or an increase of sweetness or sweetness perception when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

99. The method of any one of claims 90-98, wherein the mixture modulates a subject's acidity taste perception when the mixture is provided to the subject without negatively affecting the shelf life of a food or beverage or without increasing the pH of the food or beverage when the mixture is incorporated into the food or beverage.

100. The method of any one of claims 90-99, wherein the food or beverage or granule, powder, or liquid formulation is selected from water, a carbonated beverage, such as a carbonated fruit beverage, carbonated cola drink or carbonated water, alcoholic beverages, alcohol-free beverages, spices and/or seasonings, such as chili, wasabi, horseradish, mustard, ginger, black pepper, or cinnamon, energy beverages, flavored water, powders for drinks, dairy products, such as milk, yogurt, cheese, or ice cream, plant based milks, products of plant based milk, puddings, cakes, shakes, malts, brownies, pastries, cookies, cheesecakes, fudge, pies,

cobblers, parfaits, mousse, biscuits, custards, frosting, fruits, vegetables, hard candy, soft candy, taffy, chocolates, sugarless candies, chewing gum, bubble gum, juices, teas, coffees, salsa, gel beads, film strips for breath, gelatin candies, pectin candies, starch candies, lozenges, cough drops, throat lozenges, throat sprays, toothpastes or mouth rinses.

101. The method of any one of claims 90-100, wherein the amount of component (a) in the mixture is at least 2 ppm, such as, 3, 4, 5, 7.5, 10, 20, 30, 40, 50, 60, 70, 80, 90, 100, 110, 120, 130, 140, 150, 160, 170, 180, 190, 200, 210, 220, 230, 240, 250, 260, 270, 280, 290, or 300 ppm or an amount within a range defined by any two of the aforementioned amounts, preferably 2-40 ppm, 6-75 ppm, 6-100 ppm, or 50-300 ppm.

102. The method of any one of claims 90-101 further comprising selecting or identifying a subject to receive a composition, which modulates a taste perception in a subject, such as bitterness, sourness, or astringency, or which masks off-tastes in a subject, such as bitter or sour tastes.

103. The method of any one of claims 90-102 further comprising determining or analyzing the bitterness perception, bitterness intensity, the masking of bitterness, the sourness perception, sourness intensity, the masking of sourness, sweetness perception, sweetness intensity, astringency perception, astringency intensity, the masking of astringency, the masking of acidic tastes, the enhancement of creaminess, creamy flavor, or creaminess perception, an enhancement of fattiness, fatty flavor, or fattiness perception, an enhancement in fruitiness, fruity flavor, or fruitiness perception, or the masking of off-tastes or any combination thereof of the subject after consuming said mixture.

104. The method of any one of claims 90-103, wherein component (a) is dissolved in food grade ethanol.

105. The method of claim 104, wherein the food grade ethanol is at least 1%, such as 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 15, 20, 25, 30, 35, 40, 45, 50, 60, 70, 80, 85, 90, 95, or 100%, or with a range defined by any two of the aforementioned amounts, preferably 80, 90, or 95%.

106. A method of making a mixture, which modulates a subject's taste perception of astringency, bitterness, acidity, or sourness or masking off-tastes, the method comprising:

admixing a component (a) with a component (b) to form said mixture:

(a) an iridoid glycoside or analog thereof (for example, a glycosylation molecule of an aglycone, an aglycone of a glycosylated molecule, or a

further glycosylated molecule of a glycosylated molecule) or an extract of a plant that comprises an iridoid glycoside or an analog thereof, such as a *Rehmannia glutinosa* root extract; and

(b) a composition comprising an astringent compound, a bitter compound, a sour compound, an acidic compound, or a compound with an off-taste; wherein component (a) is admixed with component (b);

wherein the mixture is preferably provided in a food, beverage, granule, powder or liquid formulation; and

optionally, wherein the composition comprises one or more preservatives or antioxidants, such as a sulphite, sorbic acid, a sorbate compound, benzoic acid, benzoate, propionic acid, propionate, ascorbic acid, ascorbate, citric acid, a tocopherol, a retinol, a polyphenol, a phenolic acid, a flavonoid, lipoic acid, N-acetylcysteine, butylated hydroxyanisole, butylated hydroxytoluene or derivatives thereof, preferably, wherein the one or more preservatives or antioxidants improve the shelf-life, flavor profile, or reduce spoilage of the mixture.

107. The method of claim 106, wherein the iridoid glycoside or extract of a plant that comprises an iridoid glycoside comprises iridoid glycosides selected from one or more of the following: Aucubin, Catalpol, Rehmannioside A, Rehmannioside B, Rehmannioside C, Rehmannioside D, Rehmannioside E, or Rehmannioside F.

108. The method of any one of claims 106 or 107, wherein the iridoid glycoside or analog thereof or extract of a plant that comprises an iridoid glycoside or analog thereof comprises a glucosylated iridoid glycoside or an aglycones of an iridoid glycoside.

109. The method of any one of claims 106-108, wherein the composition is an alcoholic or non-alcoholic beverage, an astringent compound, such as phenolic compounds, tannins, citric acid, gallic acid, zinc oxide, zinc sulfate, tannic acid, potassium permanganate, silver nitrate, tincture of benzoin, potassium alum, caftaric acid, acacia, yarrow, sage, witch hazel, vinegar, tea, fruits, vegetables, dairy products, herbs, nuts or any combination thereof, a bitter compound, such as Absinthin, Aloin, Alpha acid, Amarogentin, Andrographolide, Brucine, Caffeine, Denatonium, Eugenin, Hesperidin, Humulone, Isohumulone, Kaempferol 3-O-rutinoside, 6-Methoxymellein, Naringin, Papaverine, Phenylthiocarbamide,

Propylthiouracil, Quassin, Quinidine, Quinine, Salicin, Strychnine, Sucrose octaacetate, Sucrose octapropionate, Theobromine, Theophylline, vegetables, tea, chocolate, fruits or any combination thereof, a sour compound, such as acetic acid, citric acid, hydrochloric acid, lactic acid, malic acid, nitric acid, fumaric acid, sulfuric acid, tartaric acid, phosphoric acid, other acid or any combination thereof, a compound with an off-taste, such as plant-based milks or products of plant-based milks, dairy products, fruits, juices, proteins, plant protein, whole grain products or any combination thereof.

110. The method of claim 109, wherein the dairy product, plant-based milk, or product of plant-based milk comprises a milk, such as whole milk, nonfat milk, lactose-free milk, buttermilk, condensed milk, cashew milk, goat milk, rick milk, soy milk, oat milk, almond milk, coconut milk, a yogurt, cheese, frosting, pudding, chocolate, custard, ice cream, gelato, sherbet, sorbet, frozen yogurt or any combination thereof.

111. The method of any one of claims 106-110, wherein the plant extract comprising an iridoid glycoside is obtained from a plant from any one or more of the following families or genera: Cornaceae, Gentianaceae, Eucommiaceae, Scrophulariaceae, Rubiaceae, Lamiaceae, Pedaliaceae, Verbenaceae, Bignoniaceae, Gentiana, Rehmannia, or Antirrhinum.

112. The method of any one of claims 106-111, wherein the plant extract comprising an iridoid glycoside is obtained from a plant from any one or more of the following species: *Coronus officinalis*, *Eucommia ulmoides*, *Gardenia jasminoides*, *Stachys betonica*, *Harpagophytum procumbens*, *Rehmannia glutinosa*, *Rehmannia chingii*, *Rehmannia chrysantha*, *Rehmannia henryi*, *Rehmannia japonica*, *Rehmannia piasezkii*, *Rehmannia solanifolia*, *Verbena officinalis*, or *Kigelia pinnata*.

113. The method of any one of claims 106-112, wherein the mixture provides a taste perception in the subject of a reduction in bitterness or bitterness perception, a masking of bitter tastes or bitterness, a reduction in sourness or sourness perception, a masking of sour tastes or sourness, a reduction in initial sourness perception or lingering sourness perception, a reduction in acidic taste or acidic taste perception, a reduction in lingering acidic taste perception, a reduction in astringency or astringency perception, a masking of astringency, a masking of acidic tastes, or a masking of off tastes when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject,

as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

114. The method of any one of claims 106-113, wherein the mixture provides a taste perception in the subject of an enhancement of creaminess, creamy flavor, or creaminess perception, an enhancement of fattiness, fatty flavor, or fattiness perception, an enhancement in fruitiness, fruity flavor, or fruitiness perception, an enhancement of brightness, bright flavor, or bright perception, or an increase of sweetness or sweetness perception when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

115. The method of any one of claims 106-114, wherein the mixture modulates a subject's acidity taste perception when the mixture is provided to the subject without negatively affecting the shelf life of a food or beverage or without increasing the pH of the food or beverage when the mixture is incorporated into the food or beverage.

116. The method of any one of claims 106-115, wherein the food or beverage or granule, powder, or liquid formulation is selected from water, a carbonated beverage, such as a carbonated fruit beverage, carbonated cola drink or carbonated water, alcoholic beverages, alcohol-free beverages, spices and/or seasonings, such as chili, wasabi, horseradish, mustard, ginger, black pepper, or cinnamon, energy beverages, flavored water, powders for drinks, dairy products, such as milk, yogurt, cheese, or ice cream, plant based milks, products of plant based milk, puddings, cakes, shakes, malts, brownies, pastries, cookies, cheesecakes, fudge, pies, cobblers, parfaits, mousse, biscuits, custards, frosting, fruits, vegetables, hard candy, soft candy, taffy, chocolates, sugarless candies, chewing gum, bubble gum, juices, teas, coffees, salsa, gel beads, film strips for breath, gelatin candies, pectin candies, starch candies, lozenges, cough drops, throat lozenges, throat sprays, toothpastes or mouth rinses.

117. The method of any one of claims 106-116, wherein the amount of component (a) in the mixture is at least 2 ppm, such as, 3, 4, 5, 7.5, 10, 20, 30, 40, 50, 60, 70, 80, 90, 100, 110, 120, 130, 140, 150, 160, 170, 180, 190, 200, 210, 220, 230, 240, 250, 260, 270, 280, 290, or 300 ppm or an amount within a range defined by any two of the aforementioned amounts, preferably 2-40 ppm, 6-75 ppm, 6-100 ppm, or 50-300 ppm.

118. The method of any one of claims 106-117, wherein component (a) is dissolved in food grade ethanol.

119. The method of claim 118, wherein the food grade ethanol is at least 1%, such as 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 15, 20, 25, 30, 35, 40, 45, 50, 60, 70, 80, 85, 90, 95, or 100%, or with a range defined by any two of the aforementioned amounts, preferably 80, 90, or 95%.

120. A composition obtained or obtainable by the method of any one of claims 106-119.

121. A mixture suitable for modulating a subject's taste perception of astringency, bitterness, acidity, or sourness or masking off-tastes, wherein the mixture comprises at least two components (a) and (b):

(a) an iridoid glycoside or analog thereof (for example, a glycosylation molecule of an aglycone, an aglycone of a glycosylated molecule, or a further glycosylated molecule of a glycosylated molecule) or an extract of a plant that comprises an iridoid glycoside or an analog thereof, such as a *Rehmannia glutinosa* root extract; and

(b) a composition comprising an astringent compound, a bitter compound, a sour compound, an acidic compound, or a compound with an off-taste; wherein component (a) is admixed with component (b);

preferably, wherein the mixture is provided in a food, beverage, granule, powder or liquid formulation; and

optionally, wherein the mixture comprises one or more preservatives or antioxidants, such as a sulphite, sorbic acid, a sorbate compound, benzoic acid, benzoate, propionic acid, propionate, ascorbic acid, ascorbate, citric acid, a tocopherol, a retinol, a polyphenol, a phenolic acid, a flavonoid, lipoic acid, N-acetylcysteine, butylated hydroxyanisole, butylated hydroxytoluene or derivatives thereof, preferably, wherein the one or more preservatives or antioxidants improve the shelf-life, flavor profile, or reduce spoilage of the mixture.

122. The mixture of claim 122, wherein the iridoid glycoside or extract of a plant that comprises an iridoid glycoside comprises iridoid glycosides selected from one or more of

the following: Aucubin, Catalpol, Rehmannioside A, Rehmannioside B, Rehmannioside C, Rehmannioside D, Rehmannioside E, or Rehmannioside F.

123. The mixture for use of any one of claims 121 or 122, wherein the iridoid glycoside or analog thereof or extract of a plant that comprises an iridoid glycoside or analog thereof comprises a glucosylated iridoid glycoside or an aglycone of an iridoid glycoside.

124. The mixture of any one of claims 121-123, wherein the composition is an alcoholic or non-alcoholic beverage, an astringent compound, such as phenolic compounds, tannins, citric acid, gallic acid, zinc oxide, zinc sulfate, tannic acid, potassium permanganate, silver nitrate, tincture of benzoin, potassium alum, caftaric acid, acacia, yarrow, sage, witch hazel, vinegar, tea, fruits, vegetables, dairy products, herbs, nuts or any combination thereof, a bitter compound, such as Absinthin, Aloin, Alpha acid, Amarogentin, Andrographolide, Brucine, Caffeine, Denatonium, Eugenin, Hesperidin, Humulone, Isohumulone, Kaempferol 3-O-rutinoside, 6-Methoxymellein, Naringin, Papaverine, Phenylthiocarbamide, Propylthiouracil, Quassin, Quinidine, Quinine, Salicin, Strychnine, Sucrose octaacetate, Sucrose octapropionate, Theobromine, Theophylline, vegetables, tea, chocolate, fruits or any combination thereof, a sour compound, such as acetic acid, citric acid, hydrochloric acid, lactic acid, malic acid, nitric acid, fumaric acid, sulfuric acid, tartaric acid, phosphoric acid, other acid or any combination thereof, a compound with an off-taste, such as plant-based milks or products of plant-based milks, dairy products, fruits, juices, proteins, plant protein, whole grain products or any combination thereof.

125. The mixture of claim 124, wherein the dairy product, plant-based milk, or product of plant-based milk comprises a milk, such as whole milk, nonfat milk, lactose-free milk, buttermilk, condensed milk, cashew milk, goat milk, rick milk, soy milk, oat milk, almond milk, coconut milk, a yogurt, cheese, frosting, pudding, chocolate, custard, ice cream, gelato, sherbet, sorbet, frozen yogurt or any combination thereof.

126. The mixture of any one of claims 121-125, wherein the plant extract comprising an iridoid glycoside is obtained from a plant from any one or more of the following families or genera: Cornaceae, Gentianaceae, Eucommiaceae, Scrophulariaceae, Rubiaceae, Lamiaceae, Pedaliaceae, Verbenaceae, Bignoniaceae, Gentiana, Rehmannia, or Antirrhinum.

127. The mixture of any one of claims 121-126, wherein the plant extract comprising an iridoid glycoside is obtained from a plant from any one or more of the following species:

Coronus officinalis, *Eucommia ulmoides*, *Gardenia jasminoides*, *Stachys betonica*, *Harpagophytum procumbens*, *Rehmannia glutinosa*, *Rehmannia chingii*, *Rehmannia chrysantha*, *Rehmannia henryi*, *Rehmannia japonica*, *Rehmannia piasezkii*, *Rehmannia solanifolia*, *Verbena officinalis*, or *Kigelia pinnata*.

128. The mixture of any one of claims 121-127, wherein the mixture provides a taste perception in the subject of a reduction in bitterness or bitterness perception, a masking of bitter tastes or bitterness, a reduction in sourness or sourness perception, a masking of sour tastes or sourness, a reduction in initial sourness perception or lingering sourness perception, a reduction in acidic taste or acidic taste perception, a reduction in lingering acidic taste perception, a reduction in astringency or astringency perception, a masking of astringency, a masking of acidic tastes, or a masking of off tastes when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

129. The mixture of any one of claims 121-128, wherein the mixture provides a taste perception in the subject of an enhancement of creaminess, creamy flavor, or creaminess perception, an enhancement of fattiness, fatty flavor, or fattiness perception, an enhancement in fruitiness, fruity flavor, or fruitiness perception, an enhancement of brightness, bright flavor, or bright perception, or an increase of sweetness or sweetness perception when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

130. The method of any one of claims 121-129, wherein the mixture modulates a subject's acidity taste perception when the mixture is provided to the subject without negatively affecting the shelf life of a food or beverage or without increasing the pH of the food or beverage when the mixture is incorporated into the food or beverage.

131. The mixture of any one of claims 121-130, wherein the food or beverage or granule, powder, or liquid formulation is selected from water, a carbonated beverage, such as a carbonated fruit beverage, carbonated cola drink or carbonated water, alcoholic beverages, alcohol-free beverages, spices and/or seasonings, such as chili, wasabi, horseradish, mustard, ginger, black pepper, or cinnamon, energy beverages, flavored water, powders for drinks, dairy

products, such as milk, yogurt, cheese, or ice cream, plant based milks, products of plant based milk, puddings, cakes, shakes, malts, brownies, pastries, cookies, cheesecakes, fudge, pies, cobblers, parfaits, mousse, biscuits, custards, frosting, fruits, vegetables, hard candy, soft candy, taffy, chocolates, sugarless candies, chewing gum, bubble gum, juices, teas, coffees, salsa, gel beads, film strips for breath, gelatin candies, pectin candies, starch candies, lozenges, cough drops, throat lozenges, throat sprays, toothpastes or mouth rinses.

132. The mixture of any one of claims 121-131, wherein the amount of component (a) in the mixture is at least 2 ppm, such as, 3, 4, 5, 7.5, 10, 20, 30, 40, 50, 60, 70, 80, 90, 100, 110, 120, 130, 140, 150, 160, 170, 180, 190, 200, 210, 220, 230, 240, 250, 260, 270, 280, 290, or 300 ppm or an amount within a range defined by any two of the aforementioned amounts, preferably 2-40 ppm, 6-75 ppm, 6-100 ppm, or 50-300 ppm.

133. The mixture of any one of claims 121-132, wherein component (a) is dissolved in food grade ethanol.

134. The mixture of claim 133, wherein the food grade ethanol is at least 1%, such as 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 15, 20, 25, 30, 35, 40, 45, 50, 60, 70, 80, 85, 90, 95, or 100%, or with a range defined by any two of the aforementioned amounts, preferably 80, 90, or 95%.

135. A method for modulating a subject's taste perception of alcohol, carbonation, spice, or cooling, the method comprising:

providing a subject a mixture that comprises at least two components (a) and (b):

(a) an amentoflavone or analog thereof (for example, a glycosylation molecule of an aglycone, an aglycone of a glycosylated molecule, or a further glycosylated molecule of a glycosylated molecule) or an extract of a plant that comprises an amentoflavone or an analog thereof, such as a *Selaginella tamariscina* extract; and

(b) a composition comprising an alcohol, carbonation, spice or a cooling compound or a non-alcoholic beverage; wherein component (a) is admixed with component (b);

wherein the mixture is preferably provided in a food, beverage, granule, powder or liquid formulation; and

optionally, wherein the mixture comprises one or more preservatives or antioxidants, such as a sulphite, sorbic acid, a sorbate compound, benzoic

acid, benzoate, propionic acid, propionate, ascorbic acid, ascorbate, citric acid, a tocopherol, a retinol, a polyphenol, a phenolic acid, a flavonoid, lipoic acid, N-acetylcysteine, butylated hydroxyanisole, butylated hydroxytoluene or derivatives thereof, preferably, wherein the one or more preservatives or antioxidants improve the shelf-life, flavor profile, or reduce spoilage of the mixture; and/or

optionally, selecting a composition that comprises an alcohol, carbonation, spice or cooling compound for receiving an agent that modulates the taste perception of a subject to an alcohol, carbonation, a spice, a cooling compound or a non-alcoholic beverage and providing said selected composition component (a); and/or

optionally, evaluating the modulation of a subject's taste perception of alcohol, carbonation, spice, or cooling after providing the subject the mixture.

136. The method of claim 135, wherein the amentoflavone or analog thereof or the extract of a plant that comprises an amentoflavone or an analog thereof comprises flavonoids selected from one or more of the following: amentoflavone, 2',8"-biapigenin, delicaflavone, ginkgetin, heveaflavone, hinokiflavone, isocryptomerin, kayaflavone, ochnaflavone, podocarpusflavone A, robustaflavone, sumaflavone, or taiwaniaflavone.

137. The method of any one of claims 135 or 136, wherein the amentoflavone or analog thereof or the extract of a plant that comprises an amentoflavone or an analog thereof comprises a glucosylated amentoflavone or an aglycone of an amentoflavone.

138. The method of any one of claims 135-137, wherein the composition is an alcoholic or non-alcoholic beverage, a spicey product that comprises a chili, wasabi, horseradish, mustard, ginger, black pepper, cinnamon, pumpkin spice, Szechuan pepper, or allspice, a carbonated beverage e.g., to reduce the bubble size of the beverage or impart a champagne-like effect, or a cooling compound, such as Menthol, Cyclohexanecarboxamide,N-Ethyl-5-Methyl-2-(1- Methylethyl) (WS-3), N-(Ethoxycarbonylmethyl)-3-p-menthanecarboxamide (WS-5), (1R,2S,5R)-N-(4-Methoxyphenyl)-5-methyl-2-(1-methylethyl)cyclohexanecarboxamide (WS-12), Butanamide, N,2,3-trimethyl-2-(1-methylethyl) (WS-23), or Menthyl Lactate or any combination thereof.

139. The method of any one of claims 135-138, wherein the plant extract comprising amentoflavone is obtained from a plant from any one or more of the following families:

Phyllanthaceae, Euphorbiaceae, Liliaceae, Guttiferae, Primulaceae, Oxalidaceae, Cupressaccae, Malpighiaceae, Leguminosae, Calophyllaceae, Ochnaceae, Burseraceae, Flacourtiaceae, Cephalotaxaceae, Connaraceae, Taxodiaceae, Cycadaceae, Podocarpaceae, Moraceae, Labiatae, Clusiaceae, Ginkgoaceae, Hypericaceae, Lanariaceae, Caprifoliaceae, Anacardiaceae, Berberidaceae, Velloziaceae, Ranunculaceae, Thymelaeaceae, Taxaceae, or Psilotaceae, such as *Amanoa almerindae*, *Alchornea glandulosa*, *Alchornea triplinervia*, *Aletris spicata*, *Allanblackia monticola*, *Androsace umbellate*, *Antidesma bunius*, *Antidesma laciniatum*, *Biophytum sensitivum*, *Biota semipervirens*, *Byrsonima crassa*, *Byrsonima intermedia*, *Caesalpinia pyramidalis*, *Callitris rhomboidea*, *Calocedrus microlepic* var. *formosana formosana*, *Calophyllum brasiliense*, *Calophyllum ferrugineum*, *Calophyllum flavoramulum*, *Calophyllum incrassatum*, *Calophyllum inophylloide*, *Calophyllum inophyllum*, *Calophyllum membranaceum*, *Calophyllum pinetorum*, *Calophyllum rivulare*, *Calophyllum symingtonianum*, *Calophyllum venulosum*, *Campylospermum calanthum*, *Campylospermum mannii*, *Canarium album*, *Canarium pimela*, *Canarium schweinfurthii*, *Casearia clarkei*, *Celaenodendron mexicanum*, *Cephalotaxus fortunei*, *Cephalotaxus koreana*, *Cephalotaxus oliveri*, *Chamaecyparis obtusa*, *Chrozophora tinctoria*, *Cnestis ferruginea*, *Cunninghamia lanceolata*, *Cupressocyparis leylandii*, *Cupressus chengiana*, *Cupressus sempervirens*, *Cycas beddomei*, *Cycas circinalis*, *Cycas panzhihuaensis*, *Cycas pectinate*, *Cycas revoluta*, *Dacrydium araucarioides*, *Decussocarpus rospigliosii*, *Discocleidion rufescens*, *Dorstenia barteri*, *Drypetes gerrardii*, *Drypetes hainanensis*, *Elateriospermum tapos*, *Galeobdolon chinense*, *Garcinia bakeriana*, *Garcinia brasiliensis*, *Garcinia brevipedicellata*, *Garcinia cowa*, *Garcinia intermedia*, *Garcinia livingstonei*, *Garcinia merguensis*, *Garcinia subelliptica*, *Garcinia xanthochymus*, *Gingko biloba*, *Hypericum connatum*, *Hypericum perforatum*, *Hyeronima alchorneoides*, *Juniperus occidentalis*, *Juniperus rigida*, *Lanaria lanata*, *Lonicera chrysantha*, *Lonicera macranthoides*, *Lonicera similes*, *Luxemburgia nobilis*, *Lysimachia christinae*, *Mangifera indica*, *Manihot esculenta*, *Microbiota decussata*, *Nandina domestica*, *Nanuza plicata*, *Ochna schweinfurthiana*, *Ouratea parviflora*, *Ouratea semiserrata*, *Ouratea sulcate*, *Pistacia chinensis*, *Podocarpus imbricadus*, *Ranunculus ternatus*, *Retrophyllum rospigliosii*, *Rhus pyroides*, *Rhus succedanea*, *Sabina pingii* var. *wilsonii*, *Sabina sinoalpina*, *Sabina vulgaris*, *Speranskia Tuberculata*, *Struthiola argentea*, *Taxus baccata*, *Thuja orientalis*, *Tmesipteris*

tannensis, *Torreya nucifera*, *Torreya yunnanensis*, *Viburnum chinshanense*, or *Zabelia tyaihyonii*.

140. The method of any one of claims 135-139, wherein the plant extract comprising amentoflavone is obtained from a plant from any one or more of the following species: *Selaginella bryopteris*, *Selaginella chrysocaulos*, *Selaginella delicatula*, *Selaginella denticulate*, *Selaginella doederleinii*, *Selaginella involvens*, *Selaginella labordei*, *Selaginella moellendorffii*, *Selaginella nipponica*, *Selaginella nothohybrida*, *Selaginella pachystachys*, *Selaginella pulvinate*, *Selaginella remotifolia*, *Selaginella rupestris*, *Selaginella sanquinolenta*, *Selaginella selaginoides*, *Selaginella sinensis*, *Selaginella stauntoniana*, *Selaginella tamariscina*, *Selaginella uncinate*, or *Selaginella willdenowii.*

141. The method of any one of claims 135-140, wherein the mixture provides an increased alcohol perception, increased alcoholic bitterness, increased cooling intensity, enhanced spiciness duration, a tingling spice sensation, or an increased spiciness sensation in the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

142. The method of any one of claims 135-141, wherein the mixture provides a taste perception in the subject of an increase in alcohol perception or alcohol intensity when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

143. The method of any one of claims 135-142, wherein the mixture provides a taste perception in the subject of an increase in alcoholic bitterness when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

144. The method of any one of claims 135-143, wherein the mixture provides a taste perception in the subject of an increase in retro nasal effect or tongue tingling effect when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

145. The method of any one of claims 135-144, wherein the mixture provides a taste perception in the subject of an increase in spiciness or spice intensity when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

146. The method of any one of claims 135-145, wherein the mixture provides a taste perception in the subject of an increased spiciness duration when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

147. The method of any one of claims 135-146, wherein the mixture provides a taste perception in the subject of an increase in burning sensation or spice tingling sensation when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

148. The method of any one of claims 135-147, wherein the mixture provides a taste perception in the subject of an increase in cooling perception or cooling intensity when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

149. The method of any one of claims 135-148, wherein the mixture provides a taste perception in the subject of a faster onset of coolness when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

150. The method of any one of claims 135-149, wherein the mixture provides a taste perception in the subject of an increased duration of coolness when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

151. The method of any one of claims 135-150, wherein the mixture provides a taste perception in the subject of an increase in carbonation perception or reduced bubble size or champagne-like effect when the mixture is provided to the subject, such as when the mixture is incorporated in a beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

152. The method of any one of claims 135-151, wherein the mixture provides a taste perception in the subject of an increase in fizzy sensation or frothy sensation when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

153. The method of any one of claims 135-152, wherein the mixture provides a taste perception in the subject of a decrease in harshness when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

154. The method of any one of claims 135-153, wherein the mixture reduces the carbonation bubble size of a beverage when the mixture is incorporated into a beverage, as compared to the carbonation bubble size of the beverage in the absence of component (a).

155. The method of any one of claims 135-154, wherein the mixture increases the amount of carbonation bubbles of a beverage when the mixture is incorporated into a beverage as compared to amount of carbonation bubbles of the beverage in the absence of component (a).

156. The method of any one of claims 135-155, wherein the food or beverage or granule, powder, or liquid formulation is selected from a carbonated beverage, such as a carbonated fruit beverage, carbonated cola drink or carbonated water, alcoholic beverages, alcohol-free beverages, spices and/or seasonings, such as chili, wasabi, horseradish, mustard, ginger, black pepper, or cinnamon, energy beverages, flavored water, powders for drinks, hard candy, soft candy, taffy, chocolates, sugarless candies, chewing gum, bubble gum, juices, teas, coffees, salsa, gel beads, film strips for breath, gelatin candies, pectin candies, starch candies, lozenges, cough drops, throat lozenges, throat sprays, toothpastes or mouth rinses.

157. The method of any one of claims 135-156, wherein the amount of component (a) in the mixture is at least 2 ppm, such as, 3, 4, 5, 7.5, 10, 20, 30, 40, 50, 60, 70, 80, 90, 100, 110, 120, 130, 140, 150, 160, 170, 180, 190, 200, 210, 220, 230, 240, 250, 260, 270, 280, 290, or 300 ppm or an amount within a range defined by any two of the aforementioned amounts, preferably 2-40 ppm, 6-75 ppm, 6-100 ppm, or 12-200 ppm.

158. The method of any one of claims 135-157 further comprising selecting or identifying a subject to receive a composition, which modulates taste perception in a subject, such as alcohol perception, alcohol intensity, alcoholic bitterness, alcoholic bitterness intensity, tongue tingling effect, cooling perception, cooling intensity, the time of onset of cooling, cooling duration, carbonation perception, fizzy sensation, frothy sensation, harshness, spiciness, spiciness duration, burning sensation, spice tingling sensation, or spiciness intensity, which decreases the carbonation bubble size or increases the carbonation bubble amount in a carbonated beverage, or which increases the retro nasal effect in subject.

159. The method of any one of claims 135-158 further comprising determining or analyzing the alcohol perception, alcohol intensity, alcoholic bitterness, alcoholic bitterness intensity, tongue tingling effect, cooling perception, cooling intensity, the time of onset of cooling, cooling duration, carbonation perception, fizzy sensation, frothy sensation, harshness, spiciness, spiciness duration, burning sensation, spice tingling sensation, spiciness intensity, the reduction of carbonation bubble size or increase of carbonation bubble amount in a carbonated beverage, or the increase of the retro nasal effect or any combination thereof of the subject after consuming said mixture.

160. The method of any one of claims 135-159, wherein component (a) is dissolved in food grade ethanol.

161. The method of claim 160, wherein the food grade ethanol is at least 1%, such as 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 15, 20, 25, 30, 35, 40, 45, 50, 60, 70, 80, 85, 90, 95, or 100%, or with a range defined by any two of the aforementioned amounts, preferably 80, 90, or 95%.

162. A method of making a mixture, which modulates a subject's taste perception of alcohol, carbonation, spice or cooling, the method comprising:

admixing a component (a) with a component (b) to form said mixture:

(a) an amentoflavone or analog thereof (for example, a glycosylation molecule of an aglycone, an aglycone of a glycosylated molecule, or a further

glycosylated molecule of a glycosylated molecule) or an extract of a plant that comprises an amentoflavone or an analog thereof, such as a *Selaginella tamariscina* extract; and

(b) a composition comprising an alcohol, carbonation, spice or a cooling compound or a non-alcoholic beverage;

wherein the composition is preferably provided in a food, beverage, granule, powder or liquid formulation; and

optionally, wherein the composition comprises one or more preservatives or antioxidants, such as a sulphite, sorbic acid, a sorbate compound, benzoic acid, benzoate, propionic acid, propionate, ascorbic acid, ascorbate, citric acid, a tocopherol, a retinol, a polyphenol, a phenolic acid, a flavonoid, lipoic acid, N-acetylcysteine, butylated hydroxyanisole, butylated hydroxytoluene or derivatives thereof, preferably, wherein the one or more preservatives or antioxidants improve the shelf-life, flavor profile, or reduce spoilage of the mixture.

163. The method of claim 162, wherein the amentoflavone or analog thereof or the extract of a plant that comprises an amentoflavone or an analog thereof comprises flavonoids selected from one or more of the following: amentoflavone, 2',8"-biapigenin, delicaflavone, ginkgetin, heveaflavone, hinokiflavone, isocryptomerin, kayaflavone, ochnaflavone, podocarpusflavone A, robustaflavone, sumaflavone, or taiwaniaflavone.

164. The method of any one of claims 162 or 163, wherein the amentoflavone or analog thereof or the extract of a plant that comprises an amentoflavone or an analog thereof comprises a glucosylated amentoflavone or an aglycone of an amentoflavone.

165. The method of any one of claims 162-164, wherein the composition is an alcoholic or non-alcoholic beverage, a spicey product that comprises a chili, wasabi, horseradish, mustard, ginger, black pepper, cinnamon, pumpkin spice, Szechuan pepper, or allspice, a carbonated beverage e.g., to reduce the bubble size of the beverage or impart a champagne-like effect, or a cooling compound, such as Menthol, Cyclohexanecarboxamide,N-Ethyl-5-Methyl-2-(1- Methylethyl) (WS-3), N-(Ethoxycarbonylmethyl)-3-p-menthanecarboxamide (WS-5), (1R,2S,5R)-N-(4-Methoxyphenyl)-5-methyl-2-(1-

methylethyl)cyclohexanecarboxamide (WS-12), Butanamide, N,2,3-trimethyl-2-(1-methylethyl) (WS-23), or Menthyl Lactate or any combination thereof.

166. The method of any one of claims 162-165, wherein the plant extract comprising amentoflavone is obtained from a plant from any one or more of the following families: Phyllanthaceae, Euphorbiaceae, Liliaceae, Guttiferae, Primulaceae, Oxalidaceae, Cupressaceae, Malpighiaceae, Leguminosae, Calophyllaceae, Ochnaceae, Burseraceae, Flacourtiaceae, Cephalotaxaceae, Connaraceae, Taxodiaceae, Cycadaceae, Podocarpaceae, Moraceae, Labiatae, Clusiaceae, Ginkgoaceae, Hypericaceae, Lanariaceae, Caprifoliaceae, Anacardiaceae, Berberidaceae, Velloziaceae, Ranunculaceae, Thymelaeaceae, Taxaceae, or Psilotaceae, such as *Amanoa almerindae*, *Alchornea glandulosa*, *Alchornea triplinervia*, *Aletris spicata*, *Allanblackia monticola*, *Androsace umbellate*, *Antidesma bunius*, *Antidesma laciniatum*, *Biophytum sensitivum*, *Biota semipervirens*, *Byrsonima crassa*, *Byrsonima intermedia*, *Caesalpinia pyramidalis*, *Callitris rhomboidea*, *Calocedrus microlepic* var. *formosana formosana*, *Calophyllum brasiliense*, *Calophyllum ferrugineum*, *Calophyllum flavoramulum*, *Calophyllum incrassatum*, *Calophyllum inophylloide*, *Calophyllum inophyllum*, *Calophyllum membranaceum*, *Calophyllum pinetorum*, *Calophyllum rivulare*, *Calophyllum symingtonianum*, *Calophyllum venulosum*, *Campylospermum calanthum*, *Campylospermum mannii*, *Canarium album*, *Canarium pimela*, *Canarium schweinfurthii*, *Casearia clarkei*, *Celaenodendron mexicanum*, *Cephalotaxus fortunei*, *Cephalotaxus koreana*, *Cephalotaxus oliveri*, *Chamaecyparis obtusa*, *Chrozophora tinctoria*, *Cnestis ferruginea*, *Cunninghamia lanceolata*, *Cupressocyparis leylandii*, *Cupressus chengiana*, *Cupressus sempervirens*, *Cycas beddomei*, *Cycas circinalis*, *Cycas panzhihuaensis*, *Cycas pectinate*, *Cycas revoluta*, *Dacrydium araucarioides*, *Decussocarpus rospigliosii*, *Discocleidion rufescens*, *Dorstenia barteri*, *Drypetes gerrardii*, *Drypetes hainanensis*, *Elateriospermum tapos*, *Galeobdolon chinense*, *Garcinia bakeriana*, *Garcinia brasiliensis*, *Garcinia brevipedicellata*, *Garcinia cowa*, *Garcinia intermedia*, *Garcinia livingstonei*, *Garcinia merguensis*, *Garcinia subelliptica*, *Garcinia xanthochymus*, *Gingko biloba*, *Hypericum connatum*, *Hypericum perforatum*, *Hyeronima alchorneoides*, *Juniperus occidentalis*, *Juniperus rigida*, *Lanaria lanata*, *Lonicera chrysantha*, *Lonicera macranthoides*, *Lonicera similes*, *Luxemburgia nobilis*, *Lysimachia christinae*, *Mangifera indica*, *Manihot esculenta*, *Microbiota decussata*, *Nandina domestica*, *Nanuza plicata*,

Ochna schweinfurthiana, *Ouratea parviflora*, *Ouratea semiserrata*, *Ouratea sulcate*, *Pistacia chinensis*, *Podocarpus imbricadus*, *Ranunculus ternatus*, *Retrophyllum rospigliosii*, *Rhus pyroides*, *Rhus succedanea*, *Sabina pingii* var. *wilsonii*, *Sabina sinoalpina*, *Sabina vulgaris*, *Speranskia Tuberculata*, *Struthiola argentea*, *Taxus baccata*, *Thuja orientalis*, *Tmesipteris tannensis*, *Torreya nucifera*, *Torreya yunnanensis*, *Viburnum chinshanense*, or *Zabelia tyaihyonii*.

167. The method of any one of claims 162-166, wherein the plant extract comprising amentoflavone is obtained from a plant from any one or more of the following species: *Selaginella bryopteris*, *Selaginella chrysocaulos*, *Selaginella delicatula*, *Selaginella denticulate*, *Selaginella doederleinii*, *Selaginella involvens*, *Selaginella labordei*, *Selaginella moellendorffii*, *Selaginella nipponica*, *Selaginella nothohybrida*, *Selaginella pachystachys*, *Selaginella pulvinate*, *Selaginella remotifolia*, *Selaginella rupestris*, *Selaginella sanquinolenta*, *Selaginella selaginoides*, *Selaginella sinensis*, *Selaginella stauntoniana*, *Selaginella tamariscina*, *Selaginella uncinate*, or *Selaginella willdenowii.*

168. The method of any one of claims 162-167, wherein the mixture provides an increased alcohol perception, increased alcoholic bitterness, increased cooling intensity, enhanced spiciness duration, a tingling spice sensation, or an increased spiciness sensation in the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

169. The method of any one of claims 162-168, wherein the mixture provides a taste perception in the subject of an increase in alcohol perception or alcohol intensity when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

170. The method of any one of claims 162-169, wherein the mixture provides a taste perception in the subject of an increase in alcoholic bitterness when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

171. The method of any one of claims 162-170, wherein the mixture provides a taste perception in the subject of an increase in retro nasal effect or tongue tingling effect when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

172. The method of any one of claims 162-171, wherein the mixture provides a taste perception in the subject of an increase in spiciness or spice intensity when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

173. The method of any one of claims 162-172, wherein the mixture provides a taste perception in the subject of an increased spiciness duration when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

174. The method of any one of claims 162-173, wherein the mixture provides a taste perception in the subject of an increase in burning sensation or spice tingling sensation when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

175. The method of any one of claims 162-174, wherein the mixture provides a taste perception in the subject of an increase in cooling perception or cooling intensity when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

176. The method of any one of claims 162-175, wherein the mixture provides a taste perception in the subject of a faster onset of coolness when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

177. The method of any one of claims 162-176, wherein the mixture provides a taste perception in the subject of an increased duration of coolness when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

178. The method of any one of claims 162-177, wherein the mixture provides a taste perception in the subject of an increase in carbonation perception or reduced bubble size or champagne-like effect when the mixture is provided to the subject, such as when the mixture is incorporated in a beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

179. The method of any one of claims 162-178, wherein the mixture provides a taste perception in the subject of an increase in fizzy sensation or frothy sensation when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

180. The method of any one of claims 162-179, wherein the mixture provides a taste perception in the subject of a decrease in harshness when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

181. The method of any one of claims 162-180, wherein the mixture reduces the carbonation bubble size of a beverage when the mixture is incorporated into a beverage, as compared to the carbonation bubble size of the beverage in the absence of component (a).

182. The method of any one of claims 162-181, wherein the mixture increases the amount of carbonation bubbles of a beverage when the mixture is incorporated into a beverage as compared to amount of carbonation bubbles of the beverage in the absence of component (a).

183. The method of any one of claims 162-182, wherein the food or beverage or granule, powder, or liquid formulation is selected from a carbonated beverage, such as a carbonated fruit beverage, carbonated cola drink or carbonated water, alcoholic beverages, alcohol-free beverages, spices and/or seasonings, such as chili, wasabi, horseradish, mustard,

ginger, black pepper, or cinnamon, energy beverages, flavored water, powders for drinks, hard candy, soft candy, taffy, chocolates, sugarless candies, chewing gum, bubble gum, juices, teas, coffees, salsa, gel beads, film strips for breath, gelatin candies, pectin candies, starch candies, lozenges, cough drops, throat lozenges, throat sprays, toothpastes or mouth rinses.

184. The method of any one of claims 162-183, wherein the amount of component (a) in the mixture is at least 2 ppm, such as, 3, 4, 5, 7.5, 10, 20, 30, 40, 50, 60, 70, 80, 90, 100, 110, 120, 130, 140, 150, 160, 170, 180, 190, 200, 210, 220, 230, 240, 250, 260, 270, 280, 290, or 300 ppm or an amount within a range defined by any two of the aforementioned amounts, preferably 2-40 ppm, 6-75 ppm, 6-100 ppm, or 12-200 ppm.

185. The method of any one of claim 162-184 further comprising dissolving component (a) in food grade ethanol.

186. The method of claim 185, wherein the food grade ethanol is at least 1%, such as 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 15, 20, 25, 30, 35, 40, 45, 50, 60, 70, 80, 85, 90, 95, or 100%, or with a range defined by any two of the aforementioned amounts, preferably 80, 90, or 95%.

187. A composition obtained or obtainable by the method of any one of claims 162-186.

188. A mixture used for modulating a subject's taste perception of alcohol, carbonation, spice, or cooling, wherein the mixture comprises at least two components (a) and (b):

(a) an amentoflavone or analog thereof (for example, a glycosylation molecule of an aglycone, an aglycone of a glycosylated molecule, or a further glycosylated molecule of a glycosylated molecule) or an extract of a plant that comprises an amentoflavone or an analog thereof, such as a *Selaginella tamariscina* extract;

(b) a composition comprising an alcohol, carbonation, spice or a cooling compound or a non-alcoholic beverage; wherein component (a) is admixed with component (b);

preferably, wherein the mixture is provided in a food, beverage, granule, powder or liquid formulation; and

optionally, wherein the mixture comprises one or more preservatives or antioxidants, such as a sulphite, sorbic acid, a sorbate compound, benzoic

acid, benzoate, propionic acid, propionate, ascorbic acid, ascorbate, citric acid, a tocopherol, a retinol, a polyphenol, a phenolic acid, a flavonoid, lipoic acid, N-acetylcysteine, butylated hydroxyanisole, butylated hydroxytoluene or derivatives thereof, preferably, wherein the one or more preservatives or antioxidants improve the shelf-life, flavor profile, or reduce spoilage of the mixture.

189. The mixture for use of claim 188, wherein the amentoflavone or analog thereof or the extract of a plant that comprises an amentoflavone or an analog thereof comprises flavonoids selected from one or more of the following: amentoflavone, 2',8"-biapigenin, delicaflavone, ginkgetin, heveaflavone, hinokiflavone, isocryptomerin, kayaflavone, ochnaflavone, podocarpusflavone A, robustaflavone, sumaflavone, or taiwaniaflavone.

190. The mixture for use of any one of claims 188 or 189, wherein the amentoflavone or analog thereof or the extract of a plant that comprises an amentoflavone or an analog thereof comprises a glucosylated amentoflavone or an aglycone of an amentoflavone.

191. The mixture for use of any one of claims 188-190, wherein the composition is an alcoholic or non-alcoholic beverage, a spicey product that comprises a chili, wasabi, horseradish, mustard, ginger, black pepper, cinnamon, pumpkin spice, Szechuan pepper, or allspice, a carbonated beverage e.g., to reduce the bubble size of the beverage or impart a champagne-like effect, or a cooling compound, such as Menthol, Cyclohexanecarboxamide,N-Ethyl-5-Methyl-2-(1- Methylethyl) (WS-3), N-(Ethoxycarbonylmethyl)-3-p-menthanecarboxamide (WS-5), (1R,2S,5R)-N-(4-Methoxyphenyl)-5-methyl-2-(1-methylethyl)cyclohexanecarboxamide (WS-12), Butanamide, N,2,3-trimethyl-2-(1-methylethyl) (WS-23), or Menthyl Lactate or any combination thereof.

192. The mixture for use of any one of claims 188-191, wherein the plant extract comprising amentoflavone is obtained from a plant from any one or more of the following families:

Phyllanthaceae, Euphorbiaceae, Liliaceae, Guttiferae, Primulaceae, Oxalidaceae, Cupressaceae, Malpighiaceae, Leguminosae, Calophyllaceae, Ochnaceae, Burseraceae, Flacourtiaceae, Cephalotaxaceae, Connaraceae, Taxodiaceae, Cycadaceae, Podocarpaceae, Moraceae, Labiatae, Clusiaceae, Ginkgoaceae, Hypericaceae, Lanariaceae, Caprifoliaceae, Anacardiaceae, Berberidaceae, Velloziaceae, Ranunculaceae, Thymelaeaceae, Taxaceae, or

Psilotaceae, such as *Amanoa almerindae*, *Alchornea glandulosa*, *Alchornea triplinervia*, *Aletris spicata*, *Allanblackia monticola*, *Androsace umbellate*, *Antidesma bunius*, *Antidesma laciniatum*, *Biophytum sensitivum*, *Biota semipervirens*, *Byrsonima crassa*, *Byrsonima intermedia*, *Caesalpinia pyramidalis*, *Callitris rhomboidea*, *Calocedrus microlepic* var. *formosana formosana*, *Calophyllum brasiliense*, *Calophyllum ferrugineum*, *Calophyllum flavoramulum*, *Calophyllum incrassatum*, *Calophyllum inophylloide*, *Calophyllum inophyllum*, *Calophyllum membranaceum*, *Calophyllum pinetorum*, *Calophyllum rivulare*, *Calophyllum symingtonianum*, *Calophyllum venulosum*, *Campylospermum calanthum*, *Campylospermum mannii*, *Canarium album*, *Canarium pimela*, *Canarium schweinfurthii*, *Casearia clarkei*, *Celaenodendron mexicanum*, *Cephalotaxus fortunei*, *Cephalotaxus koreana*, *Cephalotaxus oliveri*, *Chamaecyparis obtusa*, *Chrozophora tinctoria*, *Cnestis ferruginea*, *Cunninghamia lanceolata*, *Cupressocyparis leylandii*, *Cupressus chengiana*, *Cupressus sempervirens*, *Cycas beddomei*, *Cycas circinalis*, *Cycas panzhihuaensis*, *Cycas pectinate*, *Cycas revoluta*, *Dacrydium araucarioides*, *Decussocarpus rospigliosii*, *Discocleidion rufescens*, *Dorstenia barteri*, *Drypetes gerrardii*, *Drypetes hainanensis*, *Elateriospermum tapos*, *Galeobdolon chinense*, *Garcinia bakeriana*, *Garcinia brasiliensis*, *Garcinia brevipedicellata*, *Garcinia cowa*, *Garcinia intermedia*, *Garcinia livingstonei*, *Garcinia merguensis*, *Garcinia subelliptica*, *Garcinia xanthochymus*, *Gingko biloba*, *Hypericum connatum*, *Hypericum perforatum*, *Hyeronima alchorneoides*, *Juniperus occidentalis*, *Juniperus rigida*, *Lanaria lanata*, *Lonicera chrysantha*, *Lonicera macranthoides*, *Lonicera similes*, *Luxemburgia nobilis*, *Lysimachia christinae*, *Mangifera indica*, *Manihot esculenta*, *Microbiota decussata*, *Nandina domestica*, *Nanuza plicata*, *Ochna schweinfurthiana*, *Ouratea parviflora*, *Ouratea semiserrata*, *Ouratea sulcate*, *Pistacia chinensis*, *Podocarpus imbricadus*, *Ranunculus ternatus*, *Retrophyllum rospigliosii*, *Rhus pyroides*, *Rhus succedanea*, *Sabina pingii* var. *wilsonii*, *Sabina sinoalpina*, *Sabina vulgaris*, *Speranskia Tuberculata*, *Struthiola argentea*, *Taxus baccata*, *Thuja orientalis*, *Tmesipteris tannensis*, *Torreya nucifera*, *Torreya yunnanensis*, *Viburnum chinshanense*, or *Zabelia tyaihyonii*.

193. The mixture for use of any one of claims 188-192, wherein the plant extract comprising amentoflavone is obtained from a plant from any one or more of the following species: *Selaginella bryopteris*, *Selaginella chrysocaulos*, *Selaginella delicatula*, *Selaginella*

denticulate, *Selaginella doederleinii*, *Selaginella involvens*, *Selaginella labordei*, *Selaginella moellendorffii*, *Selaginella nipponica*, *Selaginella nothohybrida*, *Selaginella pachystachys*, *Selaginella pulvinate*, *Selaginella remotifolia*, *Selaginella rupestris*, *Selaginella sanquinolenta*, *Selaginella selaginoides*, *Selaginella sinensis*, *Selaginella stauntoniana*, *Selaginella tamariscina*, *Selaginella uncinate*, or *Selaginella willdenowii.*

194. The mixture for use of any one of claims 188-193, wherein the mixture provides an increased alcohol perception, increased alcoholic bitterness, increased cooling intensity, enhanced spiciness duration, a tingling spice sensation, or an increased spiciness sensation in the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

195. The mixture for use of any one of claims 188-194, wherein the mixture provides a taste perception in the subject of an increase in alcohol perception or alcohol intensity when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

196. The mixture for use of any one of claims 188-195, wherein the mixture provides a taste perception in the subject of an increase in alcoholic bitterness when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

197. The mixture for use of any one of claims 188-196, wherein the mixture provides a taste perception in the subject of an increase in retro nasal effect or tongue tingling effect when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

198. The mixture for use of any one of claims 188-197, wherein the mixture provides a taste perception in the subject of an increase in spiciness or spice intensity when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

199. The mixture for use of any one of claims 188-198, wherein the mixture provides a taste perception in the subject of an increased spiciness duration when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

200. The mixture for use of any one of claims 188-199, wherein the mixture provides a taste perception in the subject of an increase in burning sensation or spice tingling sensation when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

201. The mixture for use of any one of claims 188-200, wherein the mixture provides a taste perception in the subject of an increase in cooling perception or cooling intensity when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

202. The mixture for use of any one of claims 188-201, wherein the mixture provides a taste perception in the subject of a faster onset of coolness when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

203. The mixture for use of any one of claims 188-202, wherein the mixture provides a taste perception in the subject of an increased duration of coolness when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

204. The mixture for use of any one of claims 188-203, wherein the mixture provides a taste perception in the subject of an increase in carbonation perception or reduced bubble size or champagne-like effect when the mixture is provided to the subject, such as when the mixture is incorporated in a beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

205. The mixture for use of any one of claims 188-204, wherein the mixture provides a taste perception in the subject of an increase in fizzy sensation or frothy sensation when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

206. The mixture for use of any one of claims 188-205, wherein the mixture provides a taste perception in the subject of a decrease in harshness when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

207. The mixture for use of any one of claims 188-206, wherein the mixture reduces the carbonation bubble size of a beverage when the mixture is incorporated into a beverage, as compared to the carbonation bubble size of the beverage in the absence of component (a).

208. The mixture for use of any one of claims 188-207, wherein the mixture increases the amount of carbonation bubbles of a beverage when the mixture is incorporated into a beverage as compared to amount of carbonation bubbles of the beverage in the absence of component (a).

209. The mixture for use of any one of claims 188-208, wherein the food or beverage or granule, powder, or liquid formulation is selected from a carbonated beverage, such as a carbonated fruit beverage, carbonated cola drink or carbonated water, alcoholic beverages, alcohol-free beverages, spices and/or seasonings, such as chili, wasabi, horseradish, mustard, ginger, black pepper, or cinnamon, energy beverages, flavored water, powders for drinks, hard candy, soft candy, taffy, chocolates, sugarless candies, chewing gum, bubble gum, juices, teas, coffees, salsa, gel beads, film strips for breath, gelatin candies, pectin candies, starch candies, lozenges, cough drops, throat lozenges, throat sprays, toothpastes or mouth rinses.

210. The mixture for use of any one of claims 188-209, wherein the amount of component (a) in the mixture is at least 2 ppm, such as, 3, 4, 5, 7.5, 10, 20, 30, 40, 50, 60, 70, 80, 90, 100, 110, 120, 130, 140, 150, 160, 170, 180, 190, 200, 210, 220, 230, 240, 250, 260, 270, 280, 290, or 300 ppm or an amount within a range defined by any two of the aforementioned amounts, preferably 2-40 ppm, 6-75 ppm, 6-100 ppm, or 12-200 ppm.

211. The mixture for use of any one of claims 188-210 further comprising selecting or identifying a subject to receive a composition, which modulates taste perception in a subject, such as alcohol perception, alcohol intensity, alcoholic bitterness, alcoholic bitterness intensity, tongue tingling effect, cooling perception, cooling intensity, the time of onset of cooling, cooling duration, carbonation perception, fizzy sensation, frothy sensation, harshness, spiciness,, spiciness duration, burning sensation, spice tingling sensation, or spiciness intensity, which decreases the carbonation bubble size or increases carbonation bubble amount in a carbonated beverage, or which increases the retro nasal effect in subject.

212. The mixture for use of any one of claims 188-211 further comprising determining or analyzing the alcohol perception, alcohol intensity, alcoholic bitterness, alcoholic bitterness intensity, tongue tingling effect, cooling perception, cooling intensity, the time of onset of cooling, cooling duration, carbonation perception, fizzy sensation, frothy sensation, harshness, spiciness, spiciness duration, burning sensation, spice tingling sensation, spiciness intensity, the reduction of carbonation bubble size or increase of carbonation bubble amount in a carbonated beverage, or the increase of the retro nasal effect or any combination thereof of the subject after consuming said mixture.

213. The mixture for use of any one of claims 188-212, wherein component (a) is dissolved in food grade ethanol.

214. The mixture for use of claim 213, wherein the food grade ethanol is at least 1%, such as 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 15, 20, 25, 30, 35, 40, 45, 50, 60, 70, 80, 85, 90, 95, or 100%, or with a range defined by any two of the aforementioned amounts, preferably 80, 90, or 95%.

215. A method for modulating a subject's taste perception of alcohol, carbonation, spice, salt, sourness, umami, tingling, numbing, or cooling, or for masking an off-taste of a compound in a subject, the method comprising:

providing a subject a mixture that comprises at least two components (a) and (b):

(a) a polyisoprenylated benzophenone or analog thereof (for example, a glycosylation molecule of an aglycone, an aglycone of a glycosylated molecule, or a further glycosylated molecule of a glycosylated molecule) or an extract of a plant that comprises a polyisoprenylated benzophenone or an analog thereof, such as a *Garcinia indica* extract or a *Garcinia cambogia* extract; and

(b) a composition comprising an alcohol, carbonation, spice, salt, tingling compound, numbing compound, sour compound, umami compound or a cooling compound or a non-alcoholic beverage; wherein component (a) is admixed with component (b);

wherein the mixture is preferably provided in a food, beverage, granule, powder or liquid formulation; and

optionally, wherein the mixture comprises one or more preservatives or antioxidants, such as a sulphite, sorbic acid, a sorbate compound, benzoic acid, benzoate, propionic acid, propionate, ascorbic acid, ascorbate, citric acid, a tocopherol, a retinol, a polyphenol, a phenolic acid, a flavonoid, lipoic acid, N-acetylcysteine, butylated hydroxyanisole, butylated hydroxytoluene or derivatives thereof, preferably, wherein the one or more preservatives or antioxidants improve the shelf-life, flavor profile, or reduce spoilage of the mixture; and/or

optionally, selecting a composition that comprises an alcohol, carbonation, spice, salt, tingling compound, numbing compound, sour compound, umami compound or a cooling compound or a non-alcoholic beverage for receiving an agent that modulates the taste perception of a subject to an alcohol, carbonation, a spice, a salt, tingling, numbing or cooling and providing said selected composition component (a); and/or

optionally, evaluating the modulation of a subject's taste perception of alcohol, carbonation, spice, salt, sour, umami, tingling, numbing or cooling after providing the subject the mixture.

216. The method of claim 215, wherein the polyisoprenylated benzophenone or an analog thereof is selected from one or more of the following: Aristophenone A, Aristophenone B, Bronianone C, Camboginol C, Cambogin C, Chamuangone, Clusianone, 7-epi-aristophenone, 7-epi-clusianone, Eugeniaphenone, Gambogenone, Garcicowin A, Garcicowin B, Garcicowin C, Garcicowin D, Garcimangosone D, Garcimultiflorone A, Garcimultiflorone B, Garcimultiflorone C, Garcimultiflorone D, Garcimultiflorone E, Garcimultiflorone F, (+) Garcinialiptone A, (–) Garcinialiptone B, (–) Cycloxanthochymol, Garcinialiptone C, Garcinialiptone D, Garcinielliptone FA, Garcinielliptone FB, Garcinol, Garcinol 13-O-methylether, Garciosaphenone A, Guttiferone A, Guttiferone B, Guttiferone C, Guttiferone D,

Guttiferone E, Guttiferone F, Guttiferone G, Guttiferone H, Guttiferone I, Guttiferone J, Guttiferone K, Guttiferone L, Guttiferone M, Guttiferone N, Guttiferone O, Guttiferone P, Guttiferone Q, Guttiferone R, Guttiferone S, Isogarcimultiflorone F, Isogarcinol, Isogarcinol 13-O-methylether, Isoxanthochymol, Kolanone, Macurin, Myrtiaphenone A, Myrtiaphenone B, Oblongifolins A, Oblongifolins B, Oblongifolins C, Oblongifolins D, Oblongifolins E, Oblongifolins F, Oblongifolins G, Paucinone A, Paucinone B, Paucinone C, Paucinone D, Pedunculol, Pseudoguttiaphenone A, Semsinones A, Semsinones B, Semsinones C, Xanthochymol, Vismiaphenone C, 13, 14 di-dehydroxyisogarcinol, 13-hydroxygarcimultiflorone B, 18-hydroxygarcimultiflorone D, Cariphenone A, Cariphenone B, Chamone I, Chamone II, Clusianone, Clusiaphenone A, Clusiaphenone B, Coccinone A, Coccinone B, Coccinone C, Coccinone D, Coccinone E, Coccinone F, Coccinone G, Coccinone H, Cudranone, Cudraphenone A, Cudraphenone B, Cudraphenone C, Cudraphenone D, 14-deoxygarcinol, 15, 16 dihydro-16-hydroperoxy plukenetione F, 7-epi-garcinol, 7-epi-isogarcinol, 7-epi nemorosone, 28, 29 epoxy plukenetione A, Garcinielliptone I, Guttiferone K, Hilarianone, 33-hydroperoxy-isoplukenetione, Hyperibone B, Hyperibone K, Hyperibone L, Insigninone, Isovismiaphenone B, Isoxanthochymol, Lanceolatone, Machuone, Methyl hydroxyl nemorosone, Microsphaerins A, Microsphaerins B, Microsphaerins C, Microsphaerins D, Methyl Grandone, Nemorosonal, Nemorosone, Nemorosone II, Ochrocarpinone A, Ochrocarpinone B, Ochrocarpinone C, Pestalone, Plukenetione A, Plukenetione B, Plukenetione C, Plukenetione D acetate, Plukenetione E acetate, Plukenetione F, Plukenetione G, Propolone A, Propolone B, Propolone C, Propolone D, Sampsonione A, Sampsonione B, Sampsonione C, Sampsonione D, Sampsonione E, Sampsonione F, Sampsonione G, Sampsonione H, Sampsonione N, Sampsonione O, Sampsonione P, Sampsonione Q, Scrobiculatone A, Scrobiculatone B, Spiritone, Tovophenone A, Tovophenone B, Tovophenone C, Vismiaguianone A, Vismiaguianone B, Vismiaguianone C, Vismiaguianone D, Vismiaguianone E, Vismiaphenone A, Vismiaphenone B, Vismiaphenone C, Vismiaphenone D, Vismiaphenone E, Vismiaphenone F, Vismiaphenone G, Wedellianone A, Wedellianone B, Xerophenone A, Xerophenone B, 18-ethyloxy-17-hydroxy-17,18-dihydroscrobiculatone A, or 18-ethyloxy-17-hydroxy-17,18-dihydroscrobiculatone B.

217. The method of any one of claims 215 or 216, wherein the polyisoprenylated benzophenone or analog thereof or the extract of a plant that comprises an polyisoprenylated

benzophenone or an analog thereof comprises a glucosylated polyisoprenylated benzophenone or an aglycone of a polyisoprenylated benzophenone.

218. The method of any one of claims 215-217, wherein the composition is an alcoholic or non-alcoholic beverage, a spicey product that comprises a chili, wasabi, horseradish, mustard, ginger, black pepper, cinnamon, pumpkin spice, Szechuan pepper, or allspice, a salt, a carbonated beverage e.g., to reduce the bubble size of the beverage or impart a champagne-like effect, a sour compound, such as acetic acid, citric acid, malic acid, fumaric acid, tartaric acid, phosphoric acid or other acid, an umami compound, such as monosodium glutamate, disodium inosinate, disodium guanylate, seafoods, meats, vegetables, tea, seaweed, mushrooms, eggs, dairy products, or fermented products, a tingling or numbing compound, such as jambu oleoresin or spilanthol, or a cooling compound, such as Menthol, Cyclohexanecarboxamide,N-Ethyl-5-Methyl-2-(1- Methylethyl) (WS-3), N-(Ethoxycarbonylmethyl)-3-p-menthanecarboxamide (WS-5), (1R,2S,5R)-N-(4-Methoxyphenyl)-5-methyl-2-(1- methylethyl)cyclohexanecarboxamide (WS-12), Butanamide, N,2,3-trimethyl-2-(1-methylethyl) (WS-23), or Menthyl Lactate or any combination thereof.

219. The method of any one of claims 215-218, wherein the plant extract comprising a polyisoprenylated benzophenone or an analog thereof is obtained from a plant from any one or more of the following families or genera: Clusiasceae, Guttiferae, Clusia, Garcinia, Vismia, Allanblackia, Moronobea, Symphonia, Hypericum, Tovomita, Tovomiptosis, or Ochrocarpus.

220. The method of any one of claims 215-219, wherein the plant extract comprising a polyisoprenylated benzophenone or an analog thereof is obtained from a plant from any one or more of the following species: *Garcinia aristata, Garcinia xanthochymus, Garcinia multiflora, Garcinia hambroniana, Garcinia cambogia, Garcinia oblongifolia , Garcinia pedunculata, Garcinia mangostana, Garcinia cowa, Garcinia assigu, Garcinia humulis , Garcinia brasiliensis, Garcinia eugeniaefolia , Garcinia subelliptica, Garcinia purpurea, Garcinia indica, Garcinia speciosa, Garcinia yunnanensis, Garcinia livingstonei, Garcinia macrophylla, Garcinia intermedia, Garcinia virgata, Garcinia ovalifolia, Cuban propolis, Garcinia cochinchinensis, Garcinia solomonensis, Garcinia multiflora, Garcinia pyrifera, Garcinia kola, Garcinia myrtifolia, Garcinia pseudoguttifera, Garcinia paucinervis,* or *Garcinia semseii.*

221. The method of any one of claims 215-220, wherein the mixture provides an increased salt perception, increased salt impact, enhanced saltiness, increased metallic taste, increased alcohol perception, increased authentic alcohol taste, increased retro-nasal effect, increased tingling effect, increased alcoholic bitterness, increased herbal off-note taste, increased cooling intensity, increased cooling perception, enhanced spiciness duration, faster onset of spicy sensation, increase spicy intensity, improved chili flavor, increase in salt and sour flavor notes, an increased spiciness sensation in the subject, faster onset of tingling or numbing sensation, increased tingling or numbing perception, increased tingling or numbing intensity, enhanced tingling or numbing sensation, enhanced tingling or numbing impact, decreased harshness, decreased stinging sensation, enhanced umami perception, increased umami impact, enhanced umami duration, increased umami intensity, increased mouth-watering effect, increased smooth mouthfeel effect, enhanced sourness perception, increased sourness intensity, decreased astringency sensation, or a masking of off-tastes, such as jambu off-tastes, herbal off-tastes or bitter off-tastes, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

222. The method of any one of claims 215-221, wherein the mixture provides a taste perception in the subject of an increase in alcohol perception or alcohol intensity when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

223. The method of any one of claims 215-222, wherein the mixture provides a taste perception in the subject of an increase in alcoholic bitterness or an increase in authentic alcohol taste when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

224. The method of any one of claims 215-223, wherein the mixture provides a taste perception in the subject of an increase in retro nasal effect or tingling effect when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

225. The method of any one of claims 215-224, wherein the mixture provides a taste perception in the subject of an increase in spiciness or spice intensity when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

226. The method of any one of claims 215-225, wherein the mixture provides a taste perception in the subject of an increased spiciness duration or a faster spiciness onset when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

227. The method of any one of claims 215-226, wherein the mixture provides a taste perception in the subject of an increase in salt and sour flavors or improved chili flavor when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

228. The method of any one of claims 215-227, wherein the mixture provides a taste perception in the subject of an increase in cooling perception or cooling intensity when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

229. The method of any one of claims 215-228, wherein the mixture provides a taste perception in the subject of a faster onset of coolness or an increased duration of coolness when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

230. The method of any one of claims 215-229, wherein the mixture provides a taste perception in the subject of an increase in carbonation perception or reduced bubble size or champagne-like effect when the mixture is provided to the subject, such as when the mixture is incorporated in a beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

231. The method of any one of claims 215-230, wherein the mixture provides a taste perception in the subject of a decrease in harshness or decrease in stinging sensation when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

232. The method of any one of claims 215-231, wherein the mixture reduces the carbonation bubble size of a beverage when the mixture is incorporated into a beverage, as compared to the carbonation bubble size of the beverage in the absence of component (a).

233. The method of any one of claims 215-232, wherein the mixture increases the amount of carbonation bubbles of a beverage when the mixture is incorporated into a beverage as compared to amount of carbonation bubbles of the beverage in the absence of component (a).

234. The method of any one of claims 215-233, wherein the mixture provides a taste perception in the subject of an increase in numbing or tingling perception or numbing or tingling intensity when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

235. The method of any one of claims 215-234, wherein the mixture provides a taste perception in the subject of a faster onset of numbing or tingling or an increased duration of numbing or tingling when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

236. The method of any one of claims 215-235, wherein the mixture provides a taste perception in the subject of an increase in saltiness perception or salt intensity when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

237. The method of any one of claims 215-236, wherein the mixture provides a taste perception in the subject of an enhanced initial salt impact or enhanced saltiness taste when the mixture is provided to the subject, such as when the mixture is incorporated in a food or

beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

238. The method of any one of claims 215-237, wherein the mixture provides a taste perception in the subject that masks a bitter off-taste, herbal off-taste, or jambu off-taste when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

239. The method of any one of claims 215-238, wherein the mixture provides a taste perception in the subject of an enhanced umami perception or increased umami intensity when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

240. The method of any one of claims 215-239, wherein the mixture provides a taste perception in the subject of an increased umami impact or increased duration of umami sensation when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

241. The method of any one of claims 215-240, wherein the mixture provides a taste perception in the subject of an increased mouth-watering effect when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

242. The method of any one of claims 215-241, wherein the mixture provides a perception in the subject of an increased smooth mouthfeel effect when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

243. The method of any one of claims 215-242, wherein the mixture provides a taste perception in the subject of an enhanced sourness perception of increased sourness intensity when the mixture is provided to the subject, such as when the mixture is incorporated in a food

or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

244. The method of any one of claims 215-243, wherein the mixture provides a taste perception in the subject of a reduction of astringency when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

245. The method of any one of claims 215-244, wherein the food or beverage or granule, powder, or liquid formulation is selected from a carbonated beverage, such as a carbonated fruit beverage, carbonated cola drink or carbonated water, alcoholic beverages, alcohol-free beverages, spices and/or seasonings, such as chili, wasabi, horseradish, mustard, ginger, black pepper, or cinnamon, meat, vegetables, mushrooms, cheese, seafood, dry cereal, oatmeal, granola bars, salt, energy beverages, flavored water, powders for drinks, hard candy, soft candy, taffy, chocolates, sugarless candies, chewing gum, bubble gum, juices, teas, coffees, salsa, gel beads, film strips for breath, gelatin candies, pectin candies, starch candies, lozenges, cough drops, throat lozenges, throat sprays, toothpastes or mouth rinses.

246. The method of any one of claims 215-245, wherein the amount of component (a) in the mixture is at least 0.1 ppm, such as at least 0.2, 0.3, 0.4, 0.5, 0.75, 1, 1.5, 2.5, 3, 4, 5, 7.5, 10, 20, 30, 40, 50, 60, 70, 80, 90, 100, 110, 120, 130, 140, 150, 160, 170, 180, 190, 200, 210, 220, 230, 240, 250, 260, 270, 280, 290, or 300 ppm or an amount within a range defined by any two of the aforementioned amounts, preferably 1-5 ppm, 2.5-5 ppm, 5-300ppm, 20-300ppm, 25-300 ppm, 50-300 ppm, 100-300 ppm, 150-300 ppm, 200-300 ppm, or 1-300 ppm.

247. The method of any one of claims 215-246 further comprising selecting or identifying a subject to receive a composition, which modulates taste perception in a subject, such as salt perception, salt impact, saltiness, metallic taste, alcohol perception, authentic alcohol taste, tingling effect, alcoholic bitterness, cooling intensity, cooling perception, spiciness duration, the time of onset of spicy sensation, spicy intensity, chili flavor, salt or sour flavor, spiciness, the time of onset of tingling or numbing sensation, tingling or numbing perception, tingling or numbing intensity, tingling or numbing sensation, tingling or numbing impact, harshness, stinging sensation, umami perception, umami impact, umami duration, umami intensity, mouth-watering effect, sourness perception, sourness intensity, astringency

sensation, which masks off-tastes, such as jambu off-tastes, herbal off-tastes or bitter off-tastes, which modulates the mouthfeel effect in a subject, which decreases the carbonation bubble size or increases the carbonation bubble amount in a carbonated beverage, or which increases the retro nasal effect in a subject.

248. The method of any one of claims 215-247 further comprising determining or analyzing the salt perception, salt impact, saltiness, metallic taste, alcohol perception, authentic alcohol taste, tingling effect, alcoholic bitterness, cooling intensity, cooling perception, spiciness duration, the time of onset of spicy sensation, spicy intensity, chili flavor, salt or sour flavor, spiciness, the time of onset of tingling or numbing sensation, tingling or numbing perception, tingling or numbing intensity, tingling or numbing sensation, tingling or numbing impact, harshness, stinging sensation, umami perception, umami impact, umami duration, umami intensity, mouth-watering effect, sourness perception, sourness intensity, astringency sensation, the masking of off-tastes, such as jambu off-tastes, herbal off-tastes or bitter off-tastes, the mouthfeel, the reduction of carbonation bubble size or increase of carbonation bubble amount in a carbonated beverage, or the increase of the retro nasal effect or any combination thereof of the subject after consuming said mixture.

249. The method of any one of claims 215-248, wherein component (a) is dissolved in food grade ethanol.

250. The method of claim 249, wherein the food grade ethanol is at least 1%, such as 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 15, 20, 25, 30, 35, 40, 45, 50, 60, 70, 80, 85, 90, 95, or 100%, or with a range defined by any two of the aforementioned amounts, preferably 80, 90, or 95%.

251. A method of making a mixture, which modulates a subject's taste perception of alcohol, carbonation, spice, salt, sourness, umami, tingling, numbing, or cooling, or which masks an off-taste of a compound in a subject, the method comprising:

admixing a component (a) with a component (b) to form said mixture:

(a) a polyisoprenylated benzophenone or analog thereof (for example, a glycosylation molecule of an aglycone, an aglycone of a glycosylated molecule, or a further glycosylated molecule of a glycosylated molecule) or an extract of a plant that comprises a polyisoprenylated benzophenone or an analog thereof, such as a *Garcinia indica* extract or a *Garcinia cambogia* extract; and

(b) a composition comprising an alcohol, carbonation, spice, salt, tingling compound, numbing compound, sour compound, umami compound or a cooling compound or a non-alcoholic beverage;

wherein the composition is preferably provided in a food, beverage, granule, powder or liquid formulation; and

optionally, wherein the composition comprises one or more preservatives or antioxidants, such as a sulphite, sorbic acid, a sorbate compound, benzoic acid, benzoate, propionic acid, propionate, ascorbic acid, ascorbate, citric acid, a tocopherol, a retinol, a polyphenol, a phenolic acid, a flavonoid, lipoic acid, N-acetylcysteine, butylated hydroxyanisole, butylated hydroxytoluene or derivatives thereof, preferably, wherein the one or more preservatives or antioxidants improve the shelf-life, flavor profile, or reduce spoilage of the mixture.

252. The method of claim 251, wherein the polyisoprenylated benzophenone or an analog thereof is selected from one or more of the following: Aristophenone A, Aristophenone B, Bronianone C, Camboginol C, Cambogin C, Chamuangone, Clusianone, 7-epi-aristophenone, 7-epi-clusianone, Eugeniaphenone, Gambogenone, Garcicowin A, Garcicowin B, Garcicowin C, Garcicowin D, Garcimangosone D, Garcimultiflorone A, Garcimultiflorone B, Garcimultiflorone C, Garcimultiflorone D, Garcimultiflorone E, Garcimultiflorone F, (+) Garcinialiptone A, (−) Garcinialiptone B, (−) Cycloxanthochymol, Garcinialiptone C, Garcinialiptone D, Garcinielliptone FA, Garcinielliptone FB, Garcinol, Garcinol 13-O-methylether, Garciosaphenone A, Guttiferone A, Guttiferone B, Guttiferone C, Guttiferone D, Guttiferone E, Guttiferone F, Guttiferone G, Guttiferone H, Guttiferone I, Guttiferone J, Guttiferone K, Guttiferone L, Guttiferone M, Guttiferone N, Guttiferone O, Guttiferone P, Guttiferone Q, Guttiferone R, Guttiferone S, Isogarcimultiflorone F, Isogarcinol, Isogarcinol 13-O-methylether, Isoxanthochymol, Kolanone, Macurin, Myrtiaphenone A, Myrtiaphenone B, Oblongifolins A, Oblongifolins B, Oblongifolins C, Oblongifolins D, Oblongifolins E, Oblongifolins F, Oblongifolins G, Paucinone A, Paucinone B, Paucinone C, Paucinone D, Pedunculol, Pseudoguttiaphenone A, Semsinones A, Semsinones B, Semsinones C, Xanthochymol, Vismiaphenone C, 13, 14 di-dehydroxyisogarcinol, 13-hydroxygarcimultiflorone B, 18-hydroxygarcimultiflorone D, Cariphenone A, Cariphenone B,

Chamone I, Chamone II, Clusianone, Clusiaphenone A, Clusiaphenone B, Coccinone A, Coccinone B, Coccinone C, Coccinone D, Coccinone E, Coccinone F, Coccinone G, Coccinone H, Cudranone, Cudraphenone A, Cudraphenone B, Cudraphenone C, Cudraphenone D, 14-deoxygarcinol, 15, 16 dihydro-16-hydroperoxy plukenetione F, 7-epi-garcinol, 7-epi-isogarcinol, 7-epi nemorosone, 28, 29 epoxy plukenetione A, Garcinielliptone I, Guttiferone K, Hilarianone, 33-hydroperoxy-isoplukenetione, Hyperibone B, Hyperibone K, Hyperibone L, Insigninone, Isovismiaphenone B, Isoxanthochymol, Lanceolatone, Machuone, Methyl hydroxyl nemorosone, Microsphaerins A, Microsphaerins B, Microsphaerins C, Microsphaerins D, Methyl Grandone, Nemorosonal, Nemorosone, Nemorosone II, Ochrocarpinone A, Ochrocarpinone B, Ochrocarpinone C, Pestalone, Plukenetione A, Plukenetione B, Plukenetione C, Plukenetione D acetate, Plukenetione E acetate, Plukenetione F, Plukenetione G, Propolone A, Propolone B, Propolone C, Propolone D, Sampsonione A, Sampsonione B, Sampsonione C, Sampsonione D, Sampsonione E, Sampsonione F, Sampsonione G, Sampsonione H, Sampsonione N, Sampsonione O, Sampsonione P, Sampsonione Q, Scrobiculatone A, Scrobiculatone B, Spiritone, Tovophenone A, Tovophenone B, Tovophenone C, Vismiaguianone A, Vismiaguianone B, Vismiaguianone C, Vismiaguianone D, Vismiaguianone E, Vismiaphenone A, Vismiaphenone B, Vismiaphenone C, Vismiaphenone D, Vismiaphenone E, Vismiaphenone F, Vismiaphenone G, Wedellianone A, Wedellianone B, Xerophenone A, Xerophenone B, 18-ethyloxy-17-hydroxy-17,18-dihydroscrobiculatone A, or 18-ethyloxy-17-hydroxy-17,18-dihydroscrobiculatone B.

253. The method of any one of claims 251 or 252, wherein the polyisoprenylated benzophenone or analog thereof or the extract of a plant that comprises an polyisoprenylated benzophenone or an analog thereof comprises a glucosylated polyisoprenylated benzophenone or an aglycone of a polyisoprenylated benzophenone.

254. The method of any one of claims 251-253, wherein the composition is an alcoholic or non-alcoholic beverage, a spicey product that comprises a chili, wasabi, horseradish, mustard, ginger, black pepper, cinnamon, pumpkin spice, Szechuan pepper, or allspice, a salt, a carbonated beverage e.g., to reduce the bubble size of the beverage or impart a champagne-like effect, a sour compound, such as acetic acid, citric acid, malic acid, fumaric acid, tartaric acid, phosphoric acid or other acid, an umami compound, such as monosodium glutamate, disodium inosinate, disodium guanylate, seafoods, meats, vegetables, tea,

seaweed, mushrooms, eggs, dairy products, or fermented products, a tingling or numbing compound, such as jambu oleoresin or spilanthol, or a cooling compound, such as Menthol, Cyclohexanecarboxamide,N-Ethyl-5-Methyl-2-(1- Methylethyl) (WS-3), N-(Ethoxycarbonylmethyl)-3-p-menthanecarboxamide (WS-5), (1R,2S,5R)-N-(4-Methoxyphenyl)-5-methyl-2-(1- methylethyl)cyclohexanecarboxamide (WS-12), Butanamide, N,2,3-trimethyl-2-(1-methylethyl) (WS-23), or Menthyl Lactate or any combination thereof.

255. The method of any one of claims 251-254, wherein the plant extract comprising a polyisoprenylated benzophenone or an analog is obtained from a plant from any one or more of the following families or genera: Clusiasceae, Guttiferae, Clusia, Garcinia, Vismia, Allanblackia, Moronobea, Symphonia, Hypericum, Tovomita, Tovomiptosis, or Ochrocarpus.

256. The method of any one of claims 251-255, wherein the plant extract comprising amentoflavone is obtained from a plant from any one or more of the following species: *Garcinia aristata, Garcinia xanthochymus, Garcinia multiflora, Garcinia hambroniana, Garcinia cambogia, Garcinia oblongifolia , Garcinia pedunculata, Garcinia mangostana, Garcinia cowa, Garcinia assigu, Garcinia humulis , Garcinia brasiliensis, Garcinia eugeniaefolia , Garcinia subelliptica, Garcinia purpurea, Garcinia indica, Garcinia speciosa, Garcinia yunnanensis, Garcinia livingstonei, Garcinia macrophylla, Garcinia intermedia, Garcinia virgata, Garcinia ovalifolia, Cuban propolis, Garcinia cochinchinensis, Garcinia solomonensis, Garcinia multiflora, Garcinia pyrifera, Garcinia kola, Garcinia myrtifolia, Garcinia pseudoguttifera, Garcinia paucinervis,* or *Garcinia semseii.*

257. The method of any one of claims 251-256, wherein the mixture provides an increased salt perception, increased salt impact, enhanced saltiness, increased metallic taste, increased alcohol perception, increased authentic alcohol taste, increased retro-nasal effect, increased tingling effect, increased alcoholic bitterness, increased herbal off-note taste, increased cooling intensity, increased cooling perception, enhanced spiciness duration, faster onset of spicy sensation, increase spicy intensity, improved chili flavor, increase in salt and sour flavor notes, an increased spiciness sensation in the subject, faster onset of tingling or numbing sensation, increased tingling or numbing perception, increased tingling or numbing intensity, enhanced tingling or numbing sensation, enhanced tingling or numbing impact, decreased harshness, decreased stinging sensation, enhanced umami perception, increased

umami impact, enhanced umami duration, increased umami intensity, increased mouth-watering effect, increased smooth mouthfeel effect, enhanced sourness perception, increased sourness intensity, decreased astringency sensation, or a masking of off-tastes, such as jambu off-tastes, herbal off-tastes or bitter off-tastes, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

258. The method of any one of claims 251-257, wherein the mixture provides a taste perception in the subject of an increase in alcohol perception or alcohol intensity when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

259. The method of any one of claims 251-258, wherein the mixture provides a taste perception in the subject of an increase in alcoholic bitterness or authentic alcohol taste when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

260. The method of any one of claims 251-259, wherein the mixture provides a taste perception in the subject of an increase in retro nasal effect or tingling effect when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

261. The method of any one of claims 251-260, wherein the mixture provides a taste perception in the subject of an increase in spiciness or spice intensity when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

262. The method of any one of claims 251-261, wherein the mixture provides a taste perception in the subject of an increased spiciness duration or faster spiciness onset when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

263. The method of any one of claims 251-262, wherein the mixture provides a taste perception in the subject of an increase in salt and sour flavors or improved chili flavor when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

264. The method of any one of claims 251-263, wherein the mixture provides a taste perception in the subject of an increase in cooling perception or cooling intensity when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

265. The method of any one of claims 251-264, wherein the mixture provides a taste perception in the subject of a faster onset of coolness or an increased duration of coolness when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

266. The method of any one of claims 251-265, wherein the mixture provides a taste perception in the subject of an increase in carbonation perception or reduced bubble size or champagne-like effect when the mixture is provided to the subject, such as when the mixture is incorporated in a beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

267. The method of any one of claims 251-266, wherein the mixture provides a taste perception in the subject of a decrease in harshness or decrease in stinging sensation when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

268. The method of any one of claims 251-267, wherein the mixture reduces the carbonation bubble size of a beverage when the mixture is incorporated into a beverage, as compared to the carbonation bubble size of the beverage in the absence of component (a).

269. The method of any one of claims 251-268, wherein the mixture increases the amount of carbonation bubbles of a beverage when the mixture is incorporated into a beverage

as compared to amount of carbonation bubbles of the beverage in the absence of component (a).

270. The method of any one of claims 251-269, wherein the mixture provides a taste perception in the subject of an increase in numbing or tingling perception or numbing or tingling intensity when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

271. The method of any one of claims 251-270, wherein the mixture provides a taste perception in the subject of a faster onset of numbing or tingling or an increased duration of numbing or tingling when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

272. The method of any one of claims 251-271, wherein the mixture provides a taste perception in the subject of an increase in saltiness perception or salt intensity when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

273. The method of any one of claims 251-272, wherein the mixture provides a taste perception in the subject of an enhanced initial salt impact or enhanced saltiness taste when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

274. The method of any one of claims 251-273, wherein the mixture provides a taste perception in the subject that masks a bitter off-taste, herbal off-taste or jambu off-taste when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

275. The method of any one of claims 251-274, wherein the mixture provides a taste perception in the subject of an enhanced umami perception or increased umami intensity when the mixture is provided to the subject, such as when the mixture is incorporated in a food or

beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

276. The method of any one of claims 251-275, wherein the mixture provides a taste perception in the subject of an increased umami impact or increased duration of umami sensation when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

277. The method of any one of claims 251-276, wherein the mixture provides a taste perception in the subject of an increased mouth-watering effect when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

278. The method of any one of claims 251-277, wherein the mixture provides a perception in the subject of an increased smooth mouthfeel effect when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

279. The method of any one of claims 251-278, wherein the mixture provides a taste perception in the subject of an enhanced sourness perception of increased sourness intensity when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

280. The method of any one of claims 251-279, wherein the mixture provides a taste perception in the subject of a reduction of astringency when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

281. The method of any one of claims 251-280, wherein the food or beverage or granule, powder, or liquid formulation is selected from a carbonated beverage, such as a carbonated fruit beverage, carbonated cola drink or carbonated water, alcoholic beverages, alcohol-free beverages, spices and/or seasonings, such as chili, wasabi, horseradish, mustard,

ginger, black pepper, or cinnamon, meat, vegetables, mushrooms, cheese, seafood, dry cereal, oatmeal, granola bars, salt, energy beverages, flavored water, powders for drinks, hard candy, soft candy, taffy, chocolates, sugarless candies, chewing gum, bubble gum, juices, teas, coffees, salsa, gel beads, film strips for breath, gelatin candies, pectin candies, starch candies, lozenges, cough drops, throat lozenges, throat sprays, toothpastes or mouth rinses.

282. The method of any one of claims 251-281, wherein the amount of component (a) in the mixture is at least 2 ppm, such as, 3, 4, 5, 7.5, 10, 20, 30, 40, 50, 60, 70, 80, 90, 100, 110, 120, 130, 140, 150, 160, 170, 180, 190, 200, 210, 220, 230, 240, 250, 260, 270, 280, 290, or 300 ppm or an amount within a range defined by any two of the aforementioned amounts, preferably 1-5 ppm, 2.5-5 ppm, 5-300ppm, 20-300ppm, 25-300 ppm, 50-300 ppm, 100-300 ppm, 150-300 ppm, 200-300 ppm, or 1-300 ppm.

283. The method of any one of claim 251-282 further comprising dissolving component (a) in food grade ethanol.

284. The method of claim 283, wherein the food grade ethanol is at least 1%, such as 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 15, 20, 25, 30, 35, 40, 45, 50, 60, 70, 80, 85, 90, 95, or 100%, or with a range defined by any two of the aforementioned amounts, preferably 80, 90, or 95%.

285. A composition obtained or obtainable by the method of any one of claims 251-284.

286. A mixture used for modulating a subject's taste perception of alcohol, carbonation, spice, salt, sourness, umami, tingling, numbing, or cooling, or for masking an off-taste of a compound in a subject, wherein the mixture comprises at least two components (a) and (b):

(a) a polyisoprenylated benzophenone or analog thereof (for example, a glycosylation molecule of an aglycone, an aglycone of a glycosylated molecule, or a further glycosylated molecule of a glycosylated molecule) or an extract of a plant that comprises a polyisoprenylated benzophenone or an analog thereof, such as a *Garcinia indica* extract or a *Garcinia cambogia* extract; and

(b) a composition comprising an alcohol, carbonation, spice, salt, tingling compound, numbing compound, sour compound, umami compound or a cooling compound or a non-alcoholic beverage; wherein component (a) is

admixed with component (b);

preferably, wherein the mixture is provided in a food, beverage, granule, powder or liquid formulation; and

optionally, wherein the mixture comprises one or more preservatives or antioxidants, such as a sulphite, sorbic acid, a sorbate compound, benzoic acid, benzoate, propionic acid, propionate, ascorbic acid, ascorbate, citric acid, a tocopherol, a retinol, a polyphenol, a phenolic acid, a flavonoid, lipoic acid, N-acetylcysteine, butylated hydroxyanisole, butylated hydroxytoluene or derivatives thereof, preferably, wherein the one or more preservatives or antioxidants improve the shelf-life, flavor profile, or reduce spoilage of the mixture.

287. The mixture for use of claim 286, wherein the polyisoprenylated benzophenone or an analog thereof is selected from one or more of the following: Aristophenone A, Aristophenone B, Bronianone C, Camboginol C, Cambogin C, Chamuangone, Clusianone, 7-epi-aristophenone, 7-epi-clusianone, Eugeniaphenone, Gambogenone, Garcicowin A, Garcicowin B, Garcicowin C, Garcicowin D, Garcimangosone D, Garcimultiflorone A, Garcimultiflorone B, Garcimultiflorone C, Garcimultiflorone D, Garcimultiflorone E, Garcimultiflorone F, (+) Garcinialiptone A, (–) Garcinialiptone B, (–) Cycloxanthochymol, Garcinialiptone C, Garcinialiptone D, Garcinielliptone FA, Garcinielliptone FB, Garcinol, Garcinol 13-O-methylether, Garciosaphenone A, Guttiferone A, Guttiferone B, Guttiferone C, Guttiferone D, Guttiferone E, Guttiferone F, Guttiferone G, Guttiferone H, Guttiferone I, Guttiferone J, Guttiferone K, Guttiferone L, Guttiferone M, Guttiferone N, Guttiferone O, Guttiferone P, Guttiferone Q, Guttiferone R, Guttiferone S, Isogarcimultiflorone F, Isogarcinol, Isogarcinol 13-O-methylether, Isoxanthochymol, Kolanone, Macurin, Myrtiaphenone A, Myrtiaphenone B, Oblongifolins A, Oblongifolins B, Oblongifolins C, Oblongifolins D, Oblongifolins E, Oblongifolins F, Oblongifolins G, Paucinone A, Paucinone B, Paucinone C, Paucinone D, Pedunculol, Pseudoguttiaphenone A, Semsinones A, Semsinones B, Semsinones C, Xanthochymol, Vismiaphenone C, 13, 14 di-dehydroxyisogarcinol, 13-hydroxygarcimultiflorone B, 18-hydroxygarcimultiflorone D, Cariphenone A, Cariphenone B, Chamone I, Chamone II, Clusianone, Clusiaphenone A, Clusiaphenone B, Coccinone A, Coccinone B, Coccinone C, Coccinone D, Coccinone E,

Coccinone F, Coccinone G, Coccinone H, Cudranone, Cudraphenone A, Cudraphenone B, Cudraphenone C, Cudraphenone D, 14-deoxygarcinol, 15, 16 dihydro-16-hydroperoxy plukenetione F, 7-epi-garcinol, 7-epi-isogarcinol, 7-epi nemorosone, 28, 29 epoxy plukenetione A, Garcinielliptone I, Guttiferone K, Hilarianone, 33-hydroperoxy-isoplukenetione, Hyperibone B, Hyperibone K, Hyperibone L, Insigninone, Isovismiaphenone B, Isoxanthochymol, Lanceolatone, Machuone, Methyl hydroxyl nemorosone, Microsphaerins A, Microsphaerins B, Microsphaerins C, Microsphaerins D, Methyl Grandone, Nemorosonal, Nemorosone, Nemorosone II, Ochrocarpinone A, Ochrocarpinone B, Ochrocarpinone C, Pestalone, Plukenetione A, Plukenetione B, Plukenetione C, Plukenetione D acetate, Plukenetione E acetate, Plukenetione F, Plukenetione G, Propolone A, Propolone B, Propolone C, Propolone D, Sampsonione A, Sampsonione B, Sampsonione C, Sampsonione D, Sampsonione E, Sampsonione F, Sampsonione G, Sampsonione H, Sampsonione N, Sampsonione O, Sampsonione P, Sampsonione Q, Scrobiculatone A, Scrobiculatone B, Spiritone, Tovophenone A, Tovophenone B, Tovophenone C, Vismiaguianone A, Vismiaguianone B, Vismiaguianone C, Vismiaguianone D, Vismiaguianone E, Vismiaphenone A, Vismiaphenone B, Vismiaphenone C, Vismiaphenone D, Vismiaphenone E, Vismiaphenone F, Vismiaphenone G, Wedellianone A, Wedellianone B, Xerophenone A, Xerophenone B, 18-ethyloxy-17-hydroxy-17,18-dihydroscrobiculatone A, or 18-ethyloxy-17-hydroxy-17,18-dihydroscrobiculatone B.

288. The mixture for use of any one of claims 286 or 287, wherein the polyisoprenylated benzophenone or analog thereof or the extract of a plant that comprises an polyisoprenylated benzophenone or an analog thereof comprises a glucosylated polyisoprenylated benzophenone or an aglycone of a polyisoprenylated benzophenone.

289. The mixture for use of any one of claims 286-288, wherein the composition is an alcoholic or non-alcoholic beverage, a spicey product that comprises a chili, wasabi, horseradish, mustard, ginger, black pepper, cinnamon, pumpkin spice, Szechuan pepper, or allspice, a salt, a carbonated beverage e.g., to reduce the bubble size of the beverage or impart a champagne-like effect, a sour compound, such as acetic acid, citric acid, malic acid, fumaric acid, tartaric acid, phosphoric acid or other acid, an umami compound, such as monosodium glutamate, disodium inosinate, disodium guanylate, seafoods, meats, vegetables, tea,

seaweed, mushrooms, eggs, dairy products, or fermented products, a tingling or numbing compound, such as jambu oleoresin or spilanthol, or a cooling compound, such as Menthol, Cyclohexanecarboxamide,N-Ethyl-5-Methyl-2-(1- Methylethyl) (WS-3), N-(Ethoxycarbonylmethyl)-3-p-menthanecarboxamide (WS-5), (1R,2S,5R)-N-(4-Methoxyphenyl)-5-methyl-2-(1- methylethyl)cyclohexanecarboxamide (WS-12), Butanamide, N,2,3-trimethyl-2-(1-methylethyl) (WS-23), or Menthyl Lactate or any combination thereof.

290. The mixture for use of any one of claims 286-289, wherein the plant extract comprising a polyisoprenylated benzophenone or an analog is obtained from a plant from any one or more of the following families or genera: Clusiasceae, Guttiferae, Clusia, Garcinia, Vismia, Allanblackia, Moronobea, Symphonia, Hypericum, Tovomita, Tovomiptosis, or Ochrocarpus.

291. The mixture for use of any one of claims 286-290, wherein the plant extract comprising amentoflavone is obtained from a plant from any one or more of the following species: *Garcinia aristata, Garcinia xanthochymus, Garcinia multiflora, Garcinia hambroniana, Garcinia cambogia, Garcinia oblongifolia , Garcinia pedunculata, Garcinia mangostana, Garcinia cowa, Garcinia assigu, Garcinia humulis , Garcinia brasiliensis, Garcinia eugeniaefolia , Garcinia subelliptica, Garcinia purpurea, Garcinia indica, Garcinia speciosa, Garcinia yunnanensis, Garcinia livingstonei, Garcinia macrophylla, Garcinia intermedia, Garcinia virgata, Garcinia ovalifolia, Cuban propolis, Garcinia cochinchinensis, Garcinia solomonensis, Garcinia multiflora, Garcinia pyrifera, Garcinia kola, Garcinia myrtifolia, Garcinia pseudoguttifera, Garcinia paucinervis,* or *Garcinia semseii.*

292. The mixture for use of any one of claims 286-291, wherein the mixture provides an increased salt perception, increased salt impact, enhanced saltiness, increased metallic taste, increased alcohol perception, increased authentic alcohol taste, increased retro-nasal effect, increased tingling effect, increased alcoholic bitterness, increased herbal off-note taste, increased cooling intensity, increased cooling perception, enhanced spiciness duration, faster onset of spicy sensation, increase spicy intensity, improved chili flavor, increase in salt and sour flavor notes, an increased spiciness sensation in the subject, faster onset of tingling or numbing sensation, increased tingling or numbing perception, increased tingling or numbing intensity, enhanced tingling or numbing sensation, enhanced tingling or numbing impact,

decreased harshness, decreased stinging sensation, enhanced umami perception, increased umami impact, enhanced umami duration, increased umami intensity, increased mouth-watering effect, increased smooth mouthfeel effect, enhanced sourness perception, increased sourness intensity, decreased astringency sensation, or a masking of off-tastes, such as jambu off-tastes, herbal off-tastes or bitter off-tastes, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

293. The mixture for use of any one of claims 286-292, wherein the mixture provides a taste perception in the subject of an increase in alcohol perception or alcohol intensity when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

294. The mixture for use of any one of claims 286-293, wherein the mixture provides a taste perception in the subject of an increase in alcoholic bitterness or authentic alcohol taste when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

295. The mixture for use of any one of claims 286-294, wherein the mixture provides a taste perception in the subject of an increase in retro nasal effect or tingling effect when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

296. The mixture for use of any one of claims 286-295, wherein the mixture provides a taste perception in the subject of an increase in spiciness or spice intensity when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

297. The mixture for use of any one of claims 286-296, wherein the mixture provides a taste perception in the subject of an increased spiciness duration or faster spiciness onset when the mixture is provided to the subject, such as when the mixture is incorporated in a food

or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

298. The mixture for use of any one of claims 286-297, wherein the mixture provides a taste perception in the subject of an increase in salt and sour flavors or improved chili flavor when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

299. The mixture for use of any one of claims 286-298, wherein the mixture provides a taste perception in the subject of an increase in cooling perception or cooling intensity when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

300. The mixture for use of any one of claims 286-299, wherein the mixture provides a taste perception in the subject of a faster onset of coolness or an increased duration of coolness when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

301. The mixture for use of any one of claims 286-300, wherein the mixture provides a taste perception in the subject of an increase in carbonation perception or reduced bubble size or champagne-like effect when the mixture is provided to the subject, such as when the mixture is incorporated in a beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

302. The mixture for use of any one of claims 286-301, wherein the mixture provides a taste perception in the subject of a decrease in harshness or decrease in stinging sensation when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

303. The mixture for use of any one of claims 286-302, wherein the mixture reduces the carbonation bubble size of a food or beverage when the mixture is incorporated into a beverage, as compared to the carbonation bubble size of the beverage in the absence of component (a).

304. The mixture for use of any one of claims 286-303, wherein the mixture increases the amount of carbonation bubbles of a beverage when the mixture is incorporated into a beverage as compared to amount of carbonation bubbles of the beverage in the absence of component (a).

305. The mixture for use of any one of claims 286-304, wherein the mixture provides a taste perception in the subject of an increase in numbing or tingling perception or numbing or tingling intensity when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

306. The mixture for use of any one of claims 286-305, wherein the mixture provides a taste perception in the subject of a faster onset of numbing or tingling or an increased duration of numbing or tingling when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

307. The mixture for use of any one of claims 286-306, wherein the mixture provides a taste perception in the subject of an increase in saltiness perception or salt intensity when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

308. The mixture for use of any one of claims 286-307, wherein the mixture provides a taste perception in the subject of an enhanced initial salt impact or enhanced saltiness taste when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

309. The mixture for use of any one of claims 286-308, wherein the mixture provides a taste perception in the subject that masks a bitter off-taste, herbal off-taste or jambu off-taste when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

310. The mixture of any one of claims 286-309, wherein the mixture provides a taste perception in the subject of an enhanced umami perception or increased umami intensity when

the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

311. The mixture of any one of claims 286-310, wherein the mixture provides a taste perception in the subject of an increased umami impact or increased duration of umami sensation when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

312. The mixture of any one of claims 286-311, wherein the mixture provides a taste perception in the subject of an increased mouth-watering effect when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

313. The mixture of any one of claims 286-312, wherein the mixture provides a perception in the subject of an increased smooth mouthfeel effect when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

314. The mixture of any one of claims 286-313, wherein the mixture provides a taste perception in the subject of an enhanced sourness perception of increased sourness intensity when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

315. The mixture of any one of claims 286-314, wherein the mixture provides a taste perception in the subject of a reduction of astringency when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

316. The mixture for use of any one of claims 286-315, wherein the food or beverage or granule, powder, or liquid formulation is selected from a carbonated beverage, such as a carbonated fruit beverage, carbonated cola drink or carbonated water, alcoholic beverages,

alcohol-free beverages, spices and/or seasonings, such as chili, wasabi, horseradish, mustard, ginger, black pepper, or cinnamon, meat, vegetables, mushrooms, cheese, seafood, dry cereal, oatmeal, granola bars, salt, energy beverages, flavored water, powders for drinks, hard candy, soft candy, taffy, chocolates, sugarless candies, chewing gum, bubble gum, juices, teas, coffees, salsa, gel beads, film strips for breath, gelatin candies, pectin candies, starch candies, lozenges, cough drops, throat lozenges, throat sprays, toothpastes or mouth rinses.

317. The mixture for use of any one of claims 286-316, wherein the amount of component (a) in the mixture is at least 2 ppm, such as, 3, 4, 5, 7.5, 10, 20, 30, 40, 50, 60, 70, 80, 90, 100, 110, 120, 130, 140, 150, 160, 170, 180, 190, 200, 210, 220, 230, 240, 250, 260, 270, 280, 290, or 300 ppm or an amount within a range defined by any two of the aforementioned amounts, preferably 1-5 ppm, 2.5-5 ppm, 5-300ppm, 20-300ppm, 25-300 ppm, 50-300 ppm, 100-300 ppm, 150-300 ppm, 200-300 ppm, or 1-300 ppm.

318. The mixture for use of any one of claims 286-317 further comprising selecting or identifying a subject to receive a composition, which modulates taste perception in a subject, such as salt perception, salt impact, saltiness, metallic taste, alcohol perception, authentic alcohol taste, tingling effect, alcoholic bitterness, cooling intensity, cooling perception, spiciness duration, the time of onset of spicy sensation, spicy intensity, chili flavor, salt or sour flavor, spiciness, the time of onset of tingling or numbing sensation, tingling or numbing perception, tingling or numbing intensity, tingling or numbing sensation, tingling or numbing impact, harshness, stinging sensation, umami perception, umami impact, umami duration, umami intensity, mouth-watering effect, sourness perception, sourness intensity, astringency sensation, which masks off-tastes, such as jambu off-tastes, herbal off-tastes or bitter off-tastes, which modulates the mouthfeel effect in a subject, which decreases the carbonation bubble size or increases the carbonation bubble amount in a carbonated beverage, or which increases the retro nasal effect in a subject.

319. The mixture for use of any one of claims 286-318 further comprising determining or analyzing the salt perception, salt impact, saltiness, metallic taste, alcohol perception, authentic alcohol taste, tingling effect, alcoholic bitterness, cooling intensity, cooling perception, spiciness duration, the time of onset of spicy sensation, spicy intensity, chili flavor, salt or sour flavor, spiciness, the time of onset of tingling or numbing sensation, tingling or numbing perception, tingling or numbing intensity, tingling or numbing sensation,

tingling or numbing impact, harshness, stinging sensation, umami perception, umami impact, umami duration, umami intensity, mouth-watering effect, sourness perception, sourness intensity, astringency sensation, the masking of off-tastes, such as jambu off-tastes, herbal off-tastes or bitter off-tastes, the mouthfeel, the reduction of carbonation bubble size or increase of carbonation bubble amount in a carbonated beverage, or the increase of the retro nasal effect or any combination thereof of the subject after consuming said mixture.

320. The mixture for use of any one of claims 286-319, wherein component (a) is dissolved in food grade ethanol.

321. The mixture for use of claim 320, wherein the food grade ethanol is at least 1%, such as 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 15, 20, 25, 30, 35, 40, 45, 50, 60, 70, 80, 85, 90, 95, or 100%, or with a range defined by any two of the aforementioned amounts, preferably 80, 90, or 95%.

322. A method for modulating a subject's taste perception of fruity flavors, white flavors, brown flavors, pungency, burning, harshness, bitterness, aging, oak, honey, alcohol, syrup, tea, or saffron, the method comprising:

providing a subject a mixture that comprises at least two components (a) and (b):

(a) a phenylpropanoid, a phenylethanol derivative, a glycoside or an analog thereof (for example, a glycosylation molecule of an aglycone, an aglycone of a glycosylated molecule, or a further glycosylated molecule of a glycosylated molecule) or an extract of a plant that comprises a phenylpropanoid, a phenylethanol derivative, a glycoside or an analog thereof, such as a *Rhodiola rosea* root extract; and

(b) a composition comprising a fruit, vanilla, cocoa, chocolate, coffee, a pungent compound, a burning compound, a harsh compound, a bitter compound, saffron, oak extract, honey, tea, syrup, or an alcohol, wherein component (a) is admixed with component (b);

wherein the mixture is preferably provided in a food, beverage, granule, powder or liquid formulation; and

optionally, wherein the mixture comprises one or more preservatives or antioxidants, such as a sulphite, sorbic acid, a sorbate compound, benzoic acid, benzoate, propionic acid, propionate, ascorbic acid, ascorbate, citric

acid, a tocopherol, a retinol, a polyphenol, a phenolic acid, a flavonoid, lipoic acid, N-acetylcysteine, butylated hydroxyanisole, butylated hydroxytoluene or derivatives thereof, preferably, wherein the one or more preservatives or antioxidants improve the shelf-life, flavor profile, or reduce spoilage of the mixture; and/or

optionally, selecting a composition that comprises an compound with a fruit, vanilla, chocolate, coffee, a pungent compound, a burning compound, a harsh compound, a bitter compound, saffron, oak extract, honey, tea, syrup, or an alcohol for receiving an agent that modulates the taste perception of a subject of fruity flavors, white flavors, brown flavors, pungency, burning, harshness, bitterness, aging, oak tastes, or saffron tastes and providing said selected composition component (a); and/or

optionally, evaluating the modulation of a subject's taste perception of fruity flavors, white flavors, brown flavors, pungency, burning, harshness, bitterness, aging, oak tastes, or saffron tastes after providing the subject the mixture.

323. The method of claim 322, wherein the phenylpropanoid, the phenylethanol derivative, the glycoside or an analog thereof or the extract of a plant that comprises a phenylpropanoid, a phenylethanol derivative, a glycoside or an analog thereof comprises molecules selected from one or more of the following: salidroside (rhodioloside), rosin, rosavin, rosarin, rosiridrin, rhodioniside, and p-tyrosol.

324. The method of any one of claims 322 or 323, wherein the phenylpropanoid, the phenylethanol derivative, the glycoside or an analog thereof or the extract of a plant that comprises a phenylpropanoid, a phenylethanol derivative, a glycoside or an analog thereof comprises a glucosylated phenylpropanoid, a glucosylated phenylethanol derivative, a glucosylated glycoside, an aglycone of a phenylpropanoid, an aglycone of a phenylethanol derivative, or an aglycone of a glycoside.

325. The method of any one of claims 322-324, wherein the composition is a fruit, such as citrus fruits, tropical fruits, or berries, juices, puree, jam, jelly, sports drinks, fruit flavored beverages, wine, dairy product, plant-based milk, product of plant-based milk, coffee, such as black coffee, milk-based coffee drinks, iced coffee drinks, instant coffee, coffee beans, or any combination thereof, alcoholic or non-alcoholic beverage, such as vodka, brandy, whiskey, or any combination thereof, a pungent compound, such as capsaicin, capsicum,

piperine, allyl isothiocyanate, allicin, gingerol, sinigrin, eugenol, sinalbin, safrole, menthol, isothiocyanates, thymol, curcumin, resiniferatoxin, oleocanthal or any combination thereof, a harsh compound, such as quinine, caffeine, nicotine, tannins, catechins, limonene, pinene, amygdalin, saponins, oxalic acid, formic acid, allyl isothiocyanate, dimethyl sulfide, casein peptides, bromelain, capsaicin or any combination thereof, a burning compound, such as capsaicin, dihydrocapsaicin, nordihydrocapsaicin, allyl isothiocyanate, piperine, gingerol, allicin, allyl sulfide, diallyl disulfide, resiniferatoxin, acrolein, cinnamaldehyde, menthol, eugenol, ethanol, acetic acid, oleocanthal, citric acid or any combination thereof, a bitter compound, such as absinthin, aloin, alpha acid, amarogentin, andrographolide, brucine, caffeine, denatonium, eugenin, hesperidin, humulone, isohumulone, Kaempferol 3-O-rutinoside, 6-Methoxymellein, naringin, papaverine, phenylthiocarbamide, propylthiouracil, quassin, quinidine, quinine, salicin, strychnine, sucrose octaacetate, sucrose octapropionate, theobromine, theophylline, vegetables, tea, chocolate, fruits or any combination thereof, honey, vanilla, chocolate, tea, saffron, safranal or syrup, such as maple syrup.

326. The method of claim 325, wherein the dairy product, plant-based milk, or product of plant-based milk comprises a milk, such as whole milk, nonfat milk, lactose-free milk, buttermilk, condensed milk, cashew milk, goat milk, rick milk, soy milk, oat milk, almond milk, coconut milk, chocolate milk, a yogurt, cheese, frosting, pudding, chocolate, custard, ice cream, gelato, sherbet, sorbet, frozen yogurt or any combination thereof.

327. The method of any one of claims 322-326, wherein the plant extract that comprises a phenylpropanoid, a phenylethanol derivative, a glycoside or an analog thereof is obtained from a plant from any one or more of the following species: *Rhodiola rosea*, *Rhodiola alterna*, *Rhodiola brevipetiolata*, *Rhodiola crenulate*, *Rhodiola kirilowi*, *Rhodiola quadrifida*, *Rhodiola sachalinensis*, *Rhodiola sacra.*, or *Rhodiola iremelica.*.

328. The method of any one of claims 322-327, wherein the mixture provides a taste perception in the subject of an enhancement of ripeness or ripeness perception, an enhancement of juiciness or juiciness perception, an enhancement of freshness or freshness perception, an enhancement of fruity flavors or notes, an enhancement of flavor depth, an enhancement in mouthfeel or mouthfeel perception when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared,

for example, to when component (b) is provided to the subject in the absence of component (a).

329. The method of any one of claims 322-328, wherein the mixture provides a taste perception in the subject of an enhancement of cocoa flavors or notes, an enhancement of dark cocoa flavors or notes, an enhancement of vanilla bean flavors or notes, an enhancement of sweetness or sweetness perception, an enhancement of roasted coffee flavors or notes, an enhancement of dark roasted coffee flavors or notes, or an enhancement of creaminess or creaminess perception when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

330. The method of any one of claims 322-329, wherein the mixture provides a taste perception in the subject of an enhancement of cinnamic notes, an enhancement of brown notes, or an enhancement of honey notes when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

331. The method of any one of claims 322-330, wherein the mixture provides a taste perception in the subject of a reduction in pungency or pungency perception, a reduction in initial pungency perception, a reduction in burning sensation or burning perception, a reduction in initial burning perception, a delayed onset of burning sensation or burning perception, a reduction in burning sensation duration, a masking of alcohol perception, an enhancement of aged fruit notes, enhancement of brandy flavors or notes, a reduction in tingling sensation or tingling perception, a reduction in initial tingling perception, a delayed onset of tingling sensation or tingling perception, a reduction in harshness or harshness perception, a reduction in bitterness or bitterness perception, a delayed onset of spice burn or spice burn perception, or a reduction in spice intensity when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

332. The method of any one of claims 322-331, wherein the mixture provides a taste perception in the subject of an enhancement of aging effect, an enhancement of wood tastes or notes, an enhancement of brown flavors or notes, an enhancement of sweet flavors or notes,

an enhancement of caramel flavors or notes, an enhancement of floral flavors or notes, an enhancement of woodiness, an enhancement of hay flavors or notes, an enhancement of saffron taste or an enhancement of astringency or astringency perception when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

333. The method of any one of claims 322-332, wherein the food or beverage or granule, powder, or liquid formulation is selected from a sugar substitute, water, a carbonated beverage, such as a carbonated fruit beverage, carbonated cola drink or carbonated water, sport beverage, alcoholic beverages, alcohol-free beverages, spices and/or seasonings, such as chili, wasabi, horseradish, mustard, ginger, black pepper, or cinnamon, meat, vegetables, mushrooms, cheese, seafood, salt, energy beverages, flavored water, powders for drinks, dairy products, such as milk, yogurt, cheese, or ice cream, plant based milks, products of plant based milk, puddings, cakes, shakes, malts, brownies, pastries, cookies, cheesecakes, fudge, pies, cobblers, parfaits, mousse, biscuits, custards, frosting, fruits, vegetables, condiments, dry cereal, oatmeal, granola bars, hard candy, soft candy, taffy, chocolates, sugarless candies, chewing gum, bubble gum, juices, teas, coffees, salsa, gel beads, film strips for breath, gelatin candies, pectin candies, starch candies, lozenges, cough drops, throat lozenges, throat sprays, toothpastes or mouth rinses.

334. The method of any one of claims 322-333, wherein the amount of component (a) in the mixture is at least 2 ppm, such as, 3, 4, 5, 7.5, 10, 20, 30, 40, 50, 60, 70, 80, 90, 100, 110, 120, 130, 140, 150, 160, 170, 180, 190, 200, 210, 220, 230, 240, 250, 260, 270, 280, 290, or 300 ppm or an amount within a range defined by any two of the aforementioned amounts, preferably 15-25 ppm, 12.5-40 ppm, 25-50 ppm, 25-60 ppm, 25-75 ppm, 50-90 ppm, 50-150 ppm, 100-150 ppm, 100-200 ppm, 150-200 ppm, 200-250 ppm, or 12-200 ppm.

335. The method of any one of claims 322-334 further comprising selecting or identifying a subject to receive a composition, which modulates a taste perception in a subject, such as fruity flavors, white flavors, brown flavors, pungency, burning, harshness, bitterness, aging, oak tastes, or saffron tastes.

336. The method of any one of claims 322-335 further comprising determining or analyzing the ripeness perception, juiciness perception, freshness perception, flavor depth

perception, mouthfeel perception, creaminess perception, pungency perception, initial pungency onset, burning perception, initial burning onset, tingling perception, initial tingling onset, harshness perception, bitterness perception, aging effect perception, initial spice burn onset, spice intensity perception, alcohol perception, astringency perception, or perception of fruity, vanilla bean, cocoa, dark cocoa, roasted coffee, dark roasted coffee, cinnamic, brown, honey, aged fruit, wood, sweet, hay, saffron, caramel, or floral flavor or notes or any combination thereof of the subject after consuming said mixture.

337. The method of any one of claims 322-336, wherein component (a) is dissolved in food grade ethanol.

338. The method of claim 337, wherein the food grade ethanol is at least 1%, such as 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 15, 20, 25, 30, 35, 40, 45, 50, 60, 70, 80, 85, 90, 95, or 100%, or with a range defined by any two of the aforementioned amounts, preferably 80, 90, or 95%.

339. A method of making a mixture which modulates a subject's taste perception of fruity flavors, white flavors, brown flavors, pungency, burning, harshness, bitterness, aging, oak, honey, alcohol, syrup, tea, or saffron, the method comprising:

admixing a component (a) with a component (b) to form said mixture:

(a) a phenylpropanoid, a phenylethanol derivative, a glycoside or an analog thereof (for example, a glycosylation molecule of an aglycone, an aglycone of a glycosylated molecule, or a further glycosylated molecule of a glycosylated molecule) or an extract of a plant that comprises a phenylpropanoid, a phenylethanol derivative, a glycoside or an analog thereof, such as a *Rhodiola rosea* root extract; and

(b) a composition comprising a fruit, vanilla, cocoa, chocolate, coffee, a pungent compound, a burning compound, a harsh compound, a bitter compound, saffron, oak extract, honey, tea, syrup, or an alcohol;

wherein the composition is preferably provided in a food, beverage, granule, powder or liquid formulation; and

optionally, wherein the composition comprises one or more preservatives or antioxidants, such as a sulphite, sorbic acid, a sorbate compound, benzoic acid, benzoate, propionic acid, propionate, ascorbic acid, ascorbate, citric acid, a tocopherol, a retinol, a polyphenol, a phenolic acid, a flavonoid,

lipoic acid, N-acetylcysteine, butylated hydroxyanisole, butylated hydroxytoluene or derivatives thereof, preferably, wherein the one or more preservatives or antioxidants improve the shelf-life, flavor profile, or reduce spoilage of the mixture.

340. The method of claim 339, wherein the phenylpropanoid, the phenylethanol derivative, the glycoside or an analog thereof or the extract of a plant that comprises a phenylpropanoid, a phenylethanol derivative, a glycoside or an analog thereof comprises molecules selected from one or more of the following: salidroside (rhodioloside), rosin, rosavin, rosarin, rosiridrin, rhodioniside, or p-tyrosol.

341. The method of any one of claims 339 or 340, wherein the phenylpropanoid, the phenylethanol derivative, the glycoside or an analog thereof or the extract of a plant that comprises a phenylpropanoid, a phenylethanol derivative, a glycoside or an analog thereof comprises a glucosylated phenylpropanoid, a glucosylated phenylethanol derivative, a glucosylated glycoside, an aglycone of a phenylpropanoid, an aglycone of a phenylethanol derivative, or an aglycone of a glycoside.

342. The method of any one of claims 339-341, wherein the composition is a fruit, such as citrus fruits, tropical fruits, or berries, juices, puree, jam, jelly, sports drinks, fruit flavored beverages, wine, dairy product, plant-based milk, product of plant-based milk, coffee, such as black coffee, milk-based coffee drinks, iced coffee drinks, instant coffee, coffee beans, or any combination thereof, alcoholic or non-alcoholic beverage, such as vodka, brandy, whiskey, or any combination thereof, a pungent compound, such as capsaicin, capsicum, piperine, allyl isothiocyanate, allicin, gingerol, sinigrin, eugenol, sinalbin, safrole, menthol, isothiocyanates, thymol, curcumin, resiniferatoxin, oleocanthal or any combination thereof, a harsh compound, such as quinine, caffeine, nicotine, tannins, catechins, limonene, pinene, amygdalin, saponins, oxalic acid, formic acid, allyl isothiocyanate, dimethyl sulfide, casein peptides, bromelain, capsaicin or any combination thereof, a burning compound, such as capsaicin, dihydrocapsaicin, nordihydrocapsaicin, allyl isothiocyanate, piperine, gingerol, allicin, allyl sulfide, diallyl disulfide, resiniferatoxin, acrolein, cinnamaldehyde, menthol, eugenol, ethanol, acetic acid, oleocanthal, citric acid or any combination thereof, a bitter compound, such as absinthin, aloin, alpha acid, amarogentin, andrographolide, brucine, caffeine, denatonium, eugenin, hesperidin, humulone, isohumulone, Kaempferol 3-O-

rutinoside, 6-Methoxymellein, naringin, papaverine, phenylthiocarbamide, propylthiouracil, quassin, quinidine, quinine, salicin, strychnine, sucrose octaacetate, sucrose octapropionate, theobromine, theophylline, vegetables, tea, chocolate, fruits or any combination thereof, honey, vanilla, chocolate, tea, saffron, safranal or syrup, such as maple syrup.

343. The method of claim 342, wherein the dairy product, plant-based milk, or product of plant-based milk comprises a milk, such as whole milk, nonfat milk, lactose-free milk, buttermilk, condensed milk, cashew milk, goat milk, rick milk, soy milk, oat milk, almond milk, coconut milk, chocolate milk, a yogurt, cheese, frosting, pudding, chocolate, custard, ice cream, gelato, sherbet, sorbet, frozen yogurt or any combination thereof.

344. The method of any one of claims 339-343, wherein the plant extract that comprises a phenylpropanoid, a phenylethanol derivative, a glycoside or an analog thereof is obtained from a plant from any one or more of the following species: *Rhodiola rosea*, *Rhodiola alterna*, *Rhodiola brevipetiolata*, *Rhodiola crenulate*, *Rhodiola kirilowi*, *Rhodiola quadrifida*, *Rhodiola sachalinensis*, *Rhodiola sacra.*, or *Rhodiola iremelica.*.

345. The method of any one of claims 339-344, wherein the mixture provides a taste perception in the subject of an enhancement of ripeness or ripeness perception, an enhancement of juiciness or juiciness perception, an enhancement of freshness or freshness perception, an enhancement of fruity flavors or notes, an enhancement of flavor depth, an enhancement in mouthfeel or mouthfeel perception when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

346. The method of any one of claims 339-345, wherein the mixture provides a taste perception in the subject of an enhancement of cocoa flavors or notes, an enhancement of dark cocoa flavors or notes, an enhancement of vanilla bean flavors or notes, an enhancement of sweetness or sweetness perception, an enhancement of roasted coffee flavors or notes, an enhancement of dark roasted flavors or notes, or an enhancement of creaminess or creaminess perception when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

347. The method of any one of claims 339-346, wherein the mixture provides a taste perception in the subject of an enhancement of cinnamic notes, an enhancement of brown notes, or an enhancement of honey notes when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

348. The method of any one of claims 339-347, wherein the mixture provides a taste perception in the subject of a reduction in pungency or pungency perception, a reduction in initial pungency perception, a reduction in burning sensation or burning perception, a reduction in initial burning perception, a delayed onset of burning sensation or burning perception, a reduction in burning sensation duration, a masking of alcohol perception, an enhancement of aged fruit notes, enhancement of brandy flavors or notes, a reduction in tingling sensation or tingling perception, a reduction in initial tingling perception, a delayed onset of tingling sensation or tingling perception, a reduction in harshness or harshness perception, a reduction in bitterness or bitterness perception, a delayed onset of spice burn or spice burn perception, or a reduction in spice intensity when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

349. The method of any one of claims 339-348, wherein the mixture provides a taste perception in the subject of an enhancement of aging effect, an enhancement of wood tastes or notes, an enhancement of brown flavors or notes, an enhancement of sweet flavors or notes, an enhancement of caramel flavors or notes, an enhancement of floral flavors or notes, an enhancement of woodiness, an enhancement of hay flavors or notes, an enhancement of saffron taste or an enhancement of astringency or astringency perception when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

350. The method of any one of claims 339-349, wherein the food or beverage or granule, powder, or liquid formulation is selected from a sugar substitute, water, a carbonated beverage, such as a carbonated fruit beverage, carbonated cola drink or carbonated water, sport beverage, alcoholic beverages, alcohol-free beverages, spices and/or seasonings, such as chili,

wasabi, horseradish, mustard, ginger, black pepper, or cinnamon, meat, vegetables, mushrooms, cheese, seafood, salt, energy beverages, flavored water, powders for drinks, dairy products, such as milk, yogurt, cheese, or ice cream, plant based milks, products of plant based milk, puddings, cakes, shakes, malts, brownies, pastries, cookies, cheesecakes, fudge, pies, cobblers, parfaits, mousse, biscuits, custards, frosting, fruits, vegetables, condiments, dry cereal, oatmeal, granola bars, hard candy, soft candy, taffy, chocolates, sugarless candies, chewing gum, bubble gum, juices, teas, coffees, salsa, gel beads, film strips for breath, gelatin candies, pectin candies, starch candies, lozenges, cough drops, throat lozenges, throat sprays, toothpastes or mouth rinses.

351. The method of any one of claims 339-350, wherein the amount of component (a) in the mixture is at least 2 ppm, such as, 3, 4, 5, 7.5, 10, 20, 30, 40, 50, 60, 70, 80, 90, 100, 110, 120, 130, 140, 150, 160, 170, 180, 190, 200, 210, 220, 230, 240, 250, 260, 270, 280, 290, or 300 ppm or an amount within a range defined by any two of the aforementioned amounts, preferably 15-25 ppm, 12.5-40 ppm, 25-50 ppm, 25-60 ppm, 25-75 ppm, 50-90 ppm, 50-150 ppm, 100-150 ppm, 100-200 ppm, 150-200 ppm, 200-250 ppm, or 12-200 ppm.

352. The method of any one of claims 339-351, wherein component (a) is dissolved in food grade ethanol.

353. The method of claim 352, wherein the food grade ethanol is at least 1%, such as 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 15, 20, 25, 30, 35, 40, 45, 50, 60, 70, 80, 85, 90, 95, or 100%, or with a range defined by any two of the aforementioned amounts, preferably 80, 90, or 95%.

354. A composition obtained or obtainable by the method of any one of claims 339-353.

355. A mixture used for modulating a subject's taste perception of fruity flavors, white flavors, brown flavors, pungency, burning, harshness, bitterness, aging, oak, honey, alcohol, syrup, tea, or saffron in a subject, wherein the mixture comprises at least two components (a) and (b):

(a) a phenylpropanoid, a phenylethanol derivative, a glycoside or an analog thereof (for example, a glycosylation molecule of an aglycone, an aglycone of a glycosylated molecule, or a further glycosylated molecule of a glycosylated molecule) or an extract of a plant that comprises a phenylpropanoid, a phenylethanol derivative or an analog thereof, such as

a *Rhodiola rosea* root extract; and

(b) a composition comprising a fruit, vanilla, cocoa, chocolate, coffee, a pungent compound, a burning compound, a harsh compound, a bitter compound, saffron, oak extract, honey, tea, syrup, or an alcohol; wherein component (a) is admixed with component (b);

preferably, wherein the mixture is provided in a food, beverage, granule, powder or liquid formulation; and

optionally, wherein the mixture comprises one or more preservatives or antioxidants, such as a sulphite, sorbic acid, a sorbate compound, benzoic acid, benzoate, propionic acid, propionate, ascorbic acid, ascorbate, citric acid, a tocopherol, a retinol, a polyphenol, a phenolic acid, a flavonoid, lipoic acid, N-acetylcysteine, butylated hydroxyanisole, butylated hydroxytoluene or derivatives thereof, preferably, wherein the one or more preservatives or antioxidants improve the shelf-life, flavor profile, or reduce spoilage of the mixture.

356. The mixture for use of claim 355, wherein the phenylpropanoid, the phenylethanol derivative, the glycoside or an analog thereof or an extract of a plant that comprises a phenylpropanoid, a phenylethanol derivative, a glycoside or an analog thereof comprises molecules selected from one or more of the following: salidroside (rhodioloside), rosin, rosavin, rosarin, rosiridrin, rhodioniside, and p-tyrosol.

357. The mixture for use of any one of claims 355 or 356, wherein the phenylpropanoid, the phenylethanol derivative, the glycoside or an analog thereof or the extract of a plant that comprises a phenylpropanoid, a phenylethanol derivative, a glycoside or an analog thereof comprises a glucosylated phenylpropanoid, a glucosylated phenylethanol derivative, a glucosylated glycoside, an aglycone of a phenylpropanoid, an aglycone of a phenylethanol derivative, or an aglycone of a glycoside.

358. The method of any one of claims 355-357, wherein the composition is a fruit, such as citrus fruits, tropical fruits, or berries, juices, puree, jam, jelly, sports drinks, fruit flavored beverages, wine, dairy product, plant-based milk, product of plant-based milk, coffee, such as black coffee, milk-based coffee drinks, iced coffee drinks, instant coffee, coffee beans,

or any combination thereof, alcoholic or non-alcoholic beverage, such as vodka, brandy, whiskey, or any combination thereof, a pungent compound, such as capsaicin, capsicum, piperine, allyl isothiocyanate, allicin, gingerol, sinigrin, eugenol, sinalbin, safrole, menthol, isothiocyanates, thymol, curcumin, resiniferatoxin, oleocanthal or any combination thereof, a harsh compound, such as quinine, caffeine, nicotine, tannins, catechins, limonene, pinene, amygdalin, saponins, oxalic acid, formic acid, allyl isothiocyanate, dimethyl sulfide, casein peptides, bromelain, capsaicin or any combination thereof, a burning compound, such as capsaicin, dihydrocapsaicin, nordihydrocapsaicin, allyl isothiocyanate, piperine, gingerol, allicin, allyl sulfide, diallyl disulfide, resiniferatoxin, acrolein, cinnamaldehyde, menthol, eugenol, ethanol, acetic acid, oleocanthal, citric acid or any combination thereof, a bitter compound, such as absinthin, aloin, alpha acid, amarogentin, andrographolide, brucine, caffeine, denatonium, eugenin, hesperidin, humulone, isohumulone, Kaempferol 3-O-rutinoside, 6-Methoxymellein, naringin, papaverine, phenylthiocarbamide, propylthiouracil, quassin, quinidine, quinine, salicin, strychnine, sucrose octaacetate, sucrose octapropionate, theobromine, theophylline, vegetables, tea, chocolate, fruits or any combination thereof, honey, vanilla, chocolate, tea, saffron, safranal or syrup, such as maple syrup.

359. The mixture for use of claim 358, wherein the dairy product, plant-based milk, or product of plant-based milk comprises a milk, such as whole milk, nonfat milk, lactose-free milk, buttermilk, condensed milk, cashew milk, goat milk, rick milk, soy milk, oat milk, almond milk, coconut milk, chocolate milk, a yogurt, cheese, frosting, pudding, chocolate, custard, ice cream, gelato, sherbet, sorbet, frozen yogurt or any combination thereof.

360. The mixture for use of any one of claims 355-359, wherein the plant extract that comprises a phenylpropanoid, a phenylethanol derivative, a glycoside or an analog thereof is obtained from a plant from any one or more of the following species: *Rhodiola rosea*, *Rhodiola alterna*, *Rhodiola brevipetiolata*, *Rhodiola crenulate*, *Rhodiola kirilowi*, *Rhodiola quadrifida*, *Rhodiola sachalinensis*, *Rhodiola sacra.*, or *Rhodiola iremelica.*.

361. The mixture for use of any one of claims 355-360, wherein the mixture provides a taste perception in the subject of an enhancement of ripeness or ripeness perception, an enhancement of juiciness or juiciness perception, an enhancement of freshness or freshness perception, an enhancement of fruity flavors or notes, an enhancement of flavor depth, an enhancement in mouthfeel or mouthfeel perception when the mixture is provided to the subject,

such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

362. The mixture for use of any one of claims 355-361, wherein the mixture provides a taste perception in the subject of an enhancement of cocoa flavors or notes, an enhancement of dark cocoa flavors or notes, an enhancement of vanilla bean flavors or notes, an enhancement of sweetness or sweetness perception, an enhancement of roasted coffee flavors or notes, an enhancement of dark roasted flavors or notes, or an enhancement of creaminess or creaminess perception when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

363. The mixture for use of any one of claims 355-362, wherein the mixture provides a taste perception in the subject of an enhancement of cinnamic notes, an enhancement of brown notes, or an enhancement of honey notes when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

364. The mixture for use of any one of claims 355-363, wherein the mixture provides a taste perception in the subject of a reduction in pungency or pungency perception, a reduction in initial pungency perception, a reduction in burning sensation or burning perception, a reduction in initial burning perception, a delayed onset of burning sensation or burning perception, a reduction in burning sensation duration, a masking of alcohol perception, an enhancement of aged fruit notes, enhancement of brandy flavors or notes, a reduction in tingling sensation or tingling perception, a reduction in initial tingling perception, a delayed onset of tingling sensation or tingling perception, a reduction in harshness or harshness perception, a reduction in bitterness or bitterness perception, a delayed onset of spice burn or spice burn perception, or a reduction in spice intensity when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

365. The mixture for use of any one of claims 355-364, wherein the mixture provides a taste perception in the subject of an enhancement of aging effect, an enhancement of wood tastes or notes, an enhancement of brown flavors or notes, an enhancement of sweet flavors or notes, an enhancement of caramel flavors or notes, an enhancement of floral flavors or notes, an enhancement of woodiness, an enhancement of hay flavors or notes, an enhancement of saffron taste or an enhancement of astringency or astringency perception when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

366. The mixture for use of any one of claims 355-365, wherein the food or beverage or granule, powder, or liquid formulation is selected from a sugar substitute, water, a carbonated beverage, such as a carbonated fruit beverage, carbonated cola drink or carbonated water, sport beverage, alcoholic beverages, alcohol-free beverages, spices and/or seasonings, such as chili, wasabi, horseradish, mustard, ginger, black pepper, or cinnamon, meat, vegetables, mushrooms, cheese, seafood, salt, energy beverages, flavored water, powders for drinks, dairy products, such as milk, yogurt, cheese, or ice cream, plant based milks, products of plant based milk, puddings, cakes, shakes, malts, brownies, pastries, cookies, cheesecakes, fudge, pies, cobblers, parfaits, mousse, biscuits, custards, frosting, fruits, vegetables, condiments, dry cereal, oatmeal, granola bars, hard candy, soft candy, taffy, chocolates, sugarless candies, chewing gum, bubble gum, juices, teas, coffees, salsa, gel beads, film strips for breath, gelatin candies, pectin candies, starch candies, lozenges, cough drops, throat lozenges, throat sprays, toothpastes or mouth rinses.

367. The mixture for use of any one of claims 355-366 further comprising selecting or identifying a subject to receive a composition, which modulates a taste perception in a subject, such as fruity flavors, white flavors, brown flavors, pungency, burning, harshness, bitterness, aging, oak tastes, or saffron tastes.

368. The mixture for use of any one of claims 355-367 further comprising determining or analyzing the ripeness perception, juiciness perception, freshness perception, flavor depth perception, mouthfeel perception, creaminess perception, pungency perception, initial pungency onset, burning perception, initial burning onset, tingling perception, initial tingling onset, harshness perception, bitterness perception, aging effect perception, initial spice

burn onset, spice intensity perception, alcohol perception, astringency perception, or perception of fruity, vanilla bean, cocoa, dark cocoa, roasted coffee, dark roasted coffee, cinnamic, brown, honey, aged fruit, wood, sweet, hay, saffron, caramel, or floral flavor or notes or any combination thereof of the subject after consuming said mixture.

369. The mixture for use of any one of claims 355-368, wherein the amount of component (a) in the mixture is at least 2 ppm, such as, 3, 4, 5, 7.5, 10, 20, 30, 40, 50, 60, 70, 80, 90, 100, 110, 120, 130, 140, 150, 160, 170, 180, 190, 200, 210, 220, 230, 240, 250, 260, 270, 280, 290, or 300 ppm or an amount within a range defined by any two of the aforementioned amounts, preferably 15-25 ppm, 12.5-40 ppm, 25-50 ppm, 25-60 ppm, 25-75 ppm, 50-90 ppm, 50-150 ppm, 100-150 ppm, 100-200 ppm, 150-200 ppm, 200-250 ppm, or 12-200 ppm.

370. The mixture for use of any one of claims 355-369, wherein component (a) is dissolved in food grade ethanol.

371. The mixture for use of claim 370, wherein the food grade ethanol is at least 1%, such as 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 15, 20, 25, 30, 35, 40, 45, 50, 60, 70, 80, 85, 90, 95, or 100%, or with a range defined by any two of the aforementioned amounts, preferably 80, 90, or 95%.

372. A method for modulating a subject's taste perception of astringency, spiciness, bitterness, plant protein, cooling, alcohol or sourness or for masking of astringency, bitterness or sourness, the method comprising:

providing a subject a mixture that comprises at least two components (a) and (b):

(a) a steroidal saponin or an analog thereof (for example, a glycosylation molecule of an aglycone, an aglycone of a glycosylated molecule, or a further glycosylated molecule of a glycosylated molecule) or an extract of a plant that comprises a steroidal saponin or an analog thereof, such as a *Trigonella foenum graecum L.* extract; and

(b) a composition comprising an alcohol, a plant protein or plant protein product, a spice, a cooling compound, a spicy compound, an astringent compound, a bitter compound or a sour compound wherein component (a) is admixed with component (b);

wherein the mixture is preferably provided in a food, beverage, granule, powder or liquid formulation; and

optionally, wherein the mixture comprises one or more preservatives or antioxidants, such as a sulphite, sorbic acid, a sorbate compound, benzoic acid, benzoate, propionic acid, propionate, ascorbic acid, ascorbate, citric acid, a tocopherol, a retinol, a polyphenol, a phenolic acid, a flavonoid, lipoic acid, N-acetylcysteine, butylated hydroxyanisole, butylated hydroxytoluene or derivatives thereof, preferably, wherein the one or more preservatives or antioxidants improve the shelf-life, flavor profile, or reduce spoilage of the mixture; and/or

optionally, selecting a composition that comprises an alcohol, a plant protein or plant protein product, a spice, a cooling compound, a spicy compound, an astringent compound, a bitter compound or a sour compound for receiving an agent that modulates the taste perception of a subject of astringency, spiciness, bitterness, plant protein, cooling, alcohol or sourness or that masks astringency, bitterness or sourness and providing said selected composition component (a); and/or

optionally, evaluating the modulation of a subject's taste perception of astringency, spiciness, bitterness, plant protein, cooling, alcohol or sourness or masking of astringency, bitterness or sourness after providing the subject the mixture.

373. The method of claim 372, wherein the steroidal saponin or an analog thereof or the extract of a plant that comprises the steroidal saponin or an analog thereof comprises molecules selected from one or more of the following: yamogenin, diosgenin, smilagenin, sarsasapogenin, tigogenin, neotigogenin, gitogenin, yuccagenin, or saponaretin.

374. The method of any one of claims 372 or 373, wherein the steroidal saponin or an analog thereof or the extract of a plant that comprises steroidal saponin or an analog thereof comprises a glucosylated steroidal saponin or an aglycone of a steroidal saponin.

375. The method of any one of claims 372-374, wherein the composition is a fruit, such as citrus fruits, tropical fruits, or berries, juices, puree, jam, jelly, sports drinks, fruit flavored beverages, wine, dairy product, plant-based milk, product of plant-based milk, coffee, such as black coffee, milk-based coffee drinks, iced coffee drinks, instant coffee, coffee beans, or any combination thereof, alcoholic or non-alcoholic beverage, such as vodka, brandy,

whiskey, or any combination thereof, a spice or spicy compound, such as a chili, wasabi, horseradish, mustard, ginger, black pepper, cinnamon, pumpkin spice, Szechuan pepper, or allspice, a salt, a sour compound, such as acetic acid, citric acid, hydrochloric acid, lactic acid, malic acid, nitric acid, fumaric acid, sulfuric acid, tartaric acid, phosphoric acid, other acid or any combination thereof, a bitter compound, such as absinthin, aloin, alpha acid, amarogentin, andrographolide, brucine, caffeine, denatonium, eugenin, hesperidin, humulone, isohumulone, Kaempferol 3-O-rutinoside, 6-Methoxymellein, naringin, papaverine, phenylthiocarbamide, propylthiouracil, quassin, quinidine, quinine, salicin, strychnine, sucrose octaacetate, sucrose octapropionate, theobromine, theophylline, vegetables, tea, chocolate, fruits or any combination thereof, an astringent compound, such as phenolic compounds, tannins, gallic acid, zinc oxide, zinc sulfate, tannic acid, potassium permanganate, silver nitrate, tincture of benzoin, potassium alum, caftaric acid, acacia, yarrow, sage, witch hazel, vinegar, tea, fruits, vegetables, dairy products, herbs, nuts or any combination thereof, a cooling compound, such as Menthol, Cyclohexanecarboxamide,N-Ethyl-5-Methyl-2-(1- Methylethyl) (WS-3), N-(Ethoxycarbonylmethyl)-3-p-menthanecarboxamide (WS-5), (1R,2S,5R)-N-(4-Methoxyphenyl)-5-methyl-2-(1- methylethyl)cyclohexanecarboxamide (WS-12), Butanamide, N,2,3-trimethyl-2-(1-methylethyl) (WS-23), or Menthyl Lactate or any combination thereof honey, vanilla, chocolate, tea, saffron, safranal or syrup, such as maple syrup.

376. The method of claim 375, wherein the dairy product, plant-based milk, or product of plant-based milk comprises a milk, such as whole milk, nonfat milk, lactose-free milk, buttermilk, condensed milk, cashew milk, fermented milk, goat milk, rick milk, soy milk, oat milk, almond milk, pea milk, coconut milk, chocolate milk, a yogurt, cheese, frosting, pudding, chocolate, custard, ice cream, gelato, sherbet, sorbet, frozen yogurt or any combination thereof.

377. The method of any one of claims 372-376, wherein the mixture provides a taste perception in the subject of a reduction in bitterness perception, reduction in initial bitterness perception, enhancement of bitterness, masking of bitterness, reduction of sourness perception, reduction of lingering sourness perception, shorter duration of lingering sourness perception, reduction of initial sourness perception, reduction of astringency perception, masking of astringency, enhancement of mildness perception, reduction of beany tastes or flavors,

reduction of grittiness perception, reduction in cooling perception, enhancement of spice intensity, increased duration of spiciness perception, enhancement of sourness perception, delayed onset of spiciness perception when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

378. The method of any one of claims 372-377, wherein the food or beverage or granule, powder, or liquid formulation is selected from a sugar substitute, water, a carbonated beverage, such as a carbonated fruit beverage, carbonated cola drink or carbonated water, sport beverage, alcoholic beverages, alcohol-free beverages, spices and/or seasonings, such as chili, wasabi, horseradish, mustard, ginger, black pepper, or cinnamon, meat, vegetables, mushrooms, cheese, seafood, salt, energy beverages, flavored water, powders for drinks, dairy products, such as milk, yogurt, cheese, or ice cream, plant based milks, products of plant based milk, puddings, cakes, shakes, malts, brownies, pastries, cookies, cheesecakes, fudge, pies, cobblers, parfaits, mousse, biscuits, custards, frosting, fruits, vegetables, condiments, dry cereal, oatmeal, granola bars, hard candy, soft candy, taffy, chocolates, sugarless candies, chewing gum, bubble gum, juices, teas, coffees, salsa, gel beads, film strips for breath, gelatin candies, pectin candies, starch candies, lozenges, cough drops, throat lozenges, throat sprays, toothpastes or mouth rinses.

379. The method of any one of claims 372-378, wherein the amount of component (a) in the mixture is at least 2 ppm, such as, 3, 4, 5, 7.5, 10, 20, 30, 40, 50, 60, 70, 80, 90, 100, 110, 120, 130, 140, 150, 160, 170, 180, 190, 200, 210, 220, 230, 240, 250, 260, 270, 280, 290, or 300 ppm or an amount within a range defined by any two of the aforementioned amounts, preferably 15-25 ppm, 12.5-40 ppm, 25-50 ppm, 25-60 ppm, 25-75 ppm, 50-90 ppm, 50-150 ppm, 100-150 ppm, 100-200 ppm, 150-200 ppm, 200-250 ppm, or 12-200 ppm.

380. The method of any one of claims 372-379 further comprising selecting or identifying a subject to receive a composition, which modulates a taste perception in a subject, such as astringency, spiciness, bitterness, plant protein, cooling, alcohol or sourness or which masks astringency, bitterness or sourness.

381. The method of any one of claims 372-380 further comprising determining or analyzing the bitterness perception, initial bitterness perception, sourness perception, lingering

sourness perception, duration of sourness perception, initial sourness perception, astringency perception, masking of astringency, mildness perception, perception of beany tastes or flavors, or grittiness perception or any combination thereof of the subject after consuming said mixture.

382. The method of any one of claims 372-381, wherein component (a) is dissolved in food grade ethanol.

383. The method of claim 382, wherein the food grade ethanol is at least 1%, such as 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 15, 20, 25, 30, 35, 40, 45, 50, 60, 70, 80, 85, 90, 95, or 100%, or with a range defined by any two of the aforementioned amounts, preferably 80, 90, or 95%.

384. A method of making a mixture which modulates a subject's taste perception of astringency, spiciness, bitterness, plant protein, cooling, alcohol or sourness or for masking of astringency, bitterness or sourness, the method comprising:

admixing a component (a) with a component (b) to form said mixture:

(a) a steroidal saponin or an analog thereof (for example, a glycosylation molecule of an aglycone, an aglycone of a glycosylated molecule, or a further glycosylated molecule of a glycosylated molecule) or an extract of a plant that comprises a steroidal saponin or an analog thereof, such as a *Trigonella foenum graecum L.* extract; and

(b) a composition comprising an alcohol, a plant protein or plant protein product, a spice, a cooling compound, a spicy compound, an astringent compound, a bitter compound or a sour compound;

wherein the composition is preferably provided in a food, beverage, granule, powder or liquid formulation; and

optionally, wherein the composition comprises one or more preservatives or antioxidants, such as a sulphite, sorbic acid, a sorbate compound, benzoic acid, benzoate, propionic acid, propionate, ascorbic acid, ascorbate, citric acid, a tocopherol, a retinol, a polyphenol, a phenolic acid, a flavonoid, lipoic acid, N-acetylcysteine, butylated hydroxyanisole, butylated hydroxytoluene or derivatives thereof, preferably, wherein the one or more preservatives or antioxidants improve the shelf-life, flavor profile, or reduce spoilage of the mixture.

385. The method of claim 384, wherein the steroidal saponin or an analog thereof or the extract of a plant that comprises the steroidal saponin or an analog thereof comprises molecules selected from one or more of the following: yamogenin, diosgenin, smilagenin, sarsasapogenin, tigogenin, neotigogenin, gitogenin, yuccagenin, or saponaretin.

386. The method of any one of claims 384 or 385, wherein the steroidal saponin or an analog thereof or the extract of a plant that comprises steroidal saponin or an analog thereof comprises a glucosylated steroidal saponin or an aglycone of a steroidal saponin.

387. The method of any one of claims 384-386, wherein the composition is a fruit, such as citrus fruits, tropical fruits, or berries, juices, puree, jam, jelly, sports drinks, fruit flavored beverages, wine, dairy product, plant-based milk, product of plant-based milk, coffee, such as black coffee, milk-based coffee drinks, iced coffee drinks, instant coffee, coffee beans, or any combination thereof, alcoholic or non-alcoholic beverage, such as vodka, brandy, whiskey, or any combination thereof, a spice or spicy compound, such as a chili, wasabi, horseradish, mustard, ginger, black pepper, cinnamon, pumpkin spice, Szechuan pepper, or allspice, a salt, a sour compound, such as acetic acid, citric acid, hydrochloric acid, lactic acid, malic acid, nitric acid, fumaric acid, sulfuric acid, tartaric acid, phosphoric acid, other acid or any combination thereof, a bitter compound, such as absinthin, aloin, alpha acid, amarogentin, andrographolide, brucine, caffeine, denatonium, eugenin, hesperidin, humulone, isohumulone, Kaempferol 3-O-rutinoside, 6-Methoxymellein, naringin, papaverine, phenylthiocarbamide, propylthiouracil, quassin, quinidine, quinine, salicin, strychnine, sucrose octaacetate, sucrose octapropionate, theobromine, theophylline, vegetables, tea, chocolate, fruits or any combination thereof, an astringent compound, such as phenolic compounds, tannins, gallic acid, zinc oxide, zinc sulfate, tannic acid, potassium permanganate, silver nitrate, tincture of benzoin, potassium alum, caftaric acid, acacia, yarrow, sage, witch hazel, vinegar, tea, fruits, vegetables, dairy products, herbs, nuts or any combination thereof, a cooling compound, such as Menthol, Cyclohexanecarboxamide,N-Ethyl-5-Methyl-2-(1- Methylethyl) (WS-3), N-(Ethoxycarbonylmethyl)-3-p-menthanecarboxamide (WS-5), (1R,2S,5R)-N-(4-Methoxyphenyl)-5-methyl-2-(1- methylethyl)cyclohexanecarboxamide (WS-12), Butanamide, N,2,3-trimethyl-2-(1-methylethyl) (WS-23), or Menthyl Lactate or any combination thereof honey, vanilla, chocolate, tea, saffron, safranal or syrup, such as maple syrup.

388. The method of claim 387, wherein the dairy product, plant-based milk, or product of plant-based milk comprises a milk, such as whole milk, nonfat milk, lactose-free milk, buttermilk, condensed milk, cashew milk, fermented milk, goat milk, rick milk, soy milk, oat milk, almond milk, pea milk, coconut milk, chocolate milk, a yogurt, cheese, frosting, pudding, chocolate, custard, ice cream, gelato, sherbet, sorbet, frozen yogurt or any combination thereof.

389. The method of any one of claims 384-388, wherein the mixture provides a taste perception in the subject of a reduction in bitterness perception, reduction in initial bitterness perception, enhancement of bitterness, masking of bitterness, reduction of sourness perception, reduction of lingering sourness perception, shorter duration of lingering sourness perception, reduction of initial sourness perception, reduction of astringency perception, masking of astringency, enhancement of mildness perception, reduction of beany tastes or flavors, reduction of grittiness perception, reduction in cooling perception, enhancement of spice intensity, increased duration of spiciness perception, enhancement of sourness perception, delayed onset of spiciness perception when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

390. The method of any one of claims 384-389, wherein the food or beverage or granule, powder, or liquid formulation is selected from a sugar substitute, water, a carbonated beverage, such as a carbonated fruit beverage, carbonated cola drink or carbonated water, sport beverage, alcoholic beverages, alcohol-free beverages, spices and/or seasonings, such as chili, wasabi, horseradish, mustard, ginger, black pepper, or cinnamon, meat, vegetables, mushrooms, cheese, seafood, salt, energy beverages, flavored water, powders for drinks, dairy products, such as milk, yogurt, cheese, or ice cream, plant based milks, products of plant based milk, puddings, cakes, shakes, malts, brownies, pastries, cookies, cheesecakes, fudge, pies, cobblers, parfaits, mousse, biscuits, custards, frosting, fruits, vegetables, condiments, dry cereal, oatmeal, granola bars, hard candy, soft candy, taffy, chocolates, sugarless candies, chewing gum, bubble gum, juices, teas, coffees, salsa, gel beads, film strips for breath, gelatin candies, pectin candies, starch candies, lozenges, cough drops, throat lozenges, throat sprays, toothpastes or mouth rinses.

391. The method of any one of claims 384-390, wherein the amount of component (a) in the mixture is at least 2 ppm, such as, 3, 4, 5, 7.5, 10, 20, 30, 40, 50, 60, 70, 80, 90, 100, 110, 120, 130, 140, 150, 160, 170, 180, 190, 200, 210, 220, 230, 240, 250, 260, 270, 280, 290, or 300 ppm or an amount within a range defined by any two of the aforementioned amounts, preferably 15-25 ppm, 12.5-40 ppm, 25-50 ppm, 25-60 ppm, 25-75 ppm, 50-90 ppm, 50-150 ppm, 100-150 ppm, 100-200 ppm, 150-200 ppm, 200-250 ppm, or 12-200 ppm.

392. The method of any one of claims 384-391, wherein component (a) is dissolved in food grade ethanol.

393. The method of claim 392, wherein the food grade ethanol is at least 1%, such as 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 15, 20, 25, 30, 35, 40, 45, 50, 60, 70, 80, 85, 90, 95, or 100%, or with a range defined by any two of the aforementioned amounts, preferably 80, 90, or 95%.

394. A composition obtained or obtainable by the method of any one of claims 384-393.

395. A mixture used for modulating a subject's taste perception of astringency, spiciness, bitterness, plant protein, cooling, alcohol or sourness or for masking of astringency, bitterness or sourness in a subject, wherein the mixture comprises at least two components (a) and (b):

(a) a steroidal saponin or an analog thereof (for example, a glycosylation molecule of an aglycone, an aglycone of a glycosylated molecule, or a further glycosylated molecule of a glycosylated molecule) or an extract of a plant that comprises a steroidal saponin or an analog thereof, such as a *Trigonella foenum graecum L.* extract; and

(b) a composition comprising an alcohol, a plant protein or plant protein product, a spice, a cooling compound, a spicy compound, an astringent compound, a bitter compound or a sour compound; wherein component (a) is admixed with component (b);

preferably, wherein the mixture is provided in a food, beverage, granule, powder or liquid formulation; and

optionally, wherein the mixture comprises one or more preservatives or antioxidants, such as a sulphite, sorbic acid, a sorbate compound, benzoic acid, benzoate, propionic acid, propionate, ascorbic acid, ascorbate, citric

acid, a tocopherol, a retinol, a polyphenol, a phenolic acid, a flavonoid, lipoic acid, N-acetylcysteine, butylated hydroxyanisole, butylated hydroxytoluene or derivatives thereof, preferably, wherein the one or more preservatives or antioxidants improve the shelf-life, flavor profile, or reduce spoilage of the mixture.

396. The mixture for use of claim 395, wherein the steroidal saponin or an analog thereof or the extract of a plant that comprises the steroidal saponin or an analog thereof comprises molecules selected from one or more of the following: yamogenin, diosgenin, smilagenin, sarsasapogenin, tigogenin, neotigogenin, gitogenin, yuccagenin, or saponaretin.

397. The mixture for use of any one of claims 395 or 396, wherein the steroidal saponin or an analog thereof or the extract of a plant that comprises steroidal saponin or an analog thereof comprises a glucosylated steroidal saponin or an aglycone of a steroidal saponin.

398. The method of any one of claims 395-397, wherein the composition is fruit, such as citrus fruits, tropical fruits, or berries, juices, puree, jam, jelly, sports drinks, fruit flavored beverages, wine, dairy product, plant-based milk, product of plant-based milk, coffee, such as black coffee, milk-based coffee drinks, iced coffee drinks, instant coffee, coffee beans, or any combination thereof, alcoholic or non-alcoholic beverage, such as vodka, brandy, whiskey, or any combination thereof, a spice or spicy compound, such as a chili, wasabi, horseradish, mustard, ginger, black pepper, cinnamon, pumpkin spice, Szechuan pepper, or allspice, a salt, a sour compound, such as acetic acid, citric acid, hydrochloric acid, lactic acid, malic acid, nitric acid, fumaric acid, sulfuric acid, tartaric acid, phosphoric acid, other acid or any combination thereof, a bitter compound, such as absinthin, aloin, alpha acid, amarogentin, andrographolide, brucine, caffeine, denatonium, eugenin, hesperidin, humulone, isohumulone, Kaempferol 3-O-rutinoside, 6-Methoxymellein, naringin, papaverine, phenylthiocarbamide, propylthiouracil, quassin, quinidine, quinine, salicin, strychnine, sucrose octaacetate, sucrose octapropionate, theobromine, theophylline, vegetables, tea, chocolate, fruits or any combination thereof, an astringent compound, such as phenolic compounds, tannins, gallic acid, zinc oxide, zinc sulfate, tannic acid, potassium permanganate, silver nitrate, tincture of benzoin, potassium alum, caftaric acid, acacia, yarrow, sage, witch hazel, vinegar, tea, fruits, vegetables, dairy products, herbs, nuts or any combination thereof, a cooling compound, such

as Menthol, Cyclohexanecarboxamide,N-Ethyl-5-Methyl-2-(1- Methylethyl) (WS-3), N-(Ethoxycarbonylmethyl)-3-p-menthanccarboxamidc (WS-5), (1R,2S,5R)-N-(4-Methoxyphenyl)-5-methyl-2-(1- methylethyl)cyclohexanecarboxamide (WS-12), Butanamide, N,2,3-trimethyl-2-(1-methylethyl) (WS-23), or Menthyl Lactate or any combination thereof honey, vanilla, chocolate, tea, saffron, safranal or syrup, such as maple syrup.

399. The mixture for use of claim 398, wherein the dairy product, plant-based milk, or product of plant-based milk comprises a milk, such as whole milk, nonfat milk, lactose-free milk, buttermilk, condensed milk, cashew milk, fermented milk, goat milk, rick milk, soy milk, oat milk, almond milk, pea milk, coconut milk, chocolate milk, a yogurt, cheese, frosting, pudding, chocolate, custard, ice cream, gelato, sherbet, sorbet, frozen yogurt or any combination thereof.

400. The mixture for use of any one of claims 395-399, wherein the mixture provides a taste perception in the subject of a reduction in bitterness perception, reduction in initial bitterness perception, enhancement of bitterness, masking of bitterness, reduction of sourness perception, reduction of lingering sourness perception, shorter duration of lingering sourness perception, reduction of initial sourness perception, reduction of astringency perception, masking of astringency, enhancement of mildness perception, reduction of beany tastes or flavors, reduction of grittiness perception, reduction in cooling perception, enhancement of spice intensity, increased duration of spiciness perception, enhancement of sourness perception, delayed onset of spiciness perception when the mixture is provided to the subject, such as when the mixture is incorporated in a food or beverage that is provided to the subject, as compared, for example, to when component (b) is provided to the subject in the absence of component (a).

401. The mixture for use of any one of claims 395-400, wherein the food or beverage or granule, powder, or liquid formulation is selected from a sugar substitute, water, a carbonated beverage, such as a carbonated fruit beverage, carbonated cola drink or carbonated water, sport beverage, alcoholic beverages, alcohol-free beverages, spices and/or seasonings, such as chili, wasabi, horseradish, mustard, ginger, black pepper, or cinnamon, meat, vegetables, mushrooms, cheese, seafood, salt, energy beverages, flavored water, powders for drinks, dairy products, such as milk, yogurt, cheese, or ice cream, plant based milks, products

of plant based milk, puddings, cakes, shakes, malts, brownies, pastries, cookies, cheesecakes, fudge, pies, cobblers, parfaits, mousse, biscuits, custards, frosting, fruits, vegetables, condiments, dry cereal, oatmeal, granola bars, hard candy, soft candy, taffy, chocolates, sugarless candies, chewing gum, bubble gum, juices, teas, coffees, salsa, gel beads, film strips for breath, gelatin candies, pectin candies, starch candies, lozenges, cough drops, throat lozenges, throat sprays, toothpastes or mouth rinses.

402. The mixture for use of any one of claims 395-401, wherein the amount of component (a) in the mixture is at least 2 ppm, such as, 3, 4, 5, 7.5, 10, 20, 30, 40, 50, 60, 70, 80, 90, 100, 110, 120, 130, 140, 150, 160, 170, 180, 190, 200, 210, 220, 230, 240, 250, 260, 270, 280, 290, or 300 ppm or an amount within a range defined by any two of the aforementioned amounts, preferably 15-25 ppm, 12.5-40 ppm, 25-50 ppm, 25-60 ppm, 25-75 ppm, 50-90 ppm, 50-150 ppm, 100-150 ppm, 100-200 ppm, 150-200 ppm, 200-250 ppm, or 12-200 ppm.

403. The mixture for use of any one of claims 395-402, wherein component (a) is dissolved in food grade ethanol.

404. The mixture for use of claim 403, wherein the food grade ethanol is at least 1%, such as 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 15, 20, 25, 30, 35, 40, 45, 50, 60, 70, 80, 85, 90, 95, or 100%, or with a range defined by any two of the aforementioned amounts, preferably 80, 90, or 95%.