SPECIFICATION

PACKAGED BLEND TEA DRINK

TECHNICAL FIELD

[0001] The present invention relates to a packaged blend tea drink. More specifically, it relates to a packaged blend tea drink which can sustain a dark color tone (in particular, a brownish red color) and a refreshing feeling without bitterness/astringency, while avoiding precipitation when stored over a long time.

BACKGROUND ART

[0002] In recent years, there has been an increasing demand for healthy and value-added products in the beverage industry. Among tea-based drinks, blend tea drinks produced from a plurality of kinds of tea leaves and/or cereals can express various flavors that cannot be obtained by mere use of a single material and have an advantage of ensuring the intake of components of several kinds of natural materials. However, use of a plurality of kinds of materials brings about a problem that the resulting flavor becomes bitter, astringent or miscellaneous. In blend tea drinks which are sold in a packaged state, there sometimes arise additional problems; for example, precipitation is difficult to prevent upon prolonged storage. Various attempts have been made to produce blend tea drinks made from a plurality of kinds of materials. Patent Document 1 discloses a method for producing a blend tea drink rich in flavor by setting different extraction times for a plurality of kinds of materials. Patent Document 2 discloses

a blend tea drink comprising extract solutions of oolong tea leaves with white tea leaves and/or green tea leaves so as to relieve the astringency inherent to oolong tea.

[Patent Document 1] JP-A-2003-310160

[Patent Document 2] JP-A-07-111858

(Japanese Patent No.2725985)

DISCLOSURE OF THE INVENTION

PROBLEMS TO BE SOLVED BY THE INVENTION

[0003] Since a number of blend tea drinks are now on the market, it is desirable to develop a drink that can be differentiated from existing products. Under these circumstances, the present inventors focused attention on the fact that no packaged blend tea drink having a dark color tone had been marketed. According to the inventors' notion, a dark color tone (in particular, a brownish red color tone) of a blend tea drink can create a good impression of being made from many kinds of materials and being rich in many kinds of components, project a healthy and high-class image and thus add value to the blend tea drink. When it is attempted to darken the color tone of a blend tea drink, however, it is sometimes observed that the flavor of the drink becomes astringent or too thick, so that its refreshing feeling is impaired. Moreover, it is also observed in some cases that the characteristic flavor of a specific material becomes excessively noticeable, which makes the taste simple.

[0004] Accordingly, an object of the present invention is to provide a packaged blend tea drink which can sustain a dark color tone (in particular, a brownish red color tone) and a

refreshing feeling without bitterness/astringency while avoiding precipitation when stored over a long time.

MEANS FOR SOLVING THE PROBLEMS

[0005] To solve the above-described problems, the present inventors conducted intensive studies. As a result, they noticed that a plurality of kinds of materials employed in a blend tea drink show different tastes, smells and components depending on harvesting season, and the tastes, smells and components also vary depending on methods of treating the materials (roasting methods, fermentation methods, level of roasting or fermentation, etc.). Thus, they examined methods of selecting and treating the materials. Furthermore, they found out that among various characteristics and components that can be measured in blend tea drinks, specific factors are usable as indications for obtaining a blend tea drink, whereby the above-described problems can be solved. Finally, the present inventors have found out that a blend tea drink, which can sustain a dark color tone and a refreshing feeling without bitterness/astringency while avoiding precipitation when stored over a long time, can be obtained by controlling the caffeine content, Brix, haze value, etc. of the blend tea drink, thereby completing the present invention.

[0006] Accordingly, the present invention provides a blend tea drink containing liquid extracts of one or more materials selected from each of at least two groups (preferably at least three groups, more preferably at least four groups and more preferably five groups) from among the following five groups (A) to (E):

(A) stems and leaves of *Camellia sinensis*;

(B) stems and leaves of plants other than *Camellia sinensis*;

(C) cereal seeds;

(D) plant-origin materials other than stems, leaves and cereal seeds; and

(E) fungus-origin materials;

which has the following characteristics:

(i) having a caffeine content of 150 ppm or less (preferably 110 ppm or less, more preferably 80 ppm or less and more preferably 50 ppm or less);

(ii) having a Brix of 0.5% or less (preferably 0.45% or less, more preferably 0.4% or less and more preferably 0.35% or less);

(iii) having a haze value of less than 10 (preferably less than 7, more preferably less than 5 and more preferably less than 3); and

(iv) having a color tone of 0.8 or more (preferably 1.0 or more, more preferably 1.1 or more, and more preferably 1.2 or more) when measured at a wavelength of 420 nm.

The present invention further provides a blend tea drink as described above which has the following characteristics:

(i) having a caffeine content of 110 ppm or less;

(ii) having a Brix of 0.45% or less;

(iii) having a haze value of less than 7; and

(iv) having a color tone of 1.0 or more when measured at a wavelength of 420 nm.

The present invention further provides a blend tea drink as described above, which contains liquid extracts of one or more materials selected from each of at least three groups including (A) and (C) (for example, at least three groups including (A), (C) and (D))from among the above-described five groups (A) to (E).

The present invention further provides a blend tea drink as described above, which contains liquid extracts of three or more (preferably five or more) roasted materials.

The present invention further provides a blend tea drink as described above which contains a liquid extract of a material obtained by treating roasted whole-grain Job's tears with a high temperature and high pressure steam and milling (that is, a material belonging to the group (C) as described above).

The present invention further provides a blend tea drink as described above, which is packaged in a transparent container (for example, a PET container).

[0007] The present invention further provides a method of producing a blend tea drink comprising extracting with a solvent three or more materials which comprise one or more materials selected from each of at least three groups from among the following five groups (A) to (E), and filtering the obtained liquid extracts to give filtrates:

(A) stems and leaves of *Camellia sinensis*;

(B) stems and leaves of plants other than *Camellia sinensis*;

(C) cereal seeds;

(D) plant-origin materials other than stems, leaves and cereal seeds; and

(E) fungus-origin materials;

characterized in that the blend tea drink has the following characteristics:

(i) having a caffeine content of 100 ppm or less;

(ii) having a Brix of 0.5% or less; and

(iii) having a haze value of less than 10;

(preferably satisfying any two of the above characteristics (i) to (iii); more preferably satisfying all of the characteristics (i) to (iii)) and further

(iv) having a color tone of 1.0 or more when measured at a wavelength of 420 nm.

The present invention further provides a method of evaluating a blend tea drink characterized by comprising measuring (i) caffeine content, (ii) Brix, (iii) haze value and (iv) color tone (measured at a wavelength of 420 nm) of the blend tea drink.

[0008] The present invention further provides a blend tea drink as described above, which contains five or more (preferably 10 or more, more preferably 15 or more and more preferably 20 or more) kinds of materials.

The present invention furthermore provides a method of producing a blend tea drink as described above, which involves the step of measuring the Brix and OD420 value (color tone measured at 420 nm) of the extract and calculating the OD 420 value/Brix ratio and selecting a material by using the OD 420 value/Brix ratio thus determined as an indication.

The present invention further provides a blend tea drink as described above which contains liquid extracts of two or more materials (preferably three or more materials) selected from among *Lycium chinense* leaves, *Cassia mimosoides*, *Ganoderma applanatum*, dandelion roots, *Crataegus*, mulberry leaves, licorice, *Lonicera japonica*, *Psidium guajava* fruits, camomile, shiitake mushroom (*Lentinus edodes*), *Houttuynia cordata* and *Cassia obtusifolia*, each having been roasted, preferably from among *Ganoderma applanatum*, mulberry leaves, *Psidium guajava* fruits, *Houttuynia cordata* and *Cassia obtusifolia*, each having been roasted.

Moreover, the present invention provides a blend tea drink as described above in which 90 % by weight or more of the materials (preferably 95 % by weight or more, for example, all of the materials) have been roasted.

[0009] In the present specification, the expression "a blend tea drink" is a generic term used to refer to tea-based drinks containing a plurality of kinds of liquid extracts of tea leaves, cereals and other materials. In addition to the liquid extracts, it may contain, for example, a material in a finely milled state. Because of containing liquid extracts or the like originating in a plurality kinds of materials, a blend tea drink can express various flavors that cannot be obtained by merely using a single material, and has an advantage of ensuring the intake of components of a plurality of kinds of natural materials.

[0010] To enable the expression of various flavors that cannot be obtained by merely using a single material and the

intake of components of a plurality of kinds of materials, liquid extracts of one or more materials selected from each of at least two groups, preferably at least three groups, more preferably at least four groups and more preferably the five groups, from among the following five groups (A) to (E), i.e., (A) stems and leaves of *Camellia sinensis*; (B) stems and leaves of plants other than *Camellia sinensis*; (C) cereal seeds; (D) plant-origin materials other than stems, leaves and cereal seeds; and (E) fungus-origin materials, are used in the blend tea drink according to the present invention. It is preferred to use liquid extracts of one or more materials selected from each of at least three groups including (A) and (C) (for example, three or more groups including (A), (C) and (D)) from among the above-described five groups (A) to (E). The individual groups (A) to (E) will be described in detail hereinafter.

[0011] From the viewpoint of enabling the expression of various flavors that cannot be obtained by merely using a single material and the intake of components of a plurality kinds of materials, the blend tea drink according to the present invention contains liquid extracts, finely milled matters, etc. of two or more, for example three or more, preferably five or more, more preferably 10 or more, more preferably 15 or more and particularly preferably 20 or more materials.

[0012] In the present specification, the expression "a packed blend tea drink" means a blend tea drink which is packaged in a container and can be taken as such without

dilution.

[0013] The present inventors found out that a packaged blend tea drink, which can sustain a dark color tone and a refreshing feeling without bitterness/astringency while avoiding precipitation when stored over a long time, can be obtained by controlling (i) caffeine content, (ii) Brix, (iii) haze value and (iv) OD420 value (color tone measured at 420 nm), among various characteristics and components that can be measured in blend tea drinks. Depending on the desired flavor of a target blend tea drink, either all of the factors (i) to (iii) as described above or one or two thereof may be controlled. When it is intended to provide a packaged blend tea drink which can sustain a refreshing feeling without bitterness/astringency while avoiding precipitation when stored over a long time, it is desirable to control all of the above-described factors (i) to (iii).

[0014] (i) Caffeine content

The caffeine content of the blend tea drink according to the present invention is preferably 150 ppm or less, more preferably 110 ppm or less, more preferably 80 ppm or less, and still more preferably 50 ppm or less. A blend tea drink having a higher caffeine content has a more noticeable bitterness/astringency. To reduce caffeine contained in the blend tea drink, it is possible to regulate the content of a material containing a large amount of caffeine such as *Camellia sinensis* leaves in the group (A) as described above. The caffeine content can be measured by a commonly employed method. For example, it can be measured by a method that will

be described in Examples hereinafter.

[0015] (ii) Brix

In the blend tea drink according to the present invention, the Brix, which means the content of soluble solid matters, is 0.5% or less, preferably 0.45% or less, more preferably 0.4% or less and still more preferably 0.35% or less. A blend tea drink having a higher Brix shows a less refreshing feeling with an aftertaste. By considering the flavor as a drink, however, it is preferable that the Brix is 0.1% or more. As a method of regulating the Brix in the blend tea drink, use can be made of, for example, the methods of optimizing the extraction conditions (e.g., regulating the composition ratio of materials), selecting appropriate materials, controlling the conditions for roasting materials, altering other treatment conditions (e.g., the treatment with a high temperature and high pressure steam, filtration, etc. as will be described hereinafter) and so on. The Brix can be measured by a commonly employed method. For example, it can be measured referring to the method as will be described in Examples hereinafter.

[0016] (iii) Haze value

In the blend tea drink according to the present invention, the haze value, which is an indication showing the degree of turbidity of the drink, is less than 10, preferably less than 7, more preferably less than 5 and still more preferably less than 3. A blend tea drink having a higher haze value shows more precipitation when stored over a long time, which is undesirable particularly in the case of a blend

tea drink packaged in a transparent container. As a method of regulating the haze value of the blend tea drink, use can be made of, for example, methods of removing insoluble fine particles by centrifugation or filtration, and so on. The haze value can be measured by a commonly employed method. For example, it can be measured using a method that will be described in Examples hereinafter.

[0017] (iv) Color tone

In the blend tea drink according to the present invention, the color tone is an indication showing the darkness of the drink color. A dark color tone (in particular, a brownish red color tone) of the blend tea drink can give a good impression to consumers of being made from many kinds of materials and being rich in many kinds of components, project a healthy and high-class image and thus add value to the blend tea drink. In the present specification, the color tone is determined based on a value obtained by measuring the absorbance at a wavelength of 420 nm with a spectrophotometer. The color tone at the wavelength of 420 nm thus measured is sometimes called "OD420 value" in the present specification. In general, a brownish red color tone is measured at the wavelength of 420 nm. Other color tones of tea-based drinks such as a green color tone typified by green tea should be measured at other wavelengths. In the blend tea drink according to the present invention, however, the color tone is evaluated based on the OD420 value from the viewpoint that the color tone of green tea and so on would also relate to the caffeine content as discussed above.

[0018] The color tone expressed in OD420 value of the blend tea drink according to the present invention is 0.8 or more, preferably 1.0 or more, more preferably 1.1 or more and still more preferably 1.2 or more but it is desirably not more than about 3.5. The color can be measured by a commonly employed method. For example, it can be measured at the wavelength of 420 nm by a method that will be described in Examples hereinafter.

[0019] As a method of elevating the color tone of the blend tea drink, use can be made of the method of selecting materials and treating procedures (e.g., roasting and milling) as giving liquid extracts of a dark (brownish red) color tone, i.e., selecting an appropriate combination of materials with procedures for treating the materials.

[0020] Also, a blend tea drink having a dark brownish red color tone can be obtained by use of materials having been appropriately roasted. In a preferred embodiment of the present invention, therefore, a blend tea drink contains liquid extractions of three or more, more specifically five or more, materials having been roasted. In another preferred embodiment of the present invention, a blend tea drink contains liquid extracts of the materials 90 % by weight or more, more specifically 95 % by weight or more of which have been roasted.

[0021] It is also possible to employ the Brix and OD420 value of a liquid extract obtained by extracting each material alone as indications in selecting materials for obtaining a blend tea drink having a dark brownish red color tone. As

will be described in the following Examples, for example, various kinds of materials are treated by various methods and then extracted under the same conditions to give liquid extracts. Next, the Brix and OD420 value of each liquid extract are measured and the OD420 value/Brix ratio is calculated. By selection of materials having a high OD420 value/Brix ratio and blending at a composition ratio determined by considering the flavor qualities, it is expected that a blend tea drink having a dark brownish red color tone and desired flavor qualities can be provided. Examples of materials having a high OD420 value/Brix ratio include *Lycium chinense* leaves, *Cassia mimosoides*, *Ganoderma applanatum*, dandelion roots, *Crataegus*, mulberry leaves, licorice, *Lonicera japonica*, *Psidium guajava* fruits, camomile, shiitake mushroom (*Lentinus edodes*), *Houttuynia cordata* and *Cassia obtusifolia*, each having been roasted. In particular, *Ganoderma applanatum*, mulberry leaves, *Psidium guajava* fruits, *Houttuynia cordata* and *Cassia obtusifolia*, each having been roasted, may be cited.

[0022] The packaged blend tea drink according to the present invention contains liquid extracts of one or more materials selected from each of at least two groups from among the following five groups (A) to (E). Each of these materials may be a material obtained by harvesting a natural material and appropriately treating (for example, drying, roasting, milling, etc.). If desired, use can be made of a marketed material having been treated in the above-described manner and such a marketed material may be further roasted, milled and

treated with a high temperature and high pressure steam, as will be described hereinafter.

[0023] Group (A)

In the blend tea drink according to the present invention, the materials belonging to group (A) are stems and leaves of *Camellia sinensis*. It is known that these stems and leaves are processed into tea leaves having different flavor qualities depending on fermentation conditions, i.e., fermented tea (black tea), semi-fermented tea (oolong tea, etc.), non-fermented tea (green tea, etc.) and post-fermented tea (puer tea, etc.). These different fermentation conditions are well known to those skilled in the art. Each of these stems and leaves having been fermented under different conditions can be further classified into materials having different flavor qualities in detail depending on the place of origin and treating method. For example, black tea can be classified into Darjeeling, Uva, Keemun, etc., oolong tea can be classified into *Ti Kuan Yin, se zhong, huang jin gui, Wu-Yi* mountain etc., and green tea can be classified into *sencha, bancha, gyokuro, kamairicha* (pan fired tea), etc. In the present specification, such materials differing in the place of origin of the material and treating method as described above are regarded as different materials. As the material belonging to group (A), use can be made of, for example, green tea, and preferably roasted green tea. The treatment of the material (for example, fermentation, roasting, milling, drying, etc.) can be conducted by procedures that are publicly known to those skilled in the art. A treatment with a high

temperature and high pressure steam may be also carried out. By blending such materials belonging to group (A), it becomes possible to create a flavor, which is familiar and readily acceptable to consumers and serves as the basis of the drink, i.e., a black tea flavor, an oolong tea flavor, a green tea flavor, etc., in the blend tea drink according to the present invention. Since materials belonging to group (A) generally contain a large amount of caffeine, the content thereof and so on should be determined by taking the desired flavor (in particular, bitterness/astringency) of the target drink into consideration.

[0024] Group (B)

In the blend tea drink according to the present invention, the materials belonging to group (B) are stems and leaves of plants other than *Camellia sinensis*. These materials are not particularly restricted so long as they are commonly used in producing foods and drinks. For example, it is possible to use ginkgo leaves, persimmon leaves, loquat (*Eriobotrya japonica*) leaves, mulberry leaves, *Lycium chinense* leaves, *Eucommia ulmoides* leaves, *Brassica rapa var. peruviridis*, *Sasa veitchii*, *Houttuynia cordata*, *Gynostemma pentaphyllum*, *Lonicera Japonica*, *Oenothera tetraptera*, *Glechoma hederacea subsp. grandis*, *Cassia mimosoides*, *Gymnema sylvestre*, *Engelhardtia chrsolepis (Juglandaceae)*, *Rubus suavissimus S.Lee* (*Rosaceae*), *Aloe arborescens*, etc. It is also possible to use various herbs such as lemon grass. It is further possible to use buds harvested from germinating cereal seeds such as barley leaves. As the materials belonging to

group (B), use can be made of, for example, mulberry leaves, *Lycium chinense* leaves, *Houttuynia cordata*, *Lonicera Japonica*, etc. Each of these materials can be harvested in desired season and then treated by drying, roasting, milling, etc. A treatment with a high temperature and high pressure steam may be also carried out. By use of these stems and leaves of a plant other than *Camellia sinensis*, it becomes possible to create a taste with rich fullness in the blend tea drink according to the present invention. In the case of using a material having been employed as a traditional Chinese medicine, moreover, it is expected that a medicinal effect is also exhibited. Thus, a high-class, healthy and unique flavor can be added to the blend tea drink.

[0025] Group (C)

In the blend tea drink according to the present invention, the materials belonging to group (C) are cereal seeds. These materials are not particularly restricted so long as they are commonly used in producing foods and drinks. For example, Job's tears, barley, wheat, brown rice, soybean, corn, black bean, buckwheat, *Cassia obtusifolia*, malt, etc. fall within this group. Compared with other materials, these materials are generally hard. Thus, it is known that they should be subjected to optional treatments such as roasting to an elevated level, milling with a crusher after roasting and then extracting, threshing in the case of hulled seeds, etc. In the case where a plurality of kinds of materials are blended and then subjected to the extraction step at once, particular attention should be paid so that a liquid extract

having the desired flavor can be obtained within the same extraction time as other materials. As a material of group (C), sprouting grains (for example, sprouting barley, i.e., malt) may be used to alter the nutritional value or flavor. Also, a treatment with a high temperature and high pressure steam may be carried out by referring to the treatment concerning Job's tears, as will be described hereinafter. In the present specification, such materials having been treated by different methods as non-sprouting barley and sprouting barley are regarded as different materials. As the materials belonging to group (C), use can be made of, for example, *Cassia obtusifolia*, Job's tears, Job's tears having been treated with a high temperature and high pressure steam, barley, malt, etc. By use of these cereal seeds as the material, flavors such as a roast aroma and sweetness can be created in the blend tea drink. From a nutritional viewpoint, moreover, a healthy image can be created thereby.

[0026] Group (D)

In the blend tea drink according to the present invention, the materials belonging to group (D) are plant-origin materials other than stems, leaves and cereal seeds. These materials are not particularly restricted so long as they are commonly used in producing foods and drinks. Examples thereof include plant fruits, pericarps, roots, flowers, algae, etc. Although algae belongs to a biological group differing from plants from a taxonomic viewpoint, materials originating in algae are considered as materials belonging to group (D) in the present specification

regardless of parts employed, taking the effects on the flavor qualities of the blend tea drink into consideration. More specifically, there can be enumerated safflower, chamomile, *Lycium chinense/barbarum* fruits, *Rosa davurica Pallas* (rose hip) fruits, *Crataegus*, turmeric (roots), dandelion roots, *Polygonatum falcatum*、*Psidium guajava* fruits, orange peel, ginseng, sweet potato, onion, jujube, lemon peel, *laminaria*, *Hizikia fusiformis*, etc. Each of these materials can be harvested in desired season and then treated by drying, roasting, milling, etc. A treatment with a high temperature and high pressure steam may be also carried out. In the case of using roots, in particular, it is a common practice to wash away extraneous matters such as soil, optionally dry and then eliminate the inherent odor by roasting followed by milling. In the case of using fruits, in particular, small fruits are employed as such, while larger ones are milled before drying, roasting, etc. In the case of using flowers, in particular, dried flowers may be used as such as the material. As the materials belonging to group (D), use can be made of, for example, dandelion roots, *Crataegus*, *Psidium guajava* fruits, chamomile, *Rosa davurica Pallas* fruits, etc. By blending these plant-origin materials other than stems, leaves and cereal seeds, it becomes possible to create a characteristic flavor, sweetness and a taste of fullness in the blend tea drink according to the present invention. In the case of using a material having been employed as a traditional Chinese medicine, moreover, it is expected that a medicinal effect is also exhibited. Thus, a high-class, healthy and unique flavor

can be added to the blend tea drink.

[0027] Group (E)

In the blend tea drink according to the present invention, the materials belonging to group (E) are fungus-origin materials. These materials are not particularly restricted so long as they are commonly used in producing foods and drinks. Examples thereof include shiitake mushroom (*Lentinus edodes*), *Ganoderma lucidum*, *Ganoderma applanatum*, etc. Each of these materials can be harvested in desired season and then treated by drying, roasting, milling, etc. A treatment with a high temperature and high pressure steam may be also carried out. As the materials belonging to group (E), use can be made of, for example, shiitake mushroom (*Lentinus edodes*), *Ganoderma applanatum*, etc. By use of these fungus-origin materials, it becomes possible to create a characteristic flavor, body and appropriate saltiness in the blend tea drink according to the present invention. In the case of using a material having been employed as a traditional Chinese medicine, moreover, it is expected that the medicinal effect is also exhibited. Thus, a high-class, healthy and unique flavor can be added to the blend tea drink.

[0028] Roasting

Concerning the individual materials as described above, the roasting machine and roasting method are not specifically restricted. Examples of commonly employed roasting machines include a continuous fluidized bed roaster, a rotary drum roaster, etc. Depending on heating manner, roasting methods are classified into direct fire heating, hot-air heating,

far-infrared heating, microwave heating, etc. In the roasting management for materials employed in drinks, use is frequently made of L value, bulk specific gravity, moisture content, Brix, etc. as indications of roasting level in any roasting method. It is known that liquid extracts largely differ in appearance and color tone, depending on roasting methods, even though these liquid extracts are obtained from materials having the same L value. As the roasting level of a material increases in the roasting treatment, a roast flavor is imparted but bitterness becomes noticeable. Thus, the roasting level should be determined by considering the flavor.

[0029] Milling

The materials as described above can be employed in a milled state, if desired. In particular, it is expected that components of the materials of group (C) can be fully extracted by milling these materials and then extracting. A material may be milled to such a level that can be readily determined by a person skilled in the art on the basis of the working efficiency and the desired concentration of the extract. An excessively high milling level is not preferable, since the flavor of the obtained liquid extract becomes unpredictable and a long time is required for filtering the milled product to give the liquid extract in this case. At a low milling level, the extraction cannot be performed at a sufficient degree in some cases. Milling can be conducted by milling the material by using, for example, a roll crusher to such a level as giving a 2 mm-pore mesh passage rate of about 50%.

[0030] Steam treatment at high temperature and high pressure

The materials as described above can be employed after treating with a steam at high temperature and high pressure, if desired. Next, the treatment with a high temperature and high pressure steam will be illustrated in the case of Job's tears, which is a material belonging to group (C) as described above, by way of example. Other materials can be also treated with a high temperature and high pressure steam by referring to the case of Job's tears, as will be described hereinafter.

[0031] Although Job's tears are known as having various medicinal effects, there is a problem in using it as a material of a drink in that its liquid extract has an unpleasant smell and bitterness. To provide a blend tea drink with no bitterness/astringency, it is preferable from the viewpoint of flavor qualities to use Job's tears which have been treated with an effective treating amount of steam at high temperature and high pressure for an effective treating time (hereinafter sometimes referred to as "high temperature and high pressure steam-treated Job's tears").

[0032] To prevent molten components from leakage from the treating system during the treatment at high temperature and high pressure, it is preferable in the treatment as described above to use unthreshed Job's tears, i.e., whole-grain Job's tears with hull which is not milled. From the viewpoint of flavor qualities, it is preferable to roast the Job's tears. The roasting machine, roasting method, etc. are not particularly restricted, as discussed above. The roasting

level may be appropriately designed. For example, use can be made of whole-grain roasted Job's tears having an L value of L20 (a high roasting level) to L50 (a low roasting level), in particular, L30 to L40. The subsequent steam treatment at high temperature and high pressure can be carried out by using steam (for example, a saturated steam generated from purified water) at a temperature of about 150°C to about 210°C and a pressure of about 0.35 MPa to about 1.8 MPa. It should be taken into consideration that when the treating temperature is too low, the effect of creating the taste with fullness, sweetness and roast aroma and the effect of removing the unpleasant smell and bitterness can be scarcely established, while when the treating temperature is too high, a burnt smell becomes highly noticeable. Concerning the pressure, although the sourness and miscellaneous taste can be more efficiently removed at a higher pressure, an excessively high pressure brings about a burnt smell and causes the formation of an additional sourness component. The term "pressure" as described above means "gauge pressure" and saturated vapor pressure is preferred.

[0033] The effective flow rate in the steam treatment at a high temperature and a high pressure can be defined by the weight of water being in contact with the unit weight of Job's tears employed as the material per the unit time. For example, the effective treating flow rate can be controlled to 0.5 to 10 kg/h per kg of Job's tears. The effective treating time during the treatment means such a period of time as allowing the exertion of the desired flavor improving effect.

Although the effective treating time varies depending on the treating temperature and treating pressure, it may be controlled to, for example, about 3 minutes to about 10 minutes.

[0034] Compared with Job's tears before the treatment, the high temperature and high pressure steam-treated Job's tears have no stimulating smell but a roast aroma having been created therein. In particular, it contains more kinds of flavor components, in particular, pyrazines comprising 2-ethyl-3-methylpyrazine as the main component in a larger amount. Moreover, the high temperature and high pressure steam-treated Job's tears have a characteristic of showing decreases (for example, 90% by weight or less, preferably 75% by weight or less) in dietary fiber and starch contents and an increase (for example, 10% by weight or more, preferably 30% by weight or more) in saccharide such as maltose oligosaccharides (for example, maltotriose, maltotetraose, maltopentaose, maltohexaose, etc.) content compared with untreated Job's tears. This is seemingly because components such as starch in Job's tears are hydrolyzed by the hydrothermal reaction to form monosaccharides, disaccharides, oligosaccharides and so on. Thus, the processed Job's tears product and its solvent extract are sweetened. Furthermore, the high temperature and high pressure steam-treated Job's tears show a characteristic that the extraction rate is increased compared with untreated Job's tears, which brings about a taste with body (fullness) and sweetness. Moreover, it can be expected that an increase in the extraction rate

makes it possible to obtain a larger amount of solid matters from the smaller amount of materials, thereby improving the productivity.

[0035] Production of blend tea drink

Next, the process for producing a packaged blend tea drink will be roughly illustrated. After appropriate treatments such as roasting and milling, materials are extracted with a solvent such as hot water or warm water. The liquid extracts thus obtained are clarified by, for example, filtration, and then cooled. Next, auxiliary materials and treating water are added thereto to give a definite concentration and then the obtained mixture is pasteurized and cooled followed by packing and sealing. Depending on the methods employed in the pasteurization and packing, the steps of pasteurization/cooling and packing/sealing may be conducted in reverse order. Also, these steps vary depending on the container to be employed. For example, a drink packaged in a PET container is mostly produced by aseptic packaging.

[0036] It is possible to mix liquid extracts obtained by separately extracting the individual materials as described above. Alternatively, it is also possible to mix all of the materials and then extract the mixture to give a liquid extract. In the case of using a plurality of kinds of materials, the latter procedure is seemingly more convenient. Furthermore, a concentrate of each extract, a purified product thereof, etc. may be blended.

[0037] Extraction

The extraction in the production process as described

above may be roughly classified into dip extraction and drip extraction. In the dip extraction that is an extraction method wherein hot or warm water employed as an extraction solvent is neither supplied nor recovered during the extraction, a material to be extracted such as tea leaves is brought into contact with a definite amount of hot (or warm) water for a definite period of time. Use is made of a system wherein the material to be extracted can exist all over an extraction device or another system wherein the material to be extracted is put in a basket or the like which is occasionally moved, for example, in the vertical direction during the extraction. As an extraction device, a multifunctional extractor of kneader or tank type is used in the former system, while a basket extractor is used in the latter system. The method for separating the material to be extracted differs from extractor to extractor. This dip extraction has been mainly employed in producing drinks using "stems and leaves of tea (*Camellia sinensis*)" as a sole material. On the other hand, in the drip extraction that is a method having been generally employed in producing "coffee drinks", hot or warm water is continuously supplied into an extractor containing a material to be extracted, and the liquid extract is continuously recovered during the extraction. The drip extraction is classified into the dip drip extraction system, wherein the above-described operation is conducted after starting the extraction and dipping the material, and the complete drip system wherein the dripping is omitted. As a device, a multifunctional extractor or a coffee extractor is

used. Also, use is sometimes made of the batch-continuous method wherein several small-sized tank extraction pots are continuously operated. In the present invention, the extraction method is not particularly restricted and any extractor can be used therefor. In the drip extraction, attention should be paid to the appropriate control of the characteristics (grain size, sugar content, etc.) of the material and the extraction conditions (temperature, flow rate, etc.) so as to prevent jamming. Also, it is possible to combinedly employ a method wherein the extraction is conducted under feeding an inert gas such as a nitrogen gas and removing dissolved oxygen, i.e., under so-called non-oxidative conditions.

[0038] The solvent to be used in the extraction may be an arbitrary solvent without particular restriction so long as it is suitable for extraction. An aqueous solvent is preferred and water can be used as the most convenient solvent. The water qualities are not particularly restricted so long as they are suitable for treating foods. For example, use can be made of distilled water, desalted water, tap water, ionized alkaline water, deep seawater, ion-exchanged water, deoxygenated water or water containing an organic water-soluble compound (for example, an alcohol) or an inorganic salt. It is preferable to use purified water. In the case where the extraction efficiency can be elevated by an organic acid, an organic acid salt or the like such as sodium bicarbonate or sodium ascorbate, such a substance may be preliminarily added.

[0039] To obtain a blend tea drink having a refreshing feeling without bitterness/astringency, it is preferable that the ratio of the above-described materials to the extraction solvent (i.e., the material content) is from 1 to 20% by mass, more specifically from 2 to 10% by mass based on the solvent.

[0040] The extraction time may be such a period of time as gives a desired liquid extract. For example, it may be from 1 to 60 minutes, preferably from 3 to 30 minutes and more preferably from 5 to 20 minutes. In general, an excessively short extraction time makes the extraction of the flavor components insufficient, while an excessively longer extraction time strengthens the bitterness/astringency of the liquid extract; either is not preferred.

[0041] In the present invention, the term "extraction temperature" means the temperature of the extraction solvent. From the viewpoint of conducting the extraction under mild conditions so as to give a liquid extract having suppressed bitterness/astringency, the extraction temperature is from, for example, 30 to 100°C, preferably from 50 to 95°C and more preferably from 70 to 95°C.

[0042] After the extraction, the liquid extract can be filtered by use of a method that is publicly known to those skilled in the art. To prevent turbidity or sedimentation, use can be made of, for example, centrifugation, filtration through a filter fabric or diatomaceous earth, filtration through a filter, etc. To lower the haze value of the drink, microfiltration using a filter, etc. is preferred. To prevent unnecessary removal of components contributing to the flavor,

it is desirable in the filtration treatment to appropriately select the capture particle size.

[0043] Evaluation method

The present invention further provides a method of evaluating a blend tea drink characterized by comprising measuring the caffeine content, Brix, haze value and OD420 value of the blend tea drink. The present inventors have found out that the caffeine content, Brix, haze value and OD420 value are usable respectively as indications of bitterness/astringency, refreshing feel, stability during storage and brownish red color tone and, therefore, measurement of these factors makes it possible to determine whether or not a drink is a blend tea drink suitable for a packaged blend tea drink which has a refreshing feeling without bitterness/astringency and a dark color tone, and projects a healthy and high-class image while avoiding precipitation during storage over a long time. Moreover, the caffeine content, Brix, haze value, OD420 value, etc. may be measured not only in a final blend tea drink product but also in, for example, a liquid extract obtained from a single material or a combination of a plurality of kinds of materials to be used in producing a blend tea drink. Namely, these factors can be used as indications in selecting materials or determining the composition ratio thereof to produce a desired blend tea drink.

[0044] To obtain desired flavor qualities and product qualities, the packaged blend tea drink according to the present invention may contain, either singly or in

combination, additives that have been commonly used in tea drinks, for example, an antioxidant, a perfume, a coloring matter, an emulsifier, a preserving agent, a seasoning, a sweetener, a sour agent, an extract, a pH controlling agent, a quality stabilizer and so on. If desired, it may be heated and milk or sugar may be added to it.

[0045] As the container for the packaged blend tea drink according to the present invention, use can be made of various types of containers such as a bottle, a can, a paper container, a PET bottle and so on without particular restriction. From the viewpoint of further highlighting the characteristics, i.e., the dark color tone of the blend tea drink according to the present invention, it is preferred that the drink is packaged in a container which is partly or entirely transparent.

ADVANTAGES OF THE INVENTION

[0046] According to the present invention, it is possible to provide an unprecedented packaged blend tea drink having a dark color tone which has a refreshing feeling without bitterness/astringency and is prevented from precipitation when stored over a long time. A dark color tone (in particular, a brownish red color tone) of a blend tea drink can create a good impression of being made from many kinds of materials and being rich in many kinds of components, project a healthy and high-class image and thus add value to the blend tea drink. Because of having a refreshing feeling without bitterness/astringency, the blend tea drink according to the present invention can be readily taken every day with

continuing enjoyment. Since an amount of caffeine in the blend tea drink is regulated, the drink can be taken even before bedtime without problem. According to the present invention, it is also possible to provide a method whereby it can be conveniently determined whether a blend tea drink, which can be obtained by treating various kinds of materials in various manners and blending at various composition ratios, is preferable from the viewpoint of having, for example, the characteristics as discussed above. Use of these evaluation indications makes it possible to easily provide a packaged blend tea drink having the above-described characteristics.

EXAMPLES

[0047] Next, the present invention will be described in greater detail by referring to the following Examples. However, it is to be understood that the present invention is not restricted thereto.

[0048] Example 1: Flavor evaluation and component analysis on various marketed drinks

To examine preferable flavor qualities and components as a novel blend tea drink, marketed packaged tea drinks (three kinds of green tea drinks, two kinds of cereal tea drinks, two kinds of blend tea drinks and one kind of oolong tea) were prepared. Green tea drinks A to C were packaged green tea drinks differing in concentration from each other. Cereal tea drinks A and B were packaged cereal tea drinks made from barley and differing in concentration from each other. Blend tea drinks A and B were packaged blend tea drinks each made from 10 or more kinds of materials including Job's tears,

barley, brown rice and *Cassia obtusifolia*. Oolong tea was a packaged oolong tea drink made from oolong tea.

[0049] First, the caffeine contents, Brixes, haze values and OD420 values (brownish red color tone measured at a wavelength of 420 nm) were measured. The measurement conditions employed were respectively as follows. Table 1 shows the measurement data.

<<Caffeine content>>

Analyzer: TOSOH HPLC System LC8020 model II
manufactured by TOSOH Co.
[Multistation: LC-8020, Pump: CCPM-II, Autosampler: AS-8021, Detector: UV-8020, Column oven: CO-8020, On-line degasser: SD-8023]

Analysis conditions [Column: TSK gel ODS-80Ts QA, Eluent A: 10% acetonitrile/water 0.05% TFA, Eluent B: 80% acetonitrile/water 0.05% TFA, Flow rate: 1.0 ml/min, Temperature: 40°C, Detection: UV 275 nm]

<<Brix>>

Analyzer: ATAGO Differential Refractometer DD-7
manufactured by ATAGO Co., Ltd.

<<Haze value>>

Analyzer: NIPPON DENSHOKU Haze Meter NDH2000
manufactured by Nippon Denshoku Industries, Co., Ltd.

Cell employed: square cell (10 mm x 40 mm)

<<OD 420 value>>

Analyzer: SHIMADZU UV-VISIBLE SPECTROPHOTOMETER UV-1600
manufactured by SHIMADZU Co.

Cell employed: square cell, optical path length 10 mm

Measurement wavelength: 420 nm

<<L value>>

Measurement device: Spectro Color Meter SE2000
manufactured by Nippon Denshoku
Industries, Co., Ltd.

Next, the flavor of each of the tea drinks was evaluated by three skilled panelists for refreshing feeling (evaluated in five grades by scoring a sample having a highly refreshing feeling as 5 and one having little refreshing feeling as 1) and lack of bitterness/astringency (evaluated in five grades by scoring a sample having no bitterness/astringency as 5 and one having strongly noticeable bitterness/astringency as 1). Table 1 shows the averages of all panelists.

[0050] Further, stability was examined by allowing each sample to stand at 40°C for 14 days and then observing with the naked eye. A sample having a high stability (showing neither sedimentation nor precipitation) was scored as 5, one having a poor stability (showing sedimentation and precipitation) was scored as 1, and one having a somewhat poor stability (showing a little sedimentation and precipitation) was scored as 3. Table 1 summarizes the results.

[0051]

[Table 1]

	Comp. Ex.1	Comp. Ex.2	Comp. Ex.3	Comp. Ex.4	Comp. Ex.5	Comp. Ex.6	Comp. Ex.7	Comp. Ex.8
(Type)	Green tea A	Green tea B	Green tea C	Cereal tea A	Cereal tea B	Blended tea A	Blended tea B	Oolong tea
Caffeine (ppm)	150	230	130	<10	<10	20	<10	150
Brix (%)	0.3	0.5	0.3	0.4	1.2	0.2	0.3	0.3
Haze	7	9	<1	1	1	1	5	4
OD420	0.7	0.8	0.4	0.4	1.5	0.5	0.4	1.0
L value	86.7	87.8	94.8	90.2		86.5	88.9	84.1
Refreshing feeling	4	2	4	3.5	1	4	4	4
Bitterness/ astringency	3	1	2.5	5	2	5	5	1.5
Stability	3	3	4	5	3	5	4	4

[0052] The results shown in the above Table 1 indicate the following facts.

[Caffeine]

It is clarified that bitterness/astringency likely became highly noticeable with an increase in the caffeine content. Although it does not matter when a consumer takes oolong tea or green tea by making his/her own choice, it seems desirable to lower the caffeine content in the case of aiming at providing a blend tea drink having no bitterness/astringency.

[Brix]

It is clarified that a drink having a higher Brix likely had a less refreshing feeling. Although it does not matter

when a consumer would like to enjoy the aftertaste, it seems desirable to lower the Brix in the case of aiming at providing a blend tea drink having a refreshing feeling.

[Haze value]

It is clarified that a drink having a higher haze value likely had the lower stability. Although it does not matter when the drink is taken immediately after the extraction, it seems desirable to lower the haze value particularly in the case of aiming at ensuring high stability during prolonged storage as a packaged blend tea drink.

[Color tone]

In the drinks measured herein, OD420 values showed no correlation to L values. It is clarified that in the green tea drinks, the caffeine contents correlate to the green color tone darknesses. By making a connection to the idea of blend tea drinks, it is found out as a result of consumer research that a drink having a dark brownish red color tone projects a high-class image and an image of being made from many kinds of materials (which brings about a healthy image too).

[0053] In general, it is clarified that a marketed packaged tea drink having a high OD420 value and a dark brownish red color tone shows strong bitterness/astringency due to its large caffeine content or a poor refreshing feeling due to its high Brix.

[0054] Based on these results, it is expected that a drink having a dark color tone and a refreshing feeling without bitterness/astringency is available as a characteristic novel drink. It is also considered that when a drink having such

characteristics is provided as a blend tea drink, it can project a high-class image and a healthy image owing to the appearance with the dark brownish red color tone. As a packaged drink, further, it is desirable to prevent precipitation during storage over a long time. To provide a packaged blend tea drink having these properties, it is seemingly a solution for the purpose to obtain a blend tea drink which has a small caffeine content (relating to bitterness/astringency), a low Brix (relating to refreshing feeling), a low haze value (relating to stability) and a high OD420 value (relating to the darkness of brownish red color tone).

[0055] Example 2: Relation between method of treating materials and brownish red color tone

Studies were made on methods for treating materials to darken the brownish red color tone of a blend tea drink. Malt, barley and green tea, which are materials frequently employed in tea-based drinks, were roasted while changing the roasting conditions to thereby give materials having different roasting levels in three grades. The L values of roasted malt and barley were measured by the same measurement device as in Example 1. Green tea was roasted at heat powers in three levels, i.e., over high flame, medium flame and low flame. After roasting, each material was extracted under the same extraction conditions (hot water at 90°C, composition ratio 3 g/150 g, 15 minutes, dip extraction) to give a liquid extract. The OD420 values of these liquid extracts were measured by the same method as in Example 1. Table 2

summarizes the results.

[0056] [Table 2]

Material	L value after roasting	Color	
		OD420 value	Color evaluation
Malt	47	0.534	Light
	40	1.004	Dark
	33	1.683	Dark
Barley	50	0.281	Light
	44	0.716	Somewhat dark
	38	0.639	Somewhat dark
Green tea	Weak	0.779	Somewhat dark
	Medium	0.886	Somewhat dark
	Strong	1.378	Dark

[0057] Thus, it is clarified that even liquid extracts obtained from the same materials and extracted under the same conditions showed brownish red color tones of different darknesses depending on roasting level. There is observed a tendency that, in a single material, the brownish red color tone was darkened with an increase in the roasting level. As a result of testing of the obtained liquid extracts, it was found out that, as the roasting level increased, a refreshing roast flavor was created but bitterness became noticeable in each material. Therefore, it seems that an appropriate roasting level should be determined by taking the color tone and flavor of the liquid extract into consideration.

[0058] Example 3: Production of high temperature and high

pressure steam-treated Job's tears

Job's tears may be cited as one of the materials usable for blend tea drinks. Although Job's tears are known as having various medicinal effects, there is a problem in using them as a material of a drink in that their liquid extract has an unpleasant smell and bitterness. Thus, the present inventors conducted studies on the method of treating Job's tears.

[0059] Into a pressure container having a pressure resistance of 3.0 MPa made of SUS316 (high temperature/humidity treatment apparatus model HTS-70/160 manufactured by HISAKA WORKS, Ltd.; capacity: 200 L) provided with a steam inlet pipe and a steam outlet pipe, 75 kg of roasted whole-grain Job's tears (roasting level: L35) was introduced. From the steam inlet pipe, 1.4 MPa of a high temperature at about 200°C and high pressure saturated steam was continuously flown at a flow rate of 1.5 kg/hr per kg of Job's tears and the treatment was continued for 5 minutes. Thus, high temperature and high pressure steam-treated Job's tears were obtained.

[0060] Compared with Job's tears having been roasted by the commonly employed method, the high temperature and high pressure steam-treated Job's tears obtained as above showed a decrease in dietary fibers and an increase in saccharides. Concerning the saccharides, it was observed that various maltooligosacchaides were increased while starch was decreased. When the flavor components were analyzed by using GC/MS, it was found out that the high temperature and high

pressure steam-treated Job's tears contained characteristic flavor components including 2-ethyl-3-methylpyrazine that is known as showing a nut-like, sweet and roast flavor upon heating, while some flavor components became undetectable, compared with the Job's tears having been roasted by the commonly employed method.

[0061] 200 g of the high temperature and high pressure steam-treated Job's tears obtained above was milled and drip extracted with 5 L of hot water at 90°C for 15 minutes followed by solid/liquid separation to give a liquid extract. Compared with a liquid extract obtained by extracting the Job's tears having been roasted by the commonly employed method under the same extraction conditions, this liquid extract showed an elevated extraction rate (extraction rate (%)=[(Brix of liquid extract) ÷ 100] x collected liquid (g) ÷ starting Job's tears (g)) x 100).

[0062] To 2 L of the liquid extract as described above, 2 g of sodium bicarbonate and 2 g of vitamin C were added. Further, purified water was added thereto to give a total volume of 8 L. The obtained mixture was pasteurized at conditions being the same as 120°C for 4 minutes or more and filled in 500 ml PET containers to give a drink. When evaluated by skilled panelists, this drink was noted as having a sweet and roast aroma and a taste with fullness and richness compared with a drink obtained by the same process from the Job's tears having been roasted by the commonly employed method. It was also noted as scarcely having unpleasant smell and bitterness.

[0063] Based on the above results, it is considered that use of the high temperature and high pressure steam-treated Job's tears as the material makes it possible to obtain a drink having an improved flavor and reduced unpleasant smell/bitterness inherent to Job's tears.

[0064] Example 4: Selection of materials creating brownish red color tone

Various materials to be used in producing blend tea drinks were extracted under the same conditions (hot water at 90°C, composition ratio 3 g/150 g, 15 minutes, dip extraction) to give liquid extracts. All of the employed materials were roasted ones. That is, marketed materials were roasted, or marketed materials that had been already roasted were employed. For example, use was made of roasted dandelion roots (non-roasted ones have a light color and bitterness/astringency), roasted *Lycium chinense* fruits (non-roasted ones have a light color but little astringency since *Lycium chinense* fruits are inherently sweet), and so on. The individual materials obtained in the above Examples 2 and 3 were also extracted under the same conditions to give liquid extracts. The liquid extracts obtained under the extraction conditions employed in this Example had higher concentrations than common drinks. The Brix and OD420 value of each of the obtained liquid extracts were measured by the same methods as in Example 1.

[0065] Tables 3-1 and 3-2 summarize the measurement results. Table 4 shows the OD420/Brix data calculated for the individual materials.

[0066] [Table 3-1]

OD420 value	Material
Low (0≦OD420<0.5)	*Ganoderma applanatum*, *laminaria*, *Lonicera japonica*, sweet potato, Job's tears, *Sasa veitchii*, jujube, brown rice, barley of Example 2 (roasting level: L50)
Medium (0.5≦OD420<1)	*Cassia mimosoides*, *Plantago asiatica*, *Gynostemma pentaphyllum*, *Cassia obtusifolia*, Job's tears of Example 3, green teas of Example 2 (roasted on medium flame, roasted on low flame), barleys of Example 2 (roasting levels: L38, L44), malt of Example 2 (roasting level: L47), green tea
High (1≦OD420)	*Lycium chinense* leaves, dandelion roots, *Crataegus*, mulberry leaves, licorice, *Psidium guajava* fruits, *Eucommia ulmoides*, camomile, shiitake mushroom, *Houttuynia cordata*, *Rosa davurica Pallas* fruits, green tea of Example 2 (roasted on high flame), malts of Example 2 (roasting levels: L33, L40)

[0067] [Table 3-2]

Brix (%)	Material
Low (0≦Brix<0.5)	*Cassia mimosoides*, *Ganoderma applanatum*, licorice, *Lonicera japonica*, *Psidium guajava* fruits, sweet potato, Job's tears, *Sasa veitchii*, *Gynostemma pentaphyllum*, camomile, *Houttuynia cordata*, brown rice, *Cassia obtusifolia*, green tea of Example 2, barleys of Example 2 (roasting levels: L44, L50)
High (0.5≦Brix<1)	*Lycium chinense* leaves, *Plantago asiatica*, dandelion roots, *Crataegus*, *laminaria*, mulberry leaves, *Eucommia ulmoides*, shiitake mushroom, jujube, *Rosa davurica Pallas* fruits, Job's tears of Example 3, barley of Example 2 (roasting level: L38), malt of Example 2, green tea

[0068] [Table 4]

OD420/Brix ratio	Material
Low (0≦ OD420/Brix<2.5)	*Plantago asiatica*, *laminaria*, sweet potato, Job's tears, Job's tears of Example 3, *Sasa veitchii*, *Gynostemma pentaphyllum*, *Eucommia ulmoides*, jujube, brown rice, barley of Example 2, malt of Example 2
Medium (2.5≦ OD420/Brix<3.5)	*Lycium chinense* leaves, *Cassia mimosoides*, dandelion roots, *Crataegus*, licorice, *Lonicera japonica*, camomile, shiitake mushroom, *Rosa davurica Pallas* fruits, green tea of Example 2
High (3.5≦OD420/Brix)	*Ganoderma applanatum*, mulberry leaves, *Psidium guajava* fruits, *Houttuynia cordata*, *Cassia obtusifolia*

[0069] Tables 3-1 and 3-2 clearly indicate that the OD420 values and Brixes of liquid extracts of different materials widely vary even though they are obtained by extracting under the same extraction conditions.

[0070] The OD420 value/Brix ratios of the liquid extracts obtained under the same extraction conditions, which are listed in Table 4, are usable as an indication in selecting materials creating a dark brownish red color tone. As shown in Table 4, it seems that *Ganoderma applanatum*, mulberry leaves, *Psidium guajava* fruits, *Houttuynia cordata*, *Cassia obtusifolia* are particularly preferable as materials to be used in a blend tea drink having a dark brownish red color tone. Also, *Lycium chinense* leaves, *Cassia mimosoides*, dandelion roots, *Crataegus*, licorice, *Lonicera japonica*,

camomile, shiitake mushroom, *Rosa davurica Pallas* fruits and green tea of Example 2 are seemingly preferable therefor.

[0071] When the liquid extracts obtained by extracting each of the individual materials alone were tested, the tastes of the obtained liquid extracts widely varied, i.e., some showing a vague taste, some showing a highly sharp taste, etc. However, these liquid extracts had each a simple taste or smell, would therefore not particularly appeal to consumers.

[0072] Example 5: Production of blend tea drink 1

Based on the results obtained in the above Examples, blend tea drinks were produced.

[0073] Example 5-1

First, the materials the extracts of which could seemingly create a dark brownish red color (green tea, mulberry leaves, *Cassia obtusifolia*, *Psidium guajava fruits* and shiitake mushroom) were selected based on the results of Example 3. These materials had been treated as in Example 3. The composition ratio of these materials was determined in such a manner as to give a drink having a less simple flavor and a refreshing feeling without bitterness/astringency. The materials were blended, extracted by dipping in hot water at 90°C for 15 minutes and then filtered through a filter (0.8 μm). Next, the filtrate was diluted with hot water to give a final amount of 600 g, thereby giving a blend tea drink. The OD420 value, Brix, caffeine content and haze value of the blend tea drink thus obtained were measured as in Example 1 and the flavor was evaluated as in Example 1. Table 5 shows the composition ratio of the materials and the

results.

[0074] Table 5 indicates that such a blend tea drink as desired in the discussion in Example 1, i.e., having a small caffeine content (relating to bitterness/astringency), a low Brix (relating to refreshing feeling), a low haze value (relating to stability) and a high OD420 value (relating to the darkness of brownish red color tone), and therefore having a refreshing feeling without bitterness/astringency, a high stability and a dark brownish red color was obtained thereby. A packaged blend tea drink can be obtained by adding vitamin C, etc. to this blend tea drink, sterilizing and packing the same by using well-known methods.

[0075] Example 5-2

Using the high temperature and high pressure steam-treated Job's tears obtained in Example 3 as a substitute for *Cassia obtusifolia* in Example 5-1, the composition ratio of these five materials was determined by taking the flavor into consideration. The materials were extracted as in Example 5-1 but diluting with hot water to give a final amount of 550 g, and then filtered. Thus, a blend tea drink was obtained. The OD420 value, Brix, caffeine content and haze value of the blend tea drink thus obtained were measured as in Example 1 and the flavor was evaluated as in Example 1. Table 5 shows the composition ratio of the materials and the results.

[0076] Table 5 indicates that, by using the high temperature and high pressure steam-treated Job's tears, the extraction ratio was elevated and the Brix was increased. In

the flavor evaluation, it was clarified that the sweetness and richness in the flavor were improved, compared with Example 5-1. It is expected that the flavor of a blend tea drink can be further enriched by using an appropriate amount of the high temperature and high pressure steam-treated Job's tears as the material thereof.

[0077] Example 5-3

Increasing the amount of green tea in Example 5-1, the composition ratio of these five materials was determined by taking the flavor into consideration. The materials were extracted as in Example 5-1 but diluted with hot water to give a final amount of 700 g, and then filtered. Thus, a blend tea drink was obtained. The OD420 value, Brix, caffeine content and haze value of the blend tea drink thus obtained were measured as in Example 1 and the flavor was evaluated as in Example 1. Table 5 shows the composition ratio of the materials and the results.

[0078] Table 5 proves that, by increasing of the amount of green tea in the blend tea drink, the caffeine content was increased, which strengthened the bitterness/astringency of the drink, as expected in Example 1. In the flavor evaluation, it was noted that a sharp crispness characteristic to green tea was created compared with Example 5-1. Although such a blend tea drink can be provided based on the preferences of consumers, such an increase in the green tea is seemingly undesirable in the case of intending to provide a drink with no bitterness/astringency.

[0079] Example 5-4

Using the barley obtained in Example 2 as a substitute for *Cassia obtusifolia* in Example 5-1, the composition ratio of these five materials was determined by taking the flavor into consideration. The materials were extracted as in Example 5-1 but diluted with hot water to give a final amount of 700 g, and then filtered. Thus, a blend tea drink was obtained. The OD420 value, Brix, caffeine content and haze value of the blend tea drink thus obtained were measured as in Example 1 and the flavor was evaluated as in Example 1. Table 5 shows the composition ratio of the materials and the results.

[0080] Table 5 indicates that the blend tea drink thus obtained showed a high Brix and, in its turn, a less refreshing feeling and a lowered stability as expected in Example 1. Thus, it is considered that the selection and treating methods of materials also relate to the Brix, refreshing feeling and stability of the drink.

[0081] Example 5-5

Among the materials employed in Example 5-1, three materials, i.e., green tea, *Cassia obtusifolia* and *Psidium guajava* fruits were exclusively used and the composition ratio of these three materials was determined by taking the flavor into consideration. The materials were extracted as in Example 5-1 but diluted with hot water to give a final amount of 600 g, and then filtered. Thus, a blend tea drink was obtained. The OD420 value, Brix, caffeine content and haze value of the blend tea drink thus obtained were measured as in Example 1 and the flavor was evaluated as in Example 1.

Table 5 shows the composition ratio of the materials and the results.

[0082] Table 5 indicates that such a blend tea drink as desired in the discussion in Example 1, i.e., having a small caffeine content (relating to bitterness/astringency), a low Brix (relating to refreshing feeling), a low haze value (relating to stability) and a high OD420 value (relating to the darkness of brownish red color tone) and therefore having a refreshing feeling without bitterness/astringency, a high stability and a dark brownish red color, was obtained by using these three materials in combination. By taking the results of all Examples of the present invention into consideration, it is expected that such a blend tea drink as desired in the discussion in Example 1 can be obtained by combining other materials.

[0083] Comparative Example 9

A blend tea drink was obtained as in Example 5-1 but omitting filtration. The OD420 value, Brix, caffeine content and haze value of the blend tea drink thus obtained were measured as in Example 1 and the flavor was evaluated as in Example 1. Table 5 shows the composition ratio of the materials and the results.

[0084] As Table 5 indicates, it was proved that, compared with Example 5-1, the blend tea drink produced by omitting filtration showed an increased haze value and, in its turn, showed a less refreshing feeling and a lowered stability as expected in Example 1. To obtain a packaged drink having a refreshing feeling and a high stability, it is therefore

considered that a lower haze value is preferred.

[0085] [Table 5]

Example 5-1		Example 5-2		Example 5-3		Example 5-4		Example 5-5		Comp. Example 9	
Green tea	1	Green tea	1	Green tea	3	Green tea	1	Green tea	2	Green tea	1
Mulberry leaves	3	Mulberry leaves	2	Mulberry leaves	3	Mulberry leaves	3		0	Mulberry leaves	3
Cassia obtusi-folia	5	Job's tears of Example 3	2	*Cassia obtusi-folia*	5	Barley of Example 2	7	*Cassia obtusi-folia*	4	*Cassia obtusi-folia*	5
Psidium guajava fruits	2	*Psidium guajava* fruits	2	*Psidium guajava* fruits	2	*Psidium guajava* fruits	2	*Psidium guajava* fruits	6	*Psidium guajava* fruits	2
Shiitake mushroom	0.25	Shiitake mushroom	1	Shiitake mushroom	0.25	Shiitake mushroom	0.25		0	Shiitake mushroom	0.25
Hot water	600	Hot water	550	Hot water	700	Hot water	700	Hot water	600	Hot water	600
Filtered		Filtered		Filtered		Filtered		Filtered		Not filtered	
OD420	1.29	OD420	1.10	OD420	1.22	OD420	1.17	OD420	1.02	OD420	1.22
Brix[%]	0.32	Brix[%]	0.39	Brix[%]	0.4	Brix[%]	0.49	Brix[%]	0.30	Brix[%]	0.35
Caffeine [ppm]	44	Caffeine [ppm]	63	Caffeine [ppm]	113	Caffeine [ppm]	38	Caffeine [ppm]	83	Caffeine [ppm]	44
Haze value	2	Haze value	3	Haze value	2	Haze value	3	Haze value	2	Haze value	7
Refresh-ing feeling	4	Refresh-ing feeling	3	Refresh-ing feeling	4	Refresh-ing feeling	2	Refresh-ing feeling	4	Refresh-ing feeling	3
Bitter-ness/as-tringency	5	Bitter-ness/as-tringency	5	Bitter-ness/as-tringency	2	Bitter-ness/as-tringency	4	Bitter-ness/as-tringency	4	Bitter-ness/as-tringency	5
Stability	5	Stability	4	Stability	5	Stability	4	Stability	5	Stability	1

[0086] Example 6: Production of blend tea drink 2

Based on the results obtained in the above Examples, a blend tea drink was produced by using more materials to enable the intake of further various components.

[0087] By using the following materials: one kind of stems and leaves of *Camellia sinensis* (green tea); eight kinds of stems and leaves of a plant other than *Camellia sinensis* including *Houttuynia cordata*; five kinds of cereal seeds including *Cassia obtusifolia* and Job's tears (having been treated by the method of Example 4); seven kinds of plant-origin materials other than stems, leaves and cereal seeds including *Psidium guajava* fruits and *Lycium chinense* fruits; and three kinds of fungus-origin materials including *Ganoderma applanatum*, a blend tea drink (Example 6) was obtained as in Example 5-1. The OD420 value, Brix, caffeine content and haze value of the blend tea drink thus obtained were measured as in Example 1 and the flavor was evaluated as in Example 1. Table 6 shows the results.

[0088]

[Table 6]

	Example 6
Caffeine[ppm]	30
Brix[%]	0.3
Haze value	2

OD420	1.5
L value	73.5

Refreshing feeling	4
Bitterness/ astringency	5
Stability	5

[0089] Thus, such a blend tea drink as desired in the discussion in Example 1, i.e., having a small caffeine content, a low Brix and a low haze value and a high OD420 value and, therefore, having a refreshing feeling without bitterness/astringency, a high stability and a dark brownish red color, could be obtained. As a result of the flavor evaluation, it was clarified that the blend tea drink had improved richness and fullness in the taste owing to the a number of materials contained therein and yet sustained the refreshing feeling without bitterness/astringency. It is considered that such a blend tea drink is preferable as a way to continuously take many kinds of components everyday. Because of containing of caffeine in a regulated amount, it

can be taken even before bedtime without any problem. It is also considered that this blend tea drink can give the impression to consumers of containing many kinds of materials and many kinds of components at high concentrations owing to its appearance with the dark brownish red color tone, thereby creating a high-class image and a healthy image.

CLAIMS

1. A blend tea drink containing liquid extracts of one or more materials selected from each of at least two groups from among the following five groups (A) to (E):

(A) stems and leaves of *Camellia sinensis*;

(B) stems and leaves of plants other than *Camellia sinensis*;

(C) cereal seeds;

(D) plant-origin materials other than stems, leaves and cereal seeds; and

(E) fungus-origin materials;

which has the following characteristics:

(i) having a caffeine content of 150 ppm or less;

(ii) having a Brix of 0.5% or less;

(iii) having a haze value of less than 10; and

(iv) having a color tone of 0.8 or more when measured at a wavelength of 420 nm.

2. A blend tea drink according to claim 1 which has the following characteristics:

(i) having a caffeine content of 110 ppm or less;

(ii) having a Brix of 0.45% or less;

(iii) having a haze value of less than 7; and

(iv) having a color tone of 1.0 or more when measured at a wavelength of 420 nm.

3. A blend tea drink according to claim 1 or 2 which contains liquid extracts of one or more materials selected from each of at least three groups including (A) and (C) from

among the above-described five groups (A) to (E).

4. A blend tea drink according to any one of claims 1 to 3 which contains liquid extracts of three or more roasted materials.

5. A blend tea drink according to any one of claims 1 to 4 which contains a liquid extract of a material obtained by treating roasted whole-grain Job's tears with a high temperature and high pressure steam and milling.

6. A blend tea drink according to any one of claims 1 to 5 which is packaged in a transparent container.

7. A method of producing a blend tea drink comprising extracting with a solvent one or more materials selected from each of at least three of the following five groups (A) to (E) and filtering the obtained liquid extracts to give filtrates:

(A) stems and leaves of *Camellia sinensis*;

(B) stems and leaves of plants other than *Camellia sinensis*;

(C) cereal seeds;

(D) plant-origin materials other than stems, leaves and cereal seeds; and

(E) fungus-origin materials;

characterized in that the blend tea drink has the following characteristics:

(i) having a caffeine content of 100 ppm or less;

(ii) having a Brix of 0.5% or less;

(iii) having a haze value of less than 10; and

(iv) having a color tone of 0.8 or more when measured at a wavelength of 420 nm.

8. A method of evaluating a blend tea drink characterized by comprising measuring (i) caffeine content, (ii) Brix, (iii) haze value and (iv) color tone (measured at a wavelength of 420 nm) of the blend tea drink.