[0005] The widespread use of pongamia-derived foodstuffs is currently prevented by the absence of methods for preparing pongamia compositions having low levels of karanjin and pongamol while maintaining the high nutritional content (proteins, carbohydrates, etc.) intrinsic to the oilseeds. Existing methods for the removal of these undesirable components in pongamia seedcake and oil are insufficient and often require harsh, destructive conditions that reduce and degrade the nutrients to the point that the nutritional value of pongamia is severely impacted. The lack of methods for producing pongamia compositions having the critical balance of preserved nutritional content and sufficiently low levels of anti-nutrients have precluded the incorporation of pongamia-derived oil on a large enough scale to remain economically feasible.

[0006] Thus, what is desired in the art are commercially viable methods to obtain edible compositions from pongamia oilseeds that retain an optimal nutritional balance, while minimizing components such as karanjin and pongamol.

BRIEF SUMMARY

[0006a] In an aspect of the present disclosure, there is provided a pongamia oil composition, having:

less than or equal to about 1000 ppm of karanjin and pongamol combined;

less than or equal to about 1% by weight of unsaponifiable matter;

a peroxide value of less than or equal to about 5 meq/kg;

a p-anisidine value of less than or equal to about 10; and

less than or equal to about 5000 ppm of residual solvent, optionally wherein the composition comprises less than or equal to about 1000 ppm of residual solvent, wherein residual solvent, if present, is food grade solvent, optionally wherein the residual solvent comprises ethanol, optionally wherein the karanjin and pongamol concentration is determined by HPLC-DAD analysis of an acetone extract obtained from the pongamia oil composition.

[0006b] In another aspect of the present disclosure, there is provide a method for producing a pongamia oil composition, comprising:

mechanically separating dehulled pongamia oilseeds to produce crude pongamia oil and a seedcake that is at least partially deoiled, optionally wherein the crude pongamia oil is mechanically separated pongamia oil, wherein the crude pongamia oil comprises pongamia oil, karanjin, pongamol, other furanoflavonoids, and other unsaponifiable matter; and

extracting the crude pongamia oil with an immiscible solvent, optionally wherein the immiscible solvent comprises ethanol, at an elevated temperature to produce the pongamia oil composition, optionally wherein the elevated temperature is less than the boiling point of the immiscible solvent, optionally wherein the elevated temperature is between about 30°C and about 75°C, optionally wherein the crude pongamia oil and the immiscible solvent form a mixture and the mixture is agitated for at least about 30 minutes,

wherein the ratio of solvent to crude pongamia oil is between 1:1 and 20:1, optionally wherein the ratio of solvent to crude pongamia oil is between about 1:1 and about 5:1, and

wherein the composition is edible and non-bitter tasting, has less than or equal to about 1000 ppm of karanjin and pongamol combined as determined by HPLC-DAD analysis of an acetone extract obtained from the pongamia oil composition; less than or equal to about 1% by weight of unsaponifiable matter; a peroxide value of less than or equal to about 5 meq/kg; and a p-anisidine value of less than or equal to about 10.

[0006c] In a further aspect of the present disclosure, there is provided a continuous countercurrent method for producing a pongamia oil composition, comprising:

a) mechanically separating dehulled pongamia oilseeds to produce crude pongamia oil and a seedcake that is at least partially deoiled, optionally wherein the crude pongamia oil is mechanically separated pongamia oil,

wherein the crude pongamia oil comprises pongamia oil, karanjin, pongamol, other furanoflavonoids, and other unsaponifiable matter;

b) separating the crude pongamia oil into a raffinate and a solvent-rich light phase by liquid-liquid extraction using immiscible solvent at an elevated temperature, optionally wherein the elevated temperature is less than the boiling point of the immiscible solvent, optionally wherein the elevated temperature is between about 30°C and about 75°C,

wherein the ratio of solvent to crude pongamia oil is between 1:1 and 20:1, optionally wherein the ratio of solvent to crude pongamia oil is between about 1:1 and about 5:1,

wherein the raffinate comprises pongamia oil and residual solvent,

wherein the solvent comprises ethanol, and

wherein the solvent-rich light phase comprises solvent and residual pongamia oil, optionally wherein the continuous liquid-liquid extraction is performed using a forced agitated column, optionally wherein the forced agitated column is a forced agitated trayed column, the

raffinate exits the column at the bottom, and the solvent-rich light phase exits the column at the top;

c) cooling the raffinate to separate the residual solvent from pongamia oil;

d) isolating at least a portion of the pongamia oil in the cooled raffinate to produce the pongamia oil composition,

wherein the composition is edible and non-bitter tasting, has less than or equal to about 1000 ppm of karanjin and pongamol combined as determined by HPLC-DAD analysis of an acetone extract obtained from the pongamia oil composition; less than or equal to about 1% by weight of unsaponifiable matter; a peroxide value of less than or equal to about 5 meq/kg; and a p-anisidine value of less than or equal to about 10;

e) separating at least a portion of the solvent from the solvent-rich light phase, optionally wherein at least a portion of the solvent separated from the solvent-rich light phase is performed in an evaporator,

optionally wherein the solvent is evaporated from the residual pongamia oil under vacuum,

optionally further comprising condensing the solvent, and stripping the solvent of any accumulated water in a stripping column; and

f) combining the isolated solvent with additional crude pongamia oil for liquid-liquid extraction.

[0006d] In another aspect of the present disclosure, there is provided a pongamia oil composition produced according to the method disclosed herein.

[0006e] In a further aspect of the present disclosure, there is provided a use of the pongamia oil composition disclosed herein as salad oil, frying oil, sauteeing oil, vinaigrettes, sauces, dressings, fats in meat mimetics, beverages, or blended margarines and other solid fat applications, or any combination thereof.

[0006f] In another aspect of the present disclosure, there is provided a food or beverage product, comprising the pongamia oil composition disclosed herein, optionally wherein the product is salad oil, frying oil, sauteeing oil, vinaigrettes, sauces, dressings, fats in meat mimetics, beverages, or blended margarines and other solid fat applications.

[0007] In some ~~aspect~~examples, provided herein are pongamia oil compositions that are edible and non-bitter tasting. Such pongamia oil compositions can serve as useful ingredients in

a variety of food and beverage products, and address the substantial unmet need in the industry for emerging plant-based products.

[0008] In certain ~~aspect~~examples, provided are methods for producing a pongamia oil composition using solid-liquid separation. In some ~~embodiment~~examples, the method comprises: mechanically separating dehulled pongamia oilseeds to produce crude pongamia oil and a seedcake that is at least partially deoiled, wherein the crude pongamia oil comprises pongamia oil, karanjin, pongamol, other furanoflavonoids, and other unsaponifiable matter; and extracting the crude pongamia oil with an immiscible solvent at an elevated temperature to produce the pongamia oil composition, wherein the ratio of solvent to crude pongamia oil is between 1:1 and 20:1, and wherein the composition is edible and non-bitter tasting, has less than 150 ppm of karanjin and/or pongamol, and has less than 1% of unsaponifiable matter.

[0009] In certain ~~embodiment~~examples, the method comprises: a) mechanically separating dehulled pongamia oilseeds to produce crude pongamia oil and a seedcake that is at least partially deoiled, ww

wherein the crude pongamia oil comprises pongamia oil, karanjin, pongamol, other furanoflavonoids, and other unsaponifiable matter; b) combining the crude pongamia oil with an immiscible solvent at an elevated temperature to form a mixture; c) allowing the mixture to settle, at the elevated temperature, into at least a pongamia oil layer and a solvent layer; d removing the solvent layer from step c), at the elevated temperature, to isolate the pongamia oil layer, wherein the pongamia oil layer comprises edible and non-bitter tasting pongamia oil. In some ~~embodiment~~example, the method further comprises: cooling the pongamia oil layer from step c); allowing the pongamia oil layer to settle into at least a pongamia layer and a solvent layer; and removing the solvent layer to isolate the pongamia oil layer, wherein the pongamia oil layer comprises edible and non-bitter tasting pongamia oil. In some variations, the method further comprises repeating steps b)-d) by combining the isolated pongamia oil layer with fresh immiscible solvent.

[0010] In other ~~aspect~~example, provided is a continuous countercurrent method for producing a pongamia oil composition, comprising: a) mechanically separating dehulled pongamia oilseeds to produce crude pongamia oil and a seedcake that is at least partially deoiled, wherein the crude pongamia oil comprises pongamia oil, karanjin, pongamol, other furanoflavonoids, and other unsaponifiable matter; b) separating the crude pongamia oil into a raffinate and a solvent-rich light phase by liquid-liquid extraction using an immiscible solvent at an elevated temperature, wherein the ratio of solvent to crude pongamia oil is between 1:1 and 20:1, wherein the raffinate comprises pongamia oil and residual solvent, and wherein the solvent-rich light phase comprises solvent and residual pongamia oil; c) cooling the raffinate to separate the residual solvent from pongamia oil; d) isolating at least a portion of the pongamia oil in the cooled raffinate to produce the pongamia oil composition, wherein the composition is edible and non-bitter tasting, has less than or equal to 150 ppm of karanjin and/or pongamol, and has less than 1% of unsaponifiable matter; e) isolating at least a portion of the solvent from the solvent-rich light phase; and f) combining the isolated solvent with additional crude pongamia oil for liquid-liquid extraction.

[0011] In one ~~aspect~~example, provided is a pongamia oil composition produced according to any of the methods described herein. In other ~~aspect~~example, provided is a pongamia oil composition that is edible and non-bitter tasting.

[0012] In other ~~aspect~~example**s**, provided are uses of the pongamia oil compositions in food or beverage products. In some variations, the pongamia oil compositions may be used as or in salad oil, frying oil, sauteeing oil, vinaigrettes, sauces, dressings, fats in meat mimetics, beverages, or blended margarines and other solid fat applications.

[0013] In other ~~aspect~~example**s**, provided is an analytical method to measure the content of karanjin and pongamol that may be present in a pongamia oil sample. In some ~~embodiment~~example**s**, the method comprises: combining pongamia oil with an extraction solvent to provide an extraction mixture; sonicating the extraction mixture; separating the sonicated mixture into an extracted pongamia composition and an extract that comprises karanjin or pongamol, or both; and measuring the concentration of karanjin or pongamol, or both, present in the extract. In some variations, the extraction solvent comprises alkyl ketone. In some ~~embodiment~~example**s**, the measuring step involves determining the concentration of karanjin and/or pongamol by high performance liquid chromatography with an ultraviolet detector (*e.g.*, using a HPLC-DAD).

[0014] In one ~~aspect~~example, provided is a pongamia oil composition, having: less than or equal to about 1000 ppm of karanjin and pongamol combined as determined by HPLC-DAD analysis of an acetone extract obtained from the pongamia oil composition;less than or equal to about 1% by weight of unsaponifiable matter; a peroxide value of less than or equal to about 5 meq/kg; a p-anisidine value of less than or equal to about 10; and less than or equal to about 5000 ppm of residual solvent, wherein residual solvent, if present, is food grade solvent. In some variations, the pongamia oil composition has less than or equal to about 150 ppm of karanjin as determined by HPLC-DAD analysis of an acetone extract obtained from the pongamia oil composition; less than or equal to about 150 ppm of pongamol as determined by HPLC-DAD analysis of an acetone extract obtained from the pongamia oil composition; less than or equal to about 1% by weight of unsaponifiable matter; a peroxide value of less than or equal to about 5 meq/kg; a p-anisidine value of less than or equal to about 5; and less than or equal to about 5000 ppm of residual solvent, wherein residual solvent, if present, is food grade solvent.

[0015] In another ~~aspect~~example, provided is a method for producing a pongamia oil composition, comprising: mechanically separating dehulled pongamia oilseeds to produce crude pongamia oil and a seedcake that is at least partially deoiled, wherein the crude pongamia oil comprises

pongamia oil, karanjin, pongamol, other furanoflavonoids, and other unsaponifiable matter; and extracting the crude pongamia oil with ethanol at an elevated temperature to produce the pongamia oil composition, wherein the ratio of solvent to crude pongamia oil is between 1:1 and 20:1, and wherein the composition is edible and non-bitter tasting, has less than or equal to about 1000 ppm of karanjin and pongamol combined as determined by HPLC-DAD analysis of an acetone extract obtained from the pongamia oil composition; less than or equal to about 1% by weight of unsaponifiable matter; a peroxide value of less than or equal to about 5 meq/kg; and a p-anisidine value of less than or equal to about 10.

[0016] In yet another ~~aspect~~example, provided is a continuous countercurrent method for producing a pongamia oil composition, comprising: a) mechanically separating dehulled pongamia oilseeds to produce crude pongamia oil and a seedcake that is at least partially deoiled, wherein the crude pongamia oil comprises pongamia oil, karanjin, pongamol, other furanoflavonoids, and other unsaponifiable matter; b) separating the crude pongamia oil into a raffinate and a solvent-rich light phase by liquid-liquid extraction using immiscible solvent at an elevated temperature, wherein the ratio of solvent to crude pongamia oil is between 1:1 and 20:1, wherein the raffinate comprises pongamia oil and residual solvent, wherein the solvent comprises ethanol, andwherein the solvent-rich light phase comprises solvent and residual pongamia oil; c) cooling the raffinate to separate the residual solvent from pongamia oil; d) isolating at least a portion of the pongamia oil in the cooled raffinate to produce the pongamia oil composition, wherein the composition is edible and non-bitter tasting, has less than or equal to about 1000 ppm of karanjin and pongamol combined as determined by HPLC-DAD analysis of an acetone extract obtained from the pongamia oil composition; less than or equal to about 1% by weight of unsaponifiable matter; a peroxide value of less than or equal to about 5 meq/kg; and a p-anisidine value of less than or equal to about 10; e) separating at least a portion of the solvent from the solvent-rich light phase; and f) combining the isolated solvent with additional crude pongamia oil for liquid-liquid extraction.

[0017] In other ~~aspect~~examples, provided herein are food or beverage products comprising the pongamia oil compositions obtainable by the methods provided herein. In some ~~embodiment~~examples, the pongamia oil composition is light yellow as determined by the Lovibond Color - AOCS Scale; the composition comprises less than or equal to about 200 ppm karanjin and pongamol

combined as determined by HPLC-DAD analysis of an acetone extract obtained from the pongamia oil composition, and the composition has a neutral flavor. In other ~~embodiment~~examples, the pongamia oil composition is yellow as determined by the Lovibond Color - AOCS Scale; the composition comprises less than or equal to about 150 ppm karanjin and less than or equal to about 150 ppm pongamol as determined by HPLC-DAD analysis of an acetone extract obtained from the pongamia oil composition; and the composition has one or more sensory attributes selected from the group consisting of: nuttiness, butteriness, grassiness, smoothness, and sweetness, and any combinations thereof.

DESCRIPTION OF THE FIGURES

[0018] The present application can be understood by reference to the following description taken in conjunction with the accompanying figures.

[0019] FIG. **1** depicts an exemplary analytical method to determine concentrations of karanjin and/or pongamol in a pongamia oil sample.

[0020] FIG. **2** depicts an exemplary batch process to purify a crude pongamia oil mixture to produce a pongamia oil composition that is edible and non-bitter tasting.

[0021] FIGS. **3A** and **3B** compare furanoflavonoids present in crude pongamia oil (FIG. **3A**) versus those absent in an exemplary purified pongamia oil composition (FIG. **3B**), as determined by HPLC.

[0022] FIG. **4** depicts an exemplary continuous system to purify a crude pongamia oil mixture to produce a pongamia oil composition that is edible and non-bitter tasting.

DETAILED DESCRIPTION

[0023] The following description sets forth exemplary methods, parameters and the like. It should be recognized, however, that such description is not intended as a limitation on the scope of the present disclosure but is instead provided as a description of exemplary embodiments.

[0024] In some aspects, provided herein are pongamia oil compositions, and methods of producing such compositions. In some variations, the pongamia oil compositions pass human

CLAIMS

What is claimed is:

1. A pongamia oil composition, having:

less than or equal to about 1000 ppm of karanjin and pongamol combined;

less than or equal to about 1% by weight of unsaponifiable matter;

a peroxide value of less than or equal to about 5 meq/kg;

a p-anisidine value of less than or equal to about 10; and

less than or equal to about 5000 ppm of residual solvent, optionally wherein the composition comprises less than or equal to about 1000 ppm of residual solvent,

wherein residual solvent, if present, is food grade solvent, optionally wherein the residual solvent comprises ethanol,

optionally wherein the karanjin and pongamol concentration is determined by HPLC-DAD analysis of an acetone extract obtained from the pongamia oil composition.

2. The composition of claim 1, having:

less than or equal to about 150 ppm of karanjin;

less than or equal to about 150 ppm of pongamol;

less than or equal to about 1% by weight of unsaponifiable matter;

a peroxide value of less than or equal to about 5 meq/kg;

a p-anisidine value of less than or equal to about 5; and

less than or equal to about 5000 ppm of residual solvent, optionally wherein the composition comprises less than or equal to about 1000 ppm of residual solvent,

wherein residual solvent, if present, is food grade solvent, optionally wherein the residual solvent comprises ethanol,

optionally wherein the karanjin and pongamol concentration is determined by HPLC-DAD analysis of an acetone extract obtained from the pongamia oil composition.

~~3. The composition of claim 1 or 2, wherein the composition comprises less than or equal to about 1000 ppm of residual solvent.~~

~~4. The composition of any one of claims 1 to 3, wherein the residual solvent comprises ethanol.~~

~~5.~~3. The composition of ~~any one of claims 1 to 4~~claim 1 or 2, wherein the composition is liquid at room temperature; and/or

the composition has a viscosity of between about 30 centipoise and 600 centipoise as determined at 25°C; and/or

the composition has a solid fat content of between about 1% and about 10% at a temperature of about 5°C; and/or

the composition has a smoke point of at least about 195 °C.

~~6. The composition of any one of claims 1 to 5, wherein the composition has a viscosity of between about 30 centipoise and 600 centipoise as determined at 25°C.~~

~~7. The composition of any one of claims 1 to 6, wherein the composition has a solid fat content of between about 1% and about 10% at a temperature of about 5°C.~~

~~8. The composition of any one of claims 1 to 7, wherein the composition has a smoke point of at least about 195 °C.~~

~~9.~~4. The composition of any one of claims 1 to ~~8~~3, wherein the composition has less than or equal to about 400 ppm of tocopherols; and/or

the composition has less than 2500 ppm of sterols; and/or

the composition comprises oleic acid, linoleic acid, palmitic acid, stearic acid, behenic acid, alpha linolenic acid, lignoceric acid, arachidic acid, gondoic acid, oleic acid, vaccenic acid, palmitoleic acid, eicosadienoic acid, linoleic acid, margaric acid, gondoic acid, erucic acid, palmitoleic acid, heptadecenoic acid, or myristic acid, or any isomers thereof, or any combination of the foregoing, optionally wherein the composition comprises at least 40% oleic acid.

~~10. The composition of any one of claims 1 to 9, wherein the composition wherein the composition has less than 2500 ppm of sterols.~~

~~11. The composition of any one of claims 1 to 10, wherein the composition comprises oleic acid, linoleic acid, palmitic acid, stearic acid, behenic acid, alpha linolenic acid, lignoceric acid, arachidic acid, gondoic acid, oleic acid, vaccenic acid, palmitoleic acid, eicosadienoic acid, linoleic acid, margaric acid, gondoic acid, erucic acid, palmitoleic acid, heptadecenoic acid, or myristic acid, or any isomers thereof, or any combination of the foregoing.~~

~~12. The composition of claim 11, wherein the composition comprises at least 40% oleic acid.~~

~~13.~~5. The composition of any one of claims 1 to ~~4~~12, wherein the color of the composition is yellow or light yellow as determined by the Lovibond Color - AOCS Scale using a 1-inch cell path, wherein:

when the composition is yellow, the composition has a Lovibond Color Y-value of greater than or equal to 25; and

when the composition is light yellow, the composition has a Lovibond Color Y-value of less than 25.

~~14.~~6. The composition of any one of claims 1 to 5~~13~~, wherein the composition has one or more sensory attributes selected from the group consisting of: nuttiness, butteriness, grassiness, smoothness, and sweetness, and any combinations thereof, optionally wherein the composition has a ratio of karanjin to pongamol of greater than about 1.

~~15. The composition of any one of claims 1 to 14, wherein the composition has a ratio of karanjin to pongamol of greater than about 1.~~

~~16.~~7. The composition of any one of claims 1 to 6~~13~~, wherein the color of the composition is light yellow and the composition has a Lovibond Color Y-value of less than 25 as determined by the Lovibond Color - AOCS Scale using a 1-inch cell path, optionally wherein the color of the composition is light yellow as determined by the Lovibond Color - AOCS Scale, and wherein the composition comprises less than or equal to about 200 ppm karanjin and pongamol combined as determined by HPLC-DAD analysis of an acetone extract obtained from the pongamia oil composition.

~~17. The composition of any one of claims 1 to 13 and 16, wherein the color of the composition is light yellow as determined by the Lovibond Color - AOCS Scale, and wherein the composition comprises less than or equal to about 200 ppm karanjin and pongamol combined as determined by HPLC-DAD analysis of an acetone extract obtained from the pongamia oil composition.~~

~~18.~~8. The composition of any one of claims 1 to 5~~13, 16 and 17~~, wherein the composition has a neutral flavor, optionally wherein the composition has a ratio of karanjin to pongamol of less than or equal to 1.

~~19. The composition of any one of claims 1 to 13 and 16 to 18, wherein the composition has a ratio of karanjin to pongamol of less than or equal to 1.~~

~~20.~~9. The composition of any one of claims 1 to 8~~19~~, wherein the composition has:

(i) a free fatty acid content of less than or equal to about 1%;

(ii) less than or equal to about 0.1% of insoluble impurities;

(iii) less than or equal to about 25 ppm of phosphorus;

(iv) less than or equal to about 0.1 ppm of chlorophyll;

(v) a moisture content of less than or equal to about 1%;

(vi) less than or equal to about 1% glycerol;

(vii) less than or equal to about 2% monoglycerides;

(viii) less than or equal to about 5% diglycerides; and

(ix) at least about 90% triglycerides

(x) or any combination of (i)-(ix).

~~21. The composition of any one of claims 1 to 20, wherein the karanjin and pongamol concentration is determined by HPLC-DAD analysis of an acetone extract obtained from the pongamia oil composition.~~

~~22.~~10. A method for producing a pongamia oil composition, comprising:

mechanically separating dehulled pongamia oilseeds to produce crude pongamia oil and a seedcake that is at least partially deoiled, optionally wherein the crude pongamia oil is mechanically separated pongamia oil, wherein the crude pongamia oil comprises pongamia oil, karanjin, pongamol, other furanoflavonoids, and other unsaponifiable matter; and

extracting the crude pongamia oil with an immiscible solvent, optionally wherein the immiscible solvent comprises ethanol, at an elevated temperature to produce the pongamia oil composition, optionally wherein the elevated temperature is less than the boiling point of the immiscible solvent, optionally wherein the elevated temperature is between about 30°C and about 75°C, optionally wherein the crude pongamia oil and the immiscible solvent form a mixture and the mixture is agitated for at least about 30 minutes,

wherein the ratio of solvent to crude pongamia oil is between 1:1 and 20:1, optionally wherein the ratio of solvent to crude pongamia oil is between about 1:1 and about 5:1, and

~~and~~ wherein the composition is edible and non-bitter tasting, has less than or equal to about 1000 ppm of karanjin and pongamol combined as determined by HPLC-DAD analysis of an acetone extract obtained from the pongamia oil composition; less than or equal to about 1% by weight of unsaponifiable matter; a peroxide value of less than or equal to about 5 meq/kg; and a p-anisidine value of less than or equal to about 10.

~~23. The method of claim 22, wherein the crude pongamia oil and the immiscible solvent form a mixture and the mixture is agitated for at least about 30 minutes.~~

~~24.~~11. A continuous countercurrent method for producing a pongamia oil composition, comprising:

a) mechanically separating dehulled pongamia oilseeds to produce crude pongamia oil and a seedcake that is at least partially deoiled, optionally wherein the crude pongamia oil is mechanically separated pongamia oil,

wherein the crude pongamia oil comprises pongamia oil, karanjin, pongamol, other furanoflavonoids, and other unsaponifiable matter;

b) separating the crude pongamia oil into a raffinate and a solvent-rich light phase by liquid-liquid extraction using immiscible solvent at an elevated temperature, optionally wherein the elevated temperature is less than the boiling point of the immiscible solvent, optionally wherein the elevated temperature is between about 30℃ and about 75℃,

wherein the ratio of solvent to crude pongamia oil is between 1:1 and 20:1, optionally wherein the ratio of solvent to crude pongamia oil is between about 1:1 and about 5:1,

wherein the raffinate comprises pongamia oil and residual solvent,

wherein the solvent comprises ethanol, and

wherein the solvent-rich light phase comprises solvent and residual pongamia oil, optionally wherein the continuous liquid-liquid extraction is performed using a forced agitated column, optionally wherein the forced agitated column is a forced agitated trayed column, the raffinate exits the column at the bottom, and the solvent-rich light phase exits the column at the top;

c) cooling the raffinate to separate the residual solvent from pongamia oil;

d) isolating at least a portion of the pongamia oil in the cooled raffinate to produce the pongamia oil composition,

wherein the composition is edible and non-bitter tasting, has less than or equal to about 1000 ppm of karanjin and pongamol combined as determined by HPLC-DAD analysis of an acetone extract obtained from the pongamia oil composition; less than or equal to about 1% by weight of unsaponifiable matter; a peroxide value of less than or equal to about 5 meq/kg; and a p-anisidine value of less than or equal to about 10;

e) separating at least a portion of the solvent from the solvent-rich light phase, optionally wherein at least a portion of the solvent separated from the solvent-rich light phase is performed in an evaporator,

optionally wherein the solvent is evaporated from the residual pongamia oil under vacuum,

optionally further comprising condensing the solvent, and stripping the solvent of any accumulated water in a stripping column; and

f) combining the isolated solvent with additional crude pongamia oil for liquid-liquid extraction.

~~25. The method of claim 24, wherein the continuous liquid-liquid extraction is performed using a forced agitated column.~~

~~26. The method of claim 25, wherein the forced agitated column is a forced agitated trayed column, the raffinate exits the column at the bottom, and the solvent-rich light phase exits the column at the top.~~

~~27. The method of any one of claims 24 to 26, wherein at least a portion of the solvent separated from the solvent-rich light phase is performed in an evaporator.~~

~~28. The method of claim 27, wherein the solvent is evaporated from the residual pongamia oil under vacuum.~~

~~29. The method of claim 28, further comprising condensing the solvent, and stripping the solvent of any accumulated water in a stripping column.~~

~~30.~~12. The method of claim 11~~any one of claims 24 to 29~~, further comprising isolating the residual pongamia oil in the solvent-rich light phase; and distilling solvent from the isolated residual pongamia oil to produce additional pongamia oil composition.

~~31. The method of any one of claims 22 to 30, wherein the elevated temperature is less than the boiling point of the immiscible solvent.~~

~~32. The method of claim 31, wherein the elevated temperature is between about 30°C and about 75°C.~~

~~33. The method of any one of claims 22 to 32, wherein the ratio of solvent to crude pongamia oil is between about 1:1 and about 5:1.~~

~~34.~~13. The method of ~~any one of claims 22 to 33~~claim 11 or 12, wherein the crude pongamia oil has an initial color, and the pongamia oil composition produced has a final color, wherein

the final color of the pongamia oil composition is lighter than the initial color of the crude pongamia oil as determined by the Lovibond Color - AOCS Scale, optionally wherein the initial color is red and/or brown, and the final color is yellow or light yellow as determined by the Lovibond Color - AOCS Scale.

~~35. The method of claim 34, wherein the initial color is red and/or brown, and the final color is yellow or light yellow as determined by the Lovibond Color - AOCS Scale.~~

~~36. The method of any one of claims 22 to 35, wherein the crude pongamia oil is mechanically separated pongamia oil.~~

~~37.~~14. The method of any one of claims ~~22~~ 11 to ~~36~~13, wherein the composition has one or more sensory attributes selected from the group consisting of: nuttiness, butteriness, grassiness, smoothness, and sweetness, and any combinations thereof, and wherein the composition is yellow as determined by the Lovibond Color - AOCS Scale;

or

the pongamia oil composition the composition comprises less than or equal to about 200 ppm karanjin and pongamol combined as determined by HPLC-DAD analysis of an acetone extract obtained from the pongamia oil composition; the composition has a neutral flavor, and the composition is light yellow as determined by the Lovibond Color - AOCS Scale.

~~39. The method of any one of claims 22 to 36, wherein the pongamia oil composition the composition comprises less than or equal to about 200 ppm karanjin and pongamol combined as determined by HPLC-DAD analysis of an acetone extract obtained from the pongamia oil composition; the composition has a neutral flavor, and the composition is light yellow as determined by the Lovibond Color - AOCS Scale.~~

~~40.~~15. A pongamia oil composition produced according to the method of any one of claims 10~~22~~ to 14~~38~~.

~~41.~~16. Use of the pongamia oil composition of any one of claims 1 to 9~~21~~ and 15~~39~~ as salad oil, frying oil, sauteeing oil, vinaigrettes, sauces, dressings, fats in meat mimetics, beverages, or blended margarines and other solid fat applications, or any combination thereof.

~~42.~~17. A food or beverage product, comprising the pongamia oil composition of any one of claims 1 to 9 and 15~~21 and 39~~, optionally wherein the product is salad oil, frying oil,

sauteeing oil, vinaigrettes, sauces, dressings, fats in meat mimetics, beverages, or blended margarines and other solid fat applications.

~~43.~~18. The product of claim 17~~41~~, wherein the composition is light yellow as determined by the Lovibond Color - AOCS Scale; the composition comprises less than or equal to about 200 ppm karanjin and pongamol combined as determined by HPLC-DAD analysis of an acetone extract obtained from the pongamia oil composition, and the composition has a neutral flavor; or

the pongamia oil composition is yellow as determined by the Lovibond Color - AOCS Scale; the composition comprises less than or equal to about 150 ppm karanjin and less than or equal to about 150 ppm pongamol as determined by HPLC-DAD analysis of an acetone extract obtained from the pongamia oil composition; and the composition has one or more sensory attributes selected from the group consisting of: nuttiness, butteriness, grassiness, smoothness, and sweetness, and any combinations thereof.

~~44. The product of claim 41, wherein the pongamia oil composition is yellow as determined by the Lovibond Color - AOCS Scale; the composition comprises less than or equal to about 150 ppm karanjin and less than or equal to about 150 ppm pongamol as determined by HPLC-DAD analysis of an acetone extract obtained from the pongamia oil composition; and the composition has one or more sensory attributes selected from the group consisting of: nuttiness, butteriness, grassiness, smoothness, and sweetness, and any combinations thereof.~~

~~45. The product of any one of claims 41 to 43, wherein the product is salad oil, frying oil, sauteeing oil, vinaigrettes, sauces, dressings, fats in meat mimetics, beverages, or blended margarines and other solid fat applications.~~