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DESCRIPTION CN103393072A

¹⁰ High-efficiency sweetener composition containing phytosterol and composition sweetened with the composition

[0001]

¹⁵ This application was submitted by the applicant on November 17, 2006, and the application number is 200680043956.3, and the title of the invention is "a high-efficiency sweetener composition containing phytosterol and a composition sweetened with the composition

[0002]

²¹ "A divisional application of an invention application.

[0003]

²⁵ technical field

[0004]

²⁹ The present invention generally relates to functional sweeteners and edible compositions containing them.

[0005]

³³ Background technique

[0006]

³⁷ Nutrition generally focuses on the relationship between food and human health from the point of view of

ensuring that all necessary nutrients are adequately provided for human health and well-being.
39 As the diseases associated with nutritional deficiencies have largely been brought under control, it is understood that there are many nutrients that provide health value beyond the basic nutrients.
41 Accordingly, functional ingredients have been recognized to play a key role in an individual's overall health.

[0007]

45 When "functional ingredients" are incorporated into foods, beverages, and other edible products, they can provide potential health benefits over essential nutrients.
47 These ingredients have been shown to help reduce a variety of health risks or manage a variety of health concerns, including cancer, heart and cardiovascular disease, digestive health, menopausal syndrome, osteoporosis, and vision problems.
50 Since 1993, the U.S. Food and Drug Administration (FDA) has approved a variety of health claims (health claims) and agreed to food labeling information on the health benefits of functional foods (U.S. Food and Drug Administration, Food Labeling Guidelines (2000)).

[0008]

56

[0009]

61 There are a variety of other functional foods that, while not yet FDA-approved for labeling, are thought to provide other health benefits beyond those listed above, such as reducing inflammation.

[0010]

66 Functional ingredients can be roughly divided into several categories such as carotenoids, dietary fiber, fatty acids, flavonoids, isothiocyanates, phenols, phytosterols, and stanols (phytosterols and phytosterols) stanols); polyols; prebiotics/probiotics; phytoestrogens; soybean protein; sulfides/thiols; amino acids; proteins; vitamins; and minerals.
70 Functional ingredients can also be classified according to their health benefits, such as cardiovascular, cholesterol-lowering, and anti-inflammatory.

[0011]

75 Health trends are also driving consumers to increase the use of non-caloric high-potency sweeteners in their diets.
77 Although naturally caloric sweeteners such as sucrose, fructose and glucose provide the best taste for consumers, they do have calories.
79 Many natural and synthetic high-potency sweeteners are non-caloric; however, the sweetness exhibited by

these sweeteners has a different temporal profile, optimal response, taste profile than sugar , taste and/or adaptive behaviour.

[0012]

⁸⁵ For example, the onset of sweetness of natural and synthetic high-potency sweeteners is slower and lasts longer than that of sugar, which can alter the taste balance of food compositions.

⁸⁷ Because of these differences, substitution of natural and synthetic high-potency sweeteners for bulky sweeteners such as sugar in food or beverages can result in unbalanced temporal and/or flavor profiles.

⁸⁹ In addition to differences in temporal profile, high-potency sweeteners generally exhibit (i) a lower optimal response than sugar, (ii) less flavorful flavors such as bitterness, metallic taste, cold sensation, Astringency, licorice-like taste, etc., and/or (iii) the perception of sweetness will decrease with repeated tasting.

⁹² As is well known to those skilled in the art of food/beverage preparation, changing sweeteners in a composition requires rebalancing the flavor with other taste components such as acidulants.

⁹⁴ If the taste profile of natural and synthetic high-potency sweeteners could be tailored to more closely resemble sugar with a desired specific taste profile, the type and variety of compositions that could be prepared with these sweeteners would be significantly improved. expand. Accordingly, there is a need to selectively alter the taste characteristics of natural and synthetic high-potency sweeteners.

[0013]

¹⁰¹ Therefore, people need to improve the taste of edible compositions containing functional ingredients to promote their use and develop their health benefits.

[0014]

¹⁰⁶ Contents of the invention

[0015]

¹¹⁰ In general, the present invention provides a functional sweetener composition with an improved temporal change profile and/or taste change profile and an improved temporal change profile of a functional sweetener composition and/or taste profile methods to respond to the above needs.

¹¹³ In another specific embodiment, the present invention provides a functional sweetened composition comprising a sweetenable composition and a functional sweetener having an improved temporal profile and/or taste profile composition; and a method of improving the temporal profile and/or taste profile of the functionally sweetened composition.

¹¹⁷ In detail, the present invention improves the temporal profile and/or taste profile by imparting a more sugar-like temporal profile and/or taste profile.

¹¹⁹ More specifically, the present invention comprises a functional sweetener composition or a functional sweetened composition comprising at least one phytosterol, at least one phytostanol, esters thereof, or a combination thereof; at least one high-potency sweetener; and at least one sweet taste improving

composition.

[0016]

¹²⁶ Some of the objectives and advantages of the present invention will be presented from the following description, or are obvious from the description, or can be known through the implementation of the present invention.

¹²⁹ Unless otherwise defined, all technical and scientific terms and abbreviations used herein have the meanings commonly understood by one of ordinary skill in the art to which this invention belongs. Since methods and compositions similar or equivalent to those described herein can also be used in the present invention, it is not intended that any suitable methods and compositions described herein should limit the scope of the present invention.

[0017]

¹³⁷ Reference will now be made in detail to existing preferred embodiments.

¹³⁸ Each embodiment is used to explain the specific examples of the present invention, not to limit the present invention. In fact, it will be apparent to those skilled in the art that various modifications and changes can be made without departing from the spirit or scope of the invention. For example, a feature shown or described in part of one embodiment can be applied to another embodiment to yield a still further embodiment. Accordingly, the present invention is intended to cover such modifications and variations of the appended claims and their equivalents.

[0018]

¹⁴⁷ Embodiments of the present invention include functional sweetener compositions and functional sweetened compositions, which contain at least one natural and/or synthetic high-potency sweetener, at least one sweet taste improving composition, and at least one Functional ingredients.

¹⁵⁰ The present invention also specifically exemplifies methods for producing functional sweetener compositions and functional sweetened compositions.

[0019]

¹⁵⁵ I.

¹⁵⁶ functional ingredients

[0020]

¹⁶⁰ In a specific embodiment, the sweetener composition comprises at least one natural and/or synthetic high-potency sweetener, at least one sweet taste improving composition, and at least one functional ingredient.

¹⁶² The functional ingredient preferably contains phytosterols, phytostanols, esters thereof or combinations thereof. It has been known for more than 50 years that phytosterols and phytostanols have cholesterol-

lowering effects. The amount of cholesterol (which is mainly an animal sterol) in the bloodstream should be controlled to minimize the risk of coronary heart disease. Since the human body needs cholesterol as a steroid hormone and a component of the cell wall, the presence of cholesterol in the body is essential for life, but excess cholesterol will cause atherosclerosis in the arterial wall, restrict blood flow and increase blood pressure high. The development of atherosclerosis can lead to coronary heart disease and, if left untreated, to heart attack or stroke. Without intending to be bound by any theory, it is generally believed that phytosterols and phytostanols remove cholesterol from intestinal microparticles and inhibit the absorption of cholesterol in the intestine. It may also be because phytosterols and phytostanols alter the activity of enzymes involved in cholesterol metabolism and secretion. Phytosterols, phytostanols and their esters have also been indicated to have anti-cancer, anti-arteriosclerotic, anti-inflammatory and anti-oxidative properties.

[0021]

- 177 Phytosterols and stanols are found in small amounts in nature in various fruits, vegetables, nuts, seeds, grains, beans, vegetable oils and other plant sources.
- 179 Although people generally consume plant sterols and stanols on a daily basis, their intake is not sufficient to provide significant cholesterol-lowering effects or other health benefits. Accordingly, it is preferable to supplement phytosterols and phytostanols in foods and beverages.

[0022]

- 185 As used herein, the terms "sterol", "phytosterol" and "phytosterol" are synonymous.
- 186 Sterols are a subgroup of sterols that have a hydroxyl group at C-3. In general, phytosterols have a double bond in the steroid ring like cholesterol; however, phytosterols also have a substituted side chain at C-24, such as ethyl or methyl, or an additional double bond. The structure of phytosterols is known to those skilled in the art.

[0023]

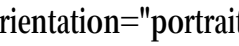
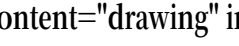
- 193 Although at least 44 naturally occurring phytosterols have been found, and are generally derived from plants such as corn, soybean, wheat, and wood oils; and other naturally occurring phytosterol properties.
- 195 According to a particular embodiment of the invention, non-limiting examples of phytosterols known to those skilled in the art include 4-desmethylsterols (e.g., β -phytosterol, brassicasterol, stigmasterol, brassica sterols, 22-dehydrobrassicasterol, and Δ 5-avenasterol), 4-monomethyl sterols, and 4,4-dimethyl sterols (triterpene alcohols) (e.g., cycloarten alcohols, 24-methylenecycloartenol and cyclobranol).

[0024]

- 202 As used herein, the terms "stanols," "phytostanols," and "phytostanols" are synonymous.
- 203 Phytostanols are saturated sterol-like alcohols and occur only in trace amounts in nature and can be produced synthetically, for example, by hydrogenating phytosterols. According to certain embodiments of the invention, non-limiting examples of phytostanols include beta-phytostanols, rapestanols, cycloartenols, and

saturated forms of other triterpene alcohols.

[0025]

²¹⁰ As used herein, phytosterols and phytostanols include various isomers such as  and  isomers (e.g., -phytosterols and -phytostanols, They are phytosterols and phytostanols which are most effective in lowering the amount of plasma cholesterol in mammals respectively).

[0026]

²²² Phytonutrients, botanical extracts, and herbal compositions may be used in their natural and/or modified forms, as is well known to those skilled in the art.

²²⁴ Modified Phytonutrients, Plant Extracts, and Herbal Compositions Includes phytonutrients, botanical extracts, and herbal compositions that have been altered in a natural manner.

²²⁶ Modified phytonutrients include, but are not limited to, phytonutrients that have been fermented, contacted with enzymes, or derived from or substituted for phytonutrients, for example. In one embodiment, modified phytonutrients can be used alone or with unmodified phytonutrients. However, for the sake of brevity, in the description of the specific examples of the present invention, it is not explicitly pointed out that the modified phytonutrients are an alternative to the unmodified phytonutrients, but it should be understood that any of the phytonutrients disclosed herein In particular, modified phytonutrients can be used in place of or in conjunction with unmodified phytonutrients. The same specific illustrations also apply to botanical extracts and other herbal compositions. Plant extracts include extracts from leaves, stems, bark, fruits, seeds and any other plant material.

[0027]

²³⁸ The preparation of phytosterols and phytostanols is well known to those skilled in the art.

²³⁹ For example, phytosterols are by-products of the pulp and paper industry and can be hydrogenated to produce phytostanols by techniques well known to those skilled in the art. These hydrogenation techniques include the use of Pd/C catalysts (catalysts) in organic solvents or other catalysts such as platinum, nickel, etc. based techniques known in this technique.

[0028]

²⁴⁶ The phytosterols and phytostanols of the present invention may also be in the form of their esters.

²⁴⁷ Suitable methods for deriving esters of phytosterols and phytostanols are known to those skilled in the art and

are disclosed in U.S. Patent Nos. 6,589,588, 6,635,774, 6,800,317 and U.S. Patent Publication No. 2003/0045473 , which is disclosed in its entirety and is hereby incorporated by reference. Non-limiting examples of suitable phytosterol and phytostanol esters include phytosteryl acetate, phytosteryl oleate, stigmasteryl oleate, and their corresponding phytostanol esters. The phytosterols and phytosterols of the present invention also include their derivatives.

[0029]

²⁵⁶ These phytosterols, phytosterols and their esters can be used alone or combined in the sweetener composition provided by the present invention as functional ingredients.

²⁵⁸ For example, according to certain embodiments of the present invention, the sweetener composition may contain a combination of various functional ingredients, including

[0030]

²⁶³ 1.

²⁶⁴ at least one phytosterol;

[0031]

²⁶⁸ 2.

²⁶⁹ at least one plant-based stanol;

[0032]

²⁷³ 3.

²⁷⁴ at least one phytosterol ester;

[0033]

²⁷⁸ 4.

²⁷⁹ at least one vegetable stanol ester;

[0034]

²⁸³ 5.

²⁸⁴ at least one phytosterol and at least one phytostanol;

[0035]

²⁸⁸ 6.

²⁸⁹ at least one phytosterol and at least one phytosterol ester;

[0036]

²⁹³ 7.

²⁹⁴ at least one phytosterol and at least one phytostanol ester;

[0037]

²⁹⁸ 8.

²⁹⁹ at least one phytosterol, at least one phytostanol, at least one phytosterol ester;

[0038]

³⁰³ 9.

³⁰⁴ at least one phytosterol, at least one phytostanol, at least one phytostanol ester;

[0039]

³⁰⁸ 10.

³⁰⁹ at least one phytosterol, at least one phytostanol, at least one phytosterol ester, at least one phytostanol ester;

[0040]

³¹³ 11.

³¹⁴ at least one phytosterol ester and at least one phytostanol ester;

[0041]

³¹⁸ 12.

³¹⁹ at least one phytosterol, at least one phytosterol ester, and at least one phytostanol ester;

[0042]

³²³ 13.

³²⁴ at least one phytostanol, at least one phytosterol ester, and at least one phytostanol ester;

[0043]

³²⁸ 14.

³²⁹ at least one phytostanol and at least one phytosterol ester; and

[0044]

³³³ 15.

³³⁴ at least one phytostanol, at least one phytosterol ester, and at least one phytostanol ester.

[0045]

³³⁸ In general, according to certain embodiments of the present invention, the amount of the phytosterols, phytosterols, esters thereof, or combinations thereof in the sweetener composition or sweetened edible composition is sufficient to promote health and benefits.

³⁴¹ Those skilled in the art should understand that different types of phytosterols, phytosterols and their esters have different abilities to promote health and benefits.

[0046]

³⁴⁶ According to a particularly preferred embodiment of the present invention, the amount of the phytosterols, phytosterols, esters thereof, or combinations thereof in the sweetener composition or edible composition is about 0.01 g to about 0.01 g per serving (about 240 ml) 5 g, and more preferably from about 1 g to about 3 g per serving.

[0047]

³⁵³ According to a specific embodiment of the present invention, the sweetener composition provided herein may also contain at least one other functional compound different from the above-mentioned phytosterols, phytosterols, esters thereof, or combinations thereof. ingredients.

³⁵⁶ According to specific embodiments of the present invention, non-limiting examples of such functional ingredients include nutrient-rich or medicinally active natural foods such as garlic, soybeans, antioxidants, fiber, glucosamine, chondroitin sulfate, ginseng, ginkgo, marigold etc.; other nutrients that can provide health benefits, such as amino acids, vitamins, minerals, carotenoids, dietary fiber, fatty acids such as omega-3 or omega-6 fatty acids, DHA, EPA or ALA (which can be derived From plant or animal sources such as salmon, other cold-water fish or algae), flavonoids, phenols, polyols, polyphenols (such as catechins, proanthocyanidins, proanthocyanidins, anthocyanins, xanthins, resveratrol, isoflavones, curcumin, punicalagin, anthotannins, citrus flavonoids such as hesperidin and naringin, and permanganic acid), prebiotics/probiotics, plants Sexual estrogens, sulfides/thiols, acocanein, saponins, ribulose biphosphate carboxylase peptide, appetite suppressants, hydration agents, autoimmune agents, C-reactive protein reducing agents, or anti- Inflammatory agents; or any other functional ingredient that is beneficial in the treatment of a particular disease or condition such as diabetes, osteoporosis, inflammation or cholesterol.

[0048]

³⁷¹ II.

³⁷² Natural and/or synthetic high-potency sweeteners

[0049]

³⁷⁶ The provided sweetener compositions also contain at least one natural and/or synthetic high-potency sweetener.

³⁷⁸ As used herein, the terms "natural high-potency sweetener," "NHPS," "NHPS composition," and "natural high-potency sweetener composition" are synonymous.

³⁸⁰ "NHPS" means any sweetener found in nature, which may be in raw, extracted, purified or any other form, either singly or in combination, and which is characterized by higher Sweetening potency of fructose or glucose, and lower in calories. Non-limiting examples of NHPS that may be used in embodiments of the invention include rebaudioside A, rebaudioside B, rebaudioside C, rebaudioside D, rebaudioside E, rebaudioside F, dulcoside (dulcoside) A, dulcoside B, rubusoside (rubusoside), stevia, stevioside (stevioside), mogroside (mogroside) IV, mogroside V, monk fruit sweetener, simonoside (siamenoside), monatin and its salts (Monatin SS, RR, RS, SR), curculin, glycyrrhizic acid and its salts, thaumatin (thaumatin), monellin, mabinlin, brazzein, hernandulcin, phyllodulcin, glycyphyllin, root Phloridzin, trilobatin, baiyunoside, osladin, polypodoside A, pterocaryoside A, Pitti Roside B, mukurozioside, phlomisioside I, periandrin I, abrusoside A and cyclocarioside I. NHPS also includes modified NHPSs. Modified NHPSs also include naturally occurring altered NHPSs. For example, modified NHPSs include, but are not limited to, NHPSs that have been fermented, contacted with enzymes, or derived from or substituted on NHPSs. In one embodiment, at least one modified NHPS can be used in combination with at least one NHPS. In another embodiment, only at least one modified NHPS and no NHPS can be used. Thus, in any embodiment of the invention described herein, modified NHPSs may be used in place of NHPSs or in combination with NHPSs. However, for the sake of brevity, in the description of the embodiments of the present invention, the modified NHPS is not explicitly indicated as an alternative to the unmodified NHPS, but it should be understood that any embodiment disclosed herein can be used Modified NHPSs to replace NHPSs.

[0050]

⁴⁰² In one embodiment, NHPS extracts at any purification ratio can be used.

⁴⁰³ In another embodiment, when the NHPS is used in a non-extracted form, the NHPS has a purity ranging from, for example, about 25% to about 100%. In another example, the NHPS may have a purity ranging from about 50% to about 100%; about 70% to about 100%; about 80% to about 100%; about 90% to about 100%; about 95% to about 100%; about 95% to about 99.5%; about 96% to about 100%; about 97% to about 100%; about 98% to about 100%; and about 99% to about 100%.

[0051]

⁴¹¹ Purity, as used herein, refers to the weight percent of individual NHPS compounds in NHPS extracts, NHPS extracts in raw or purified form.

⁴¹³ In one embodiment, a steviol glycoside extract contains a specific steviol glycoside at a specified purity, and the remainder of the steviol glycoside extract contains a mixture of other steviol glycosides.

[0052]

- 418 In order to obtain particularly pure NHPS extracts (such as rebaudioside A), it may be necessary to purify the crude extract to obtain a substantially pure form.
- 420 Such methods are generally known to those skilled in the art.

[0053]

- 424 An exemplary method for purifying NHPS such as rebaudioside A is described on June 19, 2006 by DuBois et al., entitled "Rebaudioside A Composition and Purification of Rebaudioside A" Method" and currently pending patent application Ser. No. 60/805,216, the disclosure of which is hereby incorporated by reference in its entirety.

[0054]

- 431 Briefly, substantially pure rebaudioside A is obtained in a single step from a compound containing at least one organic solvent and water at a concentration of about 10% to about 25% by weight (preferably about 15% to about 20% by weight). %) crystallized from an aqueous organic solution.
- 434 Preferably, the organic solvent includes alcohols, acetone and acetonitrile.
- 435 Non-limiting examples of such alcohols include ethanol, methanol, isopropanol, 1-propanol, 1-butanol, 2-butanol, tert-butanol, and isobutanol. Preferably, the at least one organic solvent contains a mixture of ethanol and methanol, the weight ratio of ethanol to methanol in the aqueous organic solution ranges from about 20 parts to about 1 part ethanol to 1 part methanol, more preferably About 3 parts to about 1 part ethanol to 1 part methanol.

[0055]

- 443 Preferably the weight ratio of the aqueous organic solvent to crude rebaudioside A is about 10 to about 4 parts of aqueous organic solvent to 1 part of crude rebaudioside A, more preferably about 5 to about 3 parts of aqueous Organic solvent to 1 part crude rebaudioside A.

[0056]

- 449 In an exemplary embodiment, the method for purifying rebaudioside A is performed at about room temperature.
- 451 In another embodiment, the method for purifying rebaudioside A further comprises heating the rebaudioside A solution to a temperature of about 20 ° C. to about 40 ° C. (or heating to reflux temperature in another embodiment) up to about 0.25 hours to about 8 hours.
- 454 In another exemplary embodiment, in addition to the step of heating the rebaudioside A solution, the method for purifying rebaudioside A further includes cooling the rebaudioside A solution to a temperature of about 4 ° C to about 25 ° C for steps of about 0.5 hours to about 24 hours.

[0057]

460 According to specific examples, the purity range of the rebaudioside A can be about 50% to about 100%; about 70% to about 100%; about 80% to about 100%; about 90% to about 100%; about 95% to about 100%; about 95% to about 99.5%; about 96% to about 100%; about 97% to about 100%; about 98% to about 100%;

463 According to a particularly preferred embodiment, when crude rebaudioside A is crystallized, the substantially pure rebaudioside A composition contains rebaudioside A having a purity of about 95% on a dry weight basis. % by weight to about 100% by weight. In other exemplary embodiments, the substantially pure rebaudioside A comprises a purity of rebaudioside A on a dry weight basis of greater than about 97% to about 100% by weight; greater than about 98% by weight % to about 100% by weight; or greater than about 99% by weight to about 100% by weight. The rebaudioside A solution may or may not be stirred during a single crystallization step.

[0058]

473 In an exemplary embodiment, the method for purifying rebaudioside A further comprises high-purity rebaudioside A crystals in an amount sufficient to promote crystallization of rebaudioside A to form pure rebaudioside A at an appropriate temperature A step of seeding (optional step) in the rebaudioside A solution.

477 The amount of rebaudioside A sufficient to promote the formation of substantially pure rebaudioside A crystals is about 0.0001% by weight to about 1% by weight of rebaudioside A in the solution; more particularly about 0.01% by weight % to about 1% by weight of rebaudioside A. A suitable temperature for the seeding step is from about 18 ° C to about 35 ° C.

[0059]

484 In another exemplary embodiment, the method for purifying rebaudioside A further comprises the step of isolating and washing the substantially pure rebaudioside A composition.

486 The substantially pure rebaudioside A composition can be separated from the aqueous organic solution by various solid-liquid phase separation techniques using centrifugal force, such separation techniques include but are not limited to vertical and horizontal perforated basket centrifugation, solid phase bowl centrifugation, decanting centrifugation, exfoliation centrifugation, push centrifugation, Heinkel type centrifugation, disc stack centrifugation and cyclone separation. Additionally, separation can be enhanced by any of pressure, vacuum, and gravity filtration methods including, but not limited to, the use of belts, rollers, nutsche type, blades, plates, Rosenmund type, Sparkler type, bag filter and filter pressure method. The operation of the rebaudioside A solid-liquid phase separation device can be continuous, semi-continuous or batch mode. The substantially pure rebaudioside A composition can also be washed on the separation device using different aqueous organic solvents and mixtures thereof. The substantially pure rebaudioside A composition can be partially or completely evaporated to dryness on a separation device using any number of gases, including but not limited to nitrogen and argon, to evaporate the residual liquid solvent. The substantially pure rebaudioside A composition can also be automatically or manually removed from the separation device by using liquid, gas or mechanical means to dissolve the solid or maintain the solid form.

[0060]

503 In another exemplary embodiment of the present invention, the method for purifying rebaudioside A further includes the step of drying the substantially pure rebaudioside A composition using techniques known to those skilled in the art, the Non-limiting examples of known techniques include rotary vacuum dryers, fluidized bed dryers, rotary tunnel dryers, plate dryers, pan dryers, Nauta type dryers, spray dryers, rapid Dryers, micron dryers, disc dryers, high-speed and low-speed paddle dryers and microwave dryers.

508 In an exemplary embodiment, the drying step comprises drying the substantially pure Lyme package using a nitrogen or argon flush at a temperature ranging from about 40 ° C to about 60 ° C for about 5 hours to about 100 hours to remove residual solvent Diglycoside A composition.

[0061]

514 In yet another exemplary embodiment, wherein the crude rebaudioside A mixture is substantially free of rebaudioside D impurities, the method for purifying rebaudioside A further comprises drying the substantially pure lybaudioside A The substantially pure rebaudioside A composition is slurried in an aqueous organic solvent prior to the step of including the composition of rebaudioside A.

518 The slurry is a mixture containing a solid and an aqueous organic solvent or an organic solvent, wherein the solid contains substantially pure rebaudioside A composition and is only slightly dissolved in the aqueous organic solvent or an organic solvent. In one embodiment, the weight ratio of the substantially pure rebaudioside A composition and the aqueous organic solvent in the slurry is about 15 parts to about 1 part of the aqueous organic solvent to 1 part of the substantially pure rebaudioside A Composition. In one embodiment, the slurry is maintained at room temperature. In another embodiment, the slurrying step includes heating the slurry to a temperature in the range of about 20 to about 40 ° C. The substantially pure rebaudioside A composition is slurried after stirring for about 0.5 hours to about 24 hours.

[0062]

529 In yet another exemplary embodiment, the method for purifying rebaudioside A further comprises separating the substantially pure rebaudioside A composition from the aqueous organic solvent or the organic solvent of the slurry, washing the substantially pure rebaudioside A composition, followed by the step of drying the substantially pure rebaudioside A composition.

[0063]

536 If further purification is required, the method for purifying rebaudioside A described herein can be repeated or the substantially pure rebaudioside A composition can be further purified using other purification methods (such as column chromatography).

[0064]

542 Also intended to be inclusive, other NHPs can be purified using the purification methods described herein
requiring only a little experimentation as will be apparent to those skilled in the art.

[0065]

547 Purification of rebaudioside A by crystallization as described above yields at least four different polymorphic
forms: Form 1: rebaudioside A hydrate; form 2: anhydrous rebaudioside A; form 3 Form: Rebaudioside A
Solvate; and Form 4: Rebaudioside A Amorphous.

550 The aqueous organic solution and temperature of the purification method will affect the polymorphic forms
produced in the substantially pure rebaudioside A composition.

552 Figures 1-5 are the first polymorph (hydrate), the second polymorph (anhydrous), the 3A polymorph
(methanol solvate), the 3B polymorph (ethanol solvate)) and exemplary powder x-ray diffraction (XRPD)
scans of polymorph 4 (amorphous).

[0066]

558 The physical characteristics of the four polymorphic forms of rebaudioside A are summarized in the following
table:

[0067]

563 Table 1: Rebaudioside A polymorphic forms

[0068]

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[0069]

572 <img file="BDA00003357489400111.TIF" he="66" img-content="drawing" img-format="tif" inline="no"
orientation="portrait" wi="700"/>

[0070]

577 The polymorphic form formed will depend on the composition of the aqueous organic solution, the
temperature of the crystallization step, and the temperature of the drying period.

579 The 1st and 3rd polymorphs are formed during a single crystallization step and the 2nd polymorph is
transformed from either Form 1 or 3 during a drying step.

[0071]

- 584 Form 3 polymorph is formed at low temperature during crystallization (in the range of about 20 to about 50 ° C) and at low ratios of water to organic solvent in the aqueous organic solvent.
- 586 Form 1 polymorph is formed at high temperatures (in the range of about 50 to about 80 ° C.) during crystallization and at high ratios of water to organic solvent in aqueous organic solvents.
- 588 The first polymorph can be converted into the third polymorph by slurrying with anhydrous solvent at room temperature (2-16 hours of treatment) or at reflux temperature (0.5-3 hours of treatment).
- 590 The third polymorph can be converted into the first polymorph by mixing the polymorph with water at room temperature for 16 hours or at reflux for 2-3 hours to form a slurry.
- 592 Polymorphic Form 3 can be converted to Form 2 during drying; however, raising the drying temperature above 70 ° C or prolonging the drying time of the substantially pure Rebaudioside A composition will cause rebaudioside Glycoside A decomposes and increases the amount of residual rebaudioside B impurity in the substantially pure rebaudioside A composition.
- 596 The second polymorph can be changed to the first polymorph by adding water.

[0072]

- 600 Form 4 can be prepared from polymorphs 1, 2, 3 or combinations thereof by methods known to those skilled in the art.
- 602 Non-limiting examples of such methods include melt processing, ball milling, crystallization, freeze drying, cryo-grinding, and spray drying.
- 604 In a specific embodiment, polymorphic form 4 can be prepared from the substantially pure rebaudioside A composition obtained by the above purification method by spray drying a solution of the substantially pure rebaudioside A composition have to.

[0073]

- 610 As used herein, the term "synthetic sweetener" refers to any composition that does not occur in nature and is characterized by a sweetening potency higher than that of sucrose, fructose, or glucose, and lower in calories.
- 612 Non-limiting examples of synthetic sweeteners suitable for use in embodiments of the invention include sucralose, acesulfame potassium, aspartame, elitan, saccharin, neohesperidin dihydrochalcone, cyclamate, neotame, N-[N-[3-(3-hydroxy-4-methoxyphenyl) propyl]-L- α -aspartyl]-L-phenylalanine 1-methyl ester, N-[N-[3-(3-Hydroxy-4-methoxyphenyl)-3-methylbutyl]-L- α -aspartyl]-L-phenylalanine 1-methyl ester, N- [N-[3-(3-methoxy-4-hydroxyphenyl)propyl]-L- α -aspartyl]-L-phenylalanine 1-methyl ester, and its salts, etc. .

[0074]

- 621 The NHPSs and synthetic sweeteners may be used alone or in combination with other NHPSs and/or synthetic sweeteners.
- 623 For example, the sweetener composition may contain a single NHPS or a single synthetic sweetener; a single NHPS in combination with a single synthetic sweetener; one or more NHPSs in combination with a single synthetic sweetener; a single NHPS in combination with one or more synthetic sweeteners. A sweetener; or

one or more NHPs in combination with one or more synthetic sweeteners.

⁶²⁷ Multiple natural and/or synthetic high-potency sweeteners can be used at the same time as long as the combined effect of multiple natural and/or synthetic high-potency sweeteners does not adversely affect the taste of the sweetener composition or the oral sweetened composition. sweetener.

[0075]

⁶³³ For example, specific embodiments include combinations of NHPs such as steviol glycosides.

⁶³⁴ Non-limiting examples of suitable steviol glycosides that may be combined include Rebaudioside A, Rebaudioside B, Rebaudioside C, Rebaudioside D, Rebaudioside E, Rebaudioside F, dulcoside A, dulcoside B, rubusoside, stevioside and steviol bioside. According to a particularly preferred embodiment of the present invention, the combination of high-efficiency sweeteners contains rebaudioside A, rebaudioside B, rebaudioside C, rebaudioside E, rebaudioside F, stevioside, steviolbioside, dulcoside A, or a combination thereof.

[0076]

⁶⁴³ Generally, according to certain embodiments, the amount of rebaudioside A in the combination of high-potency sweeteners ranges from about 50 to about 99.5% by weight of the combination of high-potency sweeteners, more preferably from about 70 to about 99.5% by weight of the combination of high-potency sweeteners. In the range of about 90% by weight, and more preferably in the range of about 75 to about 85% by weight.

[0077]

⁶⁵¹ In another specific embodiment, the amount of rebaudioside B in the combination of high-potency sweeteners ranges from about 1 to about 8% by weight of the combination of high-potency sweeteners, more preferably from about 2 to about 5% by weight, and more preferably about 2 to about 3% by weight.

[0078]

⁶⁵⁷ In another specific embodiment, the amount of rebaudioside C in the combination of high-potency sweeteners ranges from about 1 to about 10% by weight of the combination of high-potency sweeteners, more preferably from about 3 to about 8% by weight, and more preferably from about 4 to about 6% by weight.

[0079]

⁶⁶⁴ In yet another specific embodiment, the amount of rebaudioside E in the combination of high-potency sweeteners ranges from about 0.1 to about 4% by weight of the combination of high-potency sweeteners, more preferably from about 0.1 to about 2% by weight, and more preferably about 0.5 to about 1% by weight.

[0080]

⁶⁷⁰ In another specific embodiment, the amount of rebaudioside F in the combination of high-potency sweeteners ranges from about 0.1 to about 4% by weight of the combination of high-potency sweeteners, more preferably from about 0.1 to about 2% by weight, and more preferably about 0.5 to about 1% by weight.

[0081]

⁶⁷⁶ In another specific embodiment, the amount of dulcoside A in the combination of high-potency sweeteners ranges from about 0.1 to about 4% by weight of the combination of high-potency sweeteners, more preferably from about 0.1 to about 2% by weight, and more preferably about 0.5 to about 1% by weight.

[0082]

⁶⁸² In yet another specific embodiment, the amount of dulcoside B in the combination of high-potency sweeteners ranges from about 0.1 to about 4% by weight of the combination of high-potency sweeteners, more preferably from about 0.1 to about 2% by weight, and more preferably about 0.5 to about 1% by weight.

[0083]

⁶⁸⁸ In another specific embodiment, the amount of stevioside in the combination of high-potency sweeteners ranges from about 0.5 to about 10% by weight of the combination of high-potency sweeteners, more preferably from about 1 to about 6% by weight, and more preferably in the range of about 1 to about 4% by weight.

[0084]

⁶⁹⁵ In yet another specific embodiment, the amount of steviol diglucoside in the combination of high-potency sweeteners is in the range of about 0.1 to about 4% by weight of the combination of high-potency sweeteners, more preferably from about 0.1 to about 2 % by weight, and more preferably from about 0.5 to about 1% by weight.

[0085]

⁷⁰² According to a particularly preferred embodiment, the high-potency sweetener composition contains a combination of rebaudioside A, stevioside, rebaudioside B, rebaudioside C, and rebaudioside F; wherein the rebaudioside The amount of glycoside A in the combination of high-potency sweeteners ranges from about 75 to about 85% by weight of the total weight of the combination of high-potency sweeteners, the amount of stevioside is from about 1 to about 6% by weight, rebaudioside The amount of B is about 2 to about 5% by weight, the amount of rebaudioside C is about 3 to about 8% by weight, and the amount of rebaudioside F is about 0.1 to about 2% by weight.

[0086]

712 Additionally, those skilled in the art will appreciate that the sweetener composition can be tailored to obtain a desired calorie content.

714 For example, low- or non-caloric NHPS may incorporate caloric natural sweeteners and/or other caloric additives to produce sweetener compositions with preferred calorie content.

[0087]

719 III.

720 Sweet taste improving composition

[0088]

724 The sweetener composition may also contain a sweet taste improving composition, non-limiting examples of which include carbohydrates, polyalcohols, amino acids and their corresponding salts, polyamino acids and their corresponding salts, sugar acids and their corresponding salts, nucleotides, organic acids, inorganic acids, organic salts (including organic acid salts and organic alkali salts), inorganic salts, bitter compounds, flavoring agents and flavor ingredients, astringent compounds, Proteins or protein hydrolysates, surfactants, emulsifiers, flavonoids, alcohols, polymers, other sweet taste improving additives that impart more sugar-like properties, and combinations thereof.

[0089]

734 In one embodiment, a single sweet taste improving composition can be used with a single natural and/or synthetic high-potency sweetener.

736 In another embodiment of the invention, a single sweet taste improving composition may be used together with one or more natural and/or synthetic high-potency sweeteners.

738 In yet another embodiment, one or more sweet taste improving compositions can be used with a single natural and/or synthetic high-potency sweetener.

740 In yet another embodiment, various sweet taste improving compositions may be used with one or more natural and/or synthetic high-potency sweeteners.

[0090]

745 In a specific embodiment, the combination of at least one natural and/or synthetic high-potency sweetener and at least one sweet taste improving composition suppresses, reduces or eliminates undesired taste and imparts a more sugar-like taste to the sweetener .

748 As used herein, the term "off-taste" refers to any taste characteristic not found in carbohydrates such as glucose, sucrose, fructose or similar sugars.

750 Non-limiting examples of undesirable taste include delayed sweetness onset, lingering sweetness aftertaste, metallic taste, bitter taste, cold sensation or methanol-like taste, licorice-like taste, and/or the like.

[0091]

- 755 In one embodiment, the present invention provides sweetener compositions that exhibit more sugar-like properties than other sweetener compositions containing at least one natural and/or synthetic high-potency sweetener but no sweet taste improving composition. Temporary changes and/or a more sugar-like taste profile.
- 759 As used herein, the terms "sugar-like", "taste like sugar", "sweet like sugar", "sugar-like" and "sugar-like" are synonymous.
- 761 Sugar-like properties include any sucrose-like properties including, but not limited to, its maximal response, taste change profile, temporal change profile, adaptation behavior, mouthfeel, concentration/response function behavior, tastant and taste/ Interaction of sweet taste, selectivity of spatial pattern and temperature effect.
- 765 These properties are the dimensions by which the taste of sucrose differs from the taste of natural and synthetic high-potency sweeteners.
- 767 Whether or not a property has more sugar-like properties is determined by a sensory panel of experts who are interested in sugar and compositions containing at least one natural and/or synthetic high-potency sweetener (containing a sweet taste modifying composition and no sweet taste improving composition) were evaluated.
- 770 These evaluations quantify the properties of the compositions containing at least one natural and/or synthetic high-potency sweetener (both with and without sweet taste improving compositions) and the properties of sugar-containing compositions degree of similarity.
- 773 Suitable procedures for determining whether a composition has a more sugar-like taste are known in the art.

[0092]

- 777 In one particular embodiment, a panel of judges determined the shortening of the sweetness delay.
- 778 Briefly, a panel of panelists (typically 8 to 12 people) were trained to assess the perception of sweetness and measure the sweetness at several time points from the time the sample was placed in the mouth until 3 minutes after spitting it out .
- 781 Using statistical analysis, compare the results obtained for samples containing the additive with those obtained for samples without the additive.
- 783 Decreases in scores measured at time points after sample spitting showed shortened sweetness lingering.

[0093]

- 787 The panel of judges can be trained using procedures known to those skilled in the art.
- 788 In a specific embodiment, the panel of judges can be trained using the Spectrum™ descriptive analysis method (Meilgaard et al, Sensory Evaluation Techniques, 3rd Edition, Chapter 11).
- 790 Preferably, the focus of the training should be on the identification and measurement of basic tastes (especially sweetness). In order to ensure the accuracy and reproducibility of the results, each assessor should repeat the determination of the shortening degree of sweetness delay of each sample about three to about five times, and rest for at least five minutes between each retest and thoroughly use water. Clean your mouth thoroughly.

[0094]

⁷⁹⁷ The method of roughly measuring sweetness involves putting a 10 ml sample into the mouth, holding the sample in the mouth for 5 seconds and gently agitating the sample in the mouth, rating the perceived sweetness intensity within 5 seconds, spitting out the sample (after spitting out the sample) can ' t swallow), rinse mouth with a mouthful of water (like brushing your teeth, let the water stir vigorously in your mouth) and spit out the mouthwash, immediately after spitting out the mouthwash, evaluate the sweetness intensity in your mouth, wait for 45 seconds, and wait for 45 seconds. During 45 seconds, identify the time of maximum perceived sweetness intensity and rate the sweetness intensity at that time (moving the mouth normally and swallowing if necessary), then rate the sweetness intensity again after 10 seconds, and after another 60 seconds Score again (cumulatively 120 seconds after rinsing), and again after another 60 seconds (cumulatively 180 seconds after rinsing).

⁸⁰⁷ When evaluating different samples, rest for 5 minutes and clean your mouth thoroughly with water.

[0095]

⁸¹¹ As used herein, the term "carbohydrate" generally refers to aldehyde or ketone compounds having the general formula $(CH_2O)_n$ (wherein n is 3-30), substituted with multiple hydroxyl groups, and their oligomers and polymers .

⁸¹⁴ The carbohydrates of the present invention can also be substituted or deoxygenated compounds at one or more positions. Carbohydrates, as used herein, encompass unmodified carbohydrates, carbohydrate derivatives, substituted carbohydrates, and modified carbohydrates. As used herein, the terms "carbohydrate derivatives," "substituted carbohydrates," and "modified carbohydrates" are synonymous. Modified carbohydrate means any carbohydrate in which at least one atom has been added, removed, substituted, or a combination of these. Therefore, carbohydrate derivatives or substituted carbohydrates include substituted and unsubstituted monosaccharides, disaccharides, oligosaccharides and polysaccharides. The carbohydrate derivatives or substituted carbohydrates can optionally be deoxygenated at any corresponding C-position, and/or with one or more groups such as hydrogen, halogen, haloalkyl, carboxyl, acyl, acyloxy, amino , amido, carboxyl derivatives, alkylamino, dialkylamino, arylamino, alkoxy, aryloxy, nitro, cyano, thio, mercapto, imino, sulfonyl, oxythio, sulfide Sulfonyl, sulfamoyl, carboxyalkoxy, carboxamido, phosphonyl, phosphinyl, phosphoryl, phosphino, thioester, thioether, hydroxyimino, hydrazine, aminomethyl Acyl, phospho, phosphonato, or any other useful function that allows the carbohydrate derivative or substituted carbohydrate to function to improve the sweet taste of at least one natural and/or synthetic high-potency sweetener group substitution.

[0096]

⁸³² Non-limiting examples of carbohydrates of embodiments of the present invention include tagatose, trehalose, galactose, rhamnose, cyclodextrins (such as α -cyclodextrin, β -cyclodextrin, and γ -cyclodextrin) , maltodextrin (including digestible maltodextrin such as Fibersol-2 TM), dextran, sucrose, glucose, ribulose, fructose, isoerythralose, arabinose, xylose, lyxose, allor Sugar, Altrose, Mannose, Idose, Lactose, Maltose,

Invert Sugar, Isotrehalose, Neotrehalose, Palatinose or Isomaltulose, Erythrose, Deoxyribose, Gulose, Artemisia Dulose, talose, erythrulose, xylulose, psicose, turanose, cellobiose, pullulan, glucosamine, mannosamine, fucose, glucuronic acid, gluconic acid, gluconolactone, abicose, galactosamine, beet oligosaccharides, isomalto-oligosaccharides (isomaltose, isomaltotriose, panose, etc.), xylo-oligosaccharides (xylotriose, xylodisaccharide sugars, etc.), gentio-oligosaccharides (gentiobiose, gentiotriose, gentiotetraose, etc.), sorbose, nigero-oligosaccharides, palatinose oligosaccharides, fructose Oligosaccharides (kestose, nystose, etc.), maltotetraol, maltotriol, malto-oligosaccharides (maltotriose, maltotetraose, maltopentaose, maltohexaose, maltoheptaose, etc.), lactulose, melibiose, raffinose, rhamnose, ribose, isomerized liquid sugars such as high fructose corn/starch syrup (such as HFCS55, HFCS42 or HFCS90), linking sugars, soybean oligosaccharides, and glucose syrup.

⁸⁴⁶ Furthermore, the carbohydrates used herein can be in the D- or L-configuration.

[0097]

⁸⁵⁰ The term "polyol" as used herein refers to a molecule containing more than one hydroxyl group.

⁸⁵¹ Polyols can be diols, triols or tetraols containing 2, 3 and 4 hydroxyl groups respectively. The polyol may also contain more than four hydroxyl groups, such as pentaol, hexaol, heptaol, etc., which respectively contain 5, 6 or 7 hydroxyl groups. In addition, polyols may also be sugar alcohols, polyols or polyols in the reduced form of carbohydrates, wherein the carbonyl groups (aldehydes or ketones, reducing carbohydrates) have been reduced to primary or secondary hydroxyl groups.

[0098]

⁸⁵⁹ Non-limiting examples of polyol additives for improving sweetness of the present invention include erythritol, maltitol, mannitol, sorbitol, lactitol, xylitol, inositol, isomalt, propylene glycol, glycerin (glycerol), threitol, galactitol, palatinose, reduced isomalt-oligosaccharides, reduced wood-oligosaccharides, reduced gentian-oligosaccharides, reduced maltose syrup, reduced glucose syrup, and sugar alcohols or any other carbohydrates that can be reduced without unduly affecting the taste of the at least one natural and/or synthetic high-potency sweetener or edible composition.

[0099]

⁸⁶⁸ Suitable sweet taste improving amino acid additives that can be used in embodiments of the present invention include, but are not limited to, aspartic acid, arginine, glycine, glutamic acid, proline, hydroxybutyrate, theanine, cysteine acid, cystine, alanine, valine, tyrosine, leucine, isoleucine, asparagine, serine, lysine, histidine, ornithine, methionine, Carnitine, GABA (alpha-, beta- or gamma-isomers), glutamine, hydroxyproline, taurine, provaline, sarcosine and their salt forms such as sodium or Potassium salt or acid salt.

⁸⁷⁴ The sweet taste improving amino acid additive may be in D- or L-configuration and in mono-, di- or trimeric form of the same or different amino acids.

⁸⁷⁶ Furthermore, if appropriate, the amino acids may be α -, β -, γ -, δ - and ϵ -isomers. Combinations of the aforementioned amino acids and their corresponding salts (such as sodium, potassium, calcium, magnesium

salts or other alkali metal or alkaline earth metal salts, or acid salts) can also be used as sweet taste improving additives in embodiments of the present invention. These amino acids may be natural or synthetic. The amino acids can also be modified. A modified amino acid refers to an amino acid in which at least one atom has been added, removed, substituted, or a combination of these (such as N-alkyl amino acids, N-acyl amino acids, or N-methyl amino acids). Non-limiting examples of modified amino acids include amino acid derivatives such as trimethylglycine, N-methyl-glycine, and N-methyl-alanine. As used herein, amino acid includes both modified and unmodified amino acids. As used herein, modified amino acids also include peptides and polypeptides (such as dipeptides, tripeptides, tetrapeptides, and pentapeptides) such as glutathione and L-alanyl-L-glutamine Aminoamide.

[0100]

⁸⁹⁰ Suitable sweet taste improving polyamino acid additives include poly-L-aspartic acid, poly-L-lysine (such as poly-L- α -lysine or poly-L- ϵ -lysine), poly - L-ornithine (such as poly-L- α -ornithine or poly-L- ϵ -ornithine), poly-L-arginine, other polymeric forms of amino acids, and salt forms thereof (Such as magnesium, calcium, potassium or sodium salt such as L-glutamic acid monosodium salt).

⁸⁹⁴ The sweet taste improving polyamino acid additive can also be in D- or L-configuration. Furthermore, if appropriate, the polyamino acids may be α -, β -, γ -, δ - and ϵ -isomers. Combinations of the aforementioned polyamino acids and their corresponding salts (such as sodium, potassium, calcium, magnesium salts or other alkali metal or alkaline earth metal salts, or acid salts) are also suitable sweet taste improving additives for embodiments of the present invention. The polyamino acids described herein also include copolymers of different amino acids. These polyamino acids may be natural or synthetic. The polyamino acids can also be modified such that at least one atom is added, removed, substituted, or a combination of these (e.g., N-alkyl polyamino acids or N-acyl polyamino acids). As used herein, polyamino acid includes both modified and unmodified polyamino acids. According to specific examples, modified polyamino acids include, but are not limited to, polyamino acids of different molecular weights (MW), such as poly- L-alpha-lysine.

[0101]

⁹⁰⁸ Suitable sweet taste improving sugar acid additives that may be used in embodiments of the present invention include, but are not limited to, aldonic acid, uronic acid, aldaric acid, alginic acid, gluconic acid, glucuronic acid, glucaric acid, galactose acid, galacturonic acid, salts thereof (such as sodium, potassium, calcium, magnesium salts or other physiologically acceptable salts), and combinations thereof.

[0102]

⁹¹⁵ Suitable sweet taste improving nucleotide additives that may be used in embodiments of the invention include, but are not limited to, inosine monophosphate ("IMP"), guanosine monophosphate ("GMP"), adenosine monophosphate (" AMP"), cytosine monophosphate ("CMP"), uracil monophosphate ("UMP"), inosine diphosphate, guanosine diphosphate, adenosine diphosphate, cytosine diphosphate, Uracil diphosphate, inosine triphosphate, guanosine triphosphate, adenosine triphosphate, cytosine triphosphate, uracil

triphosphate, alkali metal or alkaline earth metal salts thereof, and combinations thereof.

⁹²¹ The nucleotides described herein may also include nucleotide-related additives, such as nucleosides or nucleic acid bases (e.g., guanosine, cytidine, adenosine, thymine, uracil).

[0103]

⁹²⁶ Suitable sweet taste improving organic acid additives include any compound containing a -COOH group.

⁹²⁷ Suitable sweet taste improving organic acid additives that may be used in embodiments of the present invention include, but are not limited to, C2-C30 carboxylic acids, substituted hydroxy C1-C30 carboxylic acids, benzoic acid, substituted benzoic acids (such as 2,4 -dihydroxybenzoic acid), substituted cinnamic acids, hydroxy acids, substituted hydroxybenzoic acids, substituted cyclohexylcarboxylic acids, tannic acid, lactic acid, tartaric acid, citric acid, gluconic acid, glucoheptanoic acid, Fatty acid, hydroxycitric acid, malic acid, fruitaric acid (a mixture of malic acid, fumaric acid and tartaric acid), fumaric acid, maleic acid, succinic acid, bleached acid, salicylic acid, Creatine, glucosamine hydrochloride, glucono-delta-lactone, caffeic acid, cholic acid, acetic acid, ascorbic acid, alginic acid, isoascorbic acid, polyglutamic acid, and their alkali metal or alkaline earth metal salt derivatives.

⁹³⁶ In addition, the sweet taste improving organic acid additive may also be in D- or L-configuration.

[0104]

⁹⁴⁰ Suitable sweet taste improving organic salt additives include but are not limited to sodium, calcium, potassium, and magnesium salts of all organic acids, such as citric acid, malic acid, tartaric acid, fumaric acid, lactic acid (such as sodium lactate), alginic acid (such as sodium alginate), ascorbic acid (sodium ascorbate), benzoic acid (such as sodium benzoate or potassium benzoate) and salts of fatty acids.

⁹⁴⁴ The examples of organic acid salt additives for improving sweet taste can optionally be substituted by one or more groups selected from the group consisting of hydrogen, alkyl, alkenyl, alkynyl, halogen, halogen Alkyl, carboxyl, acyl, acyloxy, amino, amido, carboxyl derivatives, alkylamino, dialkylamino, arylamino, alkoxy, aryloxy, nitro, cyano, thio, thiol, imine, sulfonyl, oxythiol, sulfinyl, sulfamoyl, carboxyalkoxy, carboxamido, phosphonyl, phosphinyl, phosphoryl, phosphino, thioester, thioether, anhydrides, hydroxylimino, hydrazine, carbamoyl, phosphono, phosphonato, or any other available functional groups, as long as the substituted organic acid salt additive can improve the at least one The sweetness function of natural and/or synthetic high-potency sweeteners is excellent.

[0105]

⁹⁵⁵ Suitable sweet taste improving inorganic acid additives that may be used in embodiments of the present invention include, but are not limited to, phosphoric acid, phosphorous acid, polyphosphoric acid, hydrochloric acid, sulfuric acid, carbonic acid, sodium dihydrogen phosphate, and their corresponding alkali metal or alkaline earth metal counterparts. Salts (such as magnesium/calcium inositol hexaphosphate).

[0106]

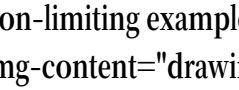
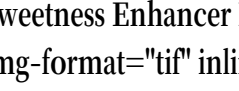
⁹⁶² Suitable sweet taste improving bitter compound additives that may be used in embodiments of the present invention include, but are not limited to, caffeine, quinine, urea, bitter orange oil, naringin, bitterwood and salts thereof.

[0107]

⁹⁶⁸ Suitable sweet taste improving flavors and flavor ingredient additives that may be used in embodiments of the present invention include, but are not limited to, vanilla extract, vanilla extract, mango extract, cinnamon, citrus, coconut, ginger, viridiflorol, Almonds, Menthol (including menthol without Menthol), Grape Skin Extract and Grape Seed Extract.

⁹⁷² "Flavour" and "flavor ingredient" are synonymous, including natural or synthetic substances or combinations thereof.

⁹⁷⁴ Flavoring agents also include other substances that contribute to taste, and may include natural or non-natural (synthetic) substances that are safe for humans and animals when used in generally acceptable ranges.

⁹⁷⁶ Non-limiting examples of suitable flavoring agents include  Natural Flavoring Sweetness Enhancer K14323 ( Darmstadt, Germany), Symrise™ Natural Flavor Mask for Sweeteners 161453 and 164126 (Symrise, Holzminden™, B91ter lock, and 2™ Advantage 10 (Natural Advantage™, Freehold, New Jersey, USA), and Sucramask™ (Creative Research Management, Stockton, California, USA).

[0108]

⁹⁸⁶ Suitable sweet taste improving polymer additives that may be used in embodiments of the present invention include, but are not limited to, chitosan, pectin, pectic acid, pectic ester acid, polyuronic acid, polygalacturonic acid, starch, Food hydrocolloids or their crude extracts (such as Senegal gum arabic (Fibergum™), Seyal (seyal) gum arabic, carrageenan), poly-L-lysine (such as poly-L- α -lysine or poly-L- ϵ -lysine), poly-L-ornithine (such as poly-L- α -ornithine or poly-L- ϵ -ornithine), polyarginine, polypropylene glycol, Polyethylene glycol, poly(ethylene glycol methyl ester), polyaspartic acid, polyglutamic acid, polyethyleneimine, alginic acid, sodium alginate, propylene glycol alginate, sodium hexametaphosphate (SHMP) and its salt, polyethylene glycol alginate and other cationic and anionic polymers.

[0109]

⁹⁹⁷ Suitable sweet taste improving protein or protein hydrolyzate additives that may be used in embodiments of the invention include, but are not limited to, bovine serum albumin (BSA), whey protein (including fractions and concentrates thereof such as 90% instant whey protein isolate 34% whey protein, 50% hydrolyzed whey protein, and 80% whey protein concentrate), soluble rice protein, soybean protein, protein isolate, protein hydrolyzate, reaction product of protein hydrolyzate, containing amino acid (Such as glycine, alanine, serine, hydroxybutyrate, asparagine, glutamine, arginine, valine, isoleucine, leucine, provaline, methionine, pro amino acid, tyrosine, hydroxyproline, etc.), glycoproteins and/or proteoglycans, collagen (such as

gelatin), partially hydrolyzed collagen (such as hydrolyzed fish collagen) and collagen hydrolyzate (Such as porcine collagen hydrolyzate).

[0110]

1009 Suitable sweet taste improving surfactant additives that may be used in embodiments of the present invention include, but are not limited to, polysorbates (such as polyoxyethylene sorbitan monooleate (polysorbate 80), polysorbate 20. Polysorbate 60), sodium dodecylbenzene sulfonate, dioctyl sulfosuccinate or dioctyl sodium sulfosuccinate, sodium lauryl sulfate, cetylpyridium chloride (chloride cetylpyridium), cetyltrimethylammonium bromide, sodium cholate, carbamoyl, choline chloride, sodium glycocholate, sodium taurodeoxycholate, sodium taurodeoxycholate, lauryl Arginine ester, sodium stearyl lactyl lactate, sodium taurocholate, lecithin, sucrose oleate, sucrose stearate, sucrose palmitate, sucrose laurate and other emulsifiers etc.

[0111]

1020 Suitable sweet taste improving flavonoid additives that can be used in embodiments of the present invention can be broadly classified into flavonols, flavonoids, flavanones, flavan-3-ols, isoflavones or anthocyanins.

1022 Non-limiting examples of flavonoid additives include catechins (such as green tea extracts such as Polyphenon™ 60, Polyphenon™ 30, and Polyphenon™ 25 (Mitsui Norin Co., Ltd., Japan), polyphenols, rutins (such as Enzyme-modified rutin Sanmelin™ AO (San-Ei Gen F.F.I., Inc., Osaka, Japan), neohesperidin, naringin, neohesperidin dihydrochalcone, etc.

[0112]

1029 Suitable sweet taste improving alcohol additives that may be used in embodiments of the present invention include, but are not limited to, ethanol.

[0113]

1034 Suitable sweet taste improving astringent compound additives include, but are not limited to, tannic acid, europium chloride (EuCl_3), gadolinium chloride (GdCl_3), terbium chloride (TbCl_3), alum, tannic acid, and polyphenols (such as tea polyphenols).

[0114]

1040 Suitable sweet taste improving vitamin additives include niacinamide (vitamin B3) and pyridoxal hydrochloride (vitamin B6).

[0115]

1045 The sweet taste improving composition may also include other natural and/or synthetic high-potency

sweeteners.

1047 For example, when the functional sweetener composition contains at least one NHPS, the at least one sweet taste improving composition may comprise a synthetic high-potency sweetener, non-limiting examples of which include sucralose, acesulfame potassium, Aspartame, Elritan, Saccharin, Neohesperidin Dihydrochalcone, Cyclamate, Neotame, N-[N-[3-(3-Hydroxy-4-methoxyphenyl)propyl]-L- α -aspartyl]-L-phenylalanine 1-methyl ester, N-[N-[3-(3-hydroxy-4-methoxyphenyl)-3-methylbutyl]-L- α -aspartyl]-L-phenylalanine 1-methyl ester, N-[N-[3-(3-methoxy-4-hydroxyphenyl)propyl]-L- α -Aspartyl]-L-phenylalanine 1-methyl ester, salts thereof, and the like.

[0116]

1057 The sweet taste improving composition may also be in the form of a salt prepared using standard procedures well known in the art.

1059 The term "salt" refers to a compound that retains the desired chemical activity of the sweet taste improving composition of the present invention and is safe for human or animal consumption when used in generally acceptable dosage ranges.

1062 It can also be prepared as alkali metal (such as sodium or potassium) or alkaline earth metal (such as calcium or magnesium) salts.

1064 Salts also include combinations of alkali metal and alkaline earth metal salts.

1065 Non-limiting examples of such salts are (a) acid addition salts formed with inorganic acids and salts formed with organic acids; (b) salts formed with metal cations such as calcium, bismuth, barium, magnesium, aluminum, copper, cobalt, nickel, cadmium, sodium, potassium, etc., or base addition salts with cations formed from ammonia, N,N-diphenylethylenediamine, D-glucosamine, tetraethylammonium or ethylenediamine; or (c), the combination of (a) and (b) above.

1070 Therefore, any salt form derived from the sweet taste improving composition may be used in embodiments of the present invention as long as the salt of the sweet taste improving additive does not unduly affect the at least one natural and/or synthetic high-potency sweetener. The flavor of the agent or the edible composition is sufficient.

1074 The additives in salt form may be added to the natural and/or synthetic sweetening composition in the same amount as their acid or base form.

[0117]

1079 In specific examples, suitable sweet taste improving inorganic salts that can be used as sweet taste improving additives include, but are not limited to, sodium chloride, potassium chloride, sodium sulfate, potassium citrate, europium chloride (EuCl_3), gadolinium chloride (GdCl_3), terbium chloride (TbCl_3), magnesium sulfate, alum, magnesium chloride, mono-, di- or tri-basic sodium or potassium salts of phosphoric acid (such as inorganic phosphates), hydrochlorides (Such as inorganic chlorides), sodium carbonate, sodium bisulfate and sodium bicarbonate.

1085 Further, in specific examples, suitable organic salts that can be used as sweet taste improving additives include but are not limited to choline chloride, sodium alginate (sodium alginate), sodium glucoheptanoate, sodium gluconate Salt (Sodium Gluconate), Potassium Gluconate (Potassium Gluconate), Guanidine

Hydrochloride, Glucosamine Hydrochloride, Amiloride Hydrochloride, Monosodium Glutamate (MSG), Adenosine Monophosphate, Magnesium Gluconate, Tartaric Acid Potassium (monohydrate) and sodium tartrate (dihydrate).

[0118]

1094 It has now been found that combining at least one natural and/or synthetic high-potency sweetener and at least one sweet taste improving composition can improve temporal profile and/or taste profile (including osmotic taste) to taste more like sugar.

1097 Those skilled in the art can obtain all possible combinations of the natural and/or synthetic high-potency sweeteners and sweet taste improving compositions according to the teaching of the present invention.

1099 For example, non-limiting combinations of such natural and/or synthetic high-potency sweeteners and sweet taste improving compositions include:

[0119]

1104 1.

1105 at least one natural and/or synthetic high-potency sweetener and at least one carbohydrate;

[0120]

1109 2.

1110 at least one natural and/or synthetic high-potency sweetener and at least one polyol;

[0121]

1114 3.

1115 at least one natural and/or synthetic high-potency sweetener and at least one amino acid;

[0122]

1119 4.

1120 at least one natural and/or synthetic high-potency sweetener and at least one other sweet taste improving additive;

[0123]

1125 5.

1126 at least one natural and/or synthetic high-potency sweetener, at least one carbohydrate, at least one polyol, at least one amino acid, and at least one other sweet taste improving additive;

[0124]

1131 6.

1132 at least one natural and/or synthetic high-potency sweetener, at least one carbohydrate, and at least one polyol;

[0125]

1137 7.

1138 at least one natural and/or synthetic high-potency sweetener, at least one carbohydrate, and at least one amino acid;

[0126]

1143 8.

1144 at least one natural and/or synthetic high-potency sweetener, at least one carbohydrate, and at least one other sweet taste improving additive;

[0127]

1149 9.

1150 at least one natural and/or synthetic high-potency sweetener, at least one polyol, and at least one amino acid;

[0128]

1154 10.

1155 at least one natural and/or synthetic high-potency sweetener, at least one polyol, and at least one other sweet taste improving additive;

[0129]

1160 11.

1161 at least one natural and/or synthetic high-potency sweetener, at least one amino acid, and at least one other sweet taste improving additive;

[0130]

1166 12.

1167 at least one natural and/or synthetic high-potency sweetener, at least one carbohydrate, at least one polyol, and at least one amino acid;

[0131]

1172 13.

1173 at least one natural and/or synthetic high-potency sweetener, at least one carbohydrate, at least one polyol,
and at least one other sweet taste improving additive;

[0132]

1178 14.

1179 at least one natural and/or synthetic high-potency sweetener, at least one polyol, at least one amino acid, and
at least one other sweet taste improving additive; and

[0133]

1184 15.

1185 at least one natural and/or synthetic high-potency sweetener, at least one carbohydrate, at least one amino
acid, and at least one other sweet taste improving additive.

[0134]

1190 These fifteen major combinations can be subdivided into further combinations to improve the overall taste of
the natural and/or synthetic high-potency sweetener or edible composition containing the natural and/or
synthetic high-potency sweetener.

[0135]

1196 As explained above, the sweet taste improving composition is selected from polyols, carbohydrates, amino
acids, other sweet taste improving additives, and combinations thereof.

1198 Other sweet taste improving additives which may be used in embodiments of the invention have been
described above.

1200 In one embodiment, a single sweet taste improving composition can be used with a single natural or synthetic
high-potency sweetener and at least one functional ingredient. In another embodiment of the present
invention, a single sweet taste improving composition may be used together with one or more natural
and/or synthetic high-potency sweeteners and at least one functional ingredient. In yet another
embodiment, one or more sweet taste improving compositions may be used in combination with a single
natural or synthetic high-potency sweetener and at least one functional ingredient. In yet another
embodiment, various sweet taste improving compositions can be used in combination with one or more
natural and/or synthetic high-potency sweeteners and at least one functional ingredient. Therefore, non-
limiting examples of combinations of sweet taste improving compositions of embodiments of the present
invention include:

[0136]

1213 i.

1214 at least one polyol, at least one carbohydrate, at least one amino acid, and at least one other sweet taste improving additive;

[0137]

1219 ii.

1220 at least one polyol, at least one carbohydrate, and at least one other sweet taste improving additive;

[0138]

1224 iii.

1225 at least one polyol and at least one other sweet taste improving additive;

[0139]

1229 iv.

1230 at least one polyol and at least one carbohydrate;

[0140]

1234 v.

1235 at least one carbohydrate and at least one other sweet taste improving additive;

[0141]

1239 vi.

1240 at least one polyol and at least one amino acid;

[0142]

1244 vii.

1245 at least one carbohydrate and at least one amino acid;

[0143]

1249 viii.

1250 At least one amino acid and at least one other sweet taste improving additive.

[0144]

1254 According to an embodiment of the present invention, other combinations of sweet taste improving compositions include:

[0145]

1259 1.

1260 at least one polyol, at least one carbohydrate, and at least one amino acid;

[0146]

1264 2.

1265 at least one polyol, at least one carbohydrate, and at least one polyamino acid;

[0147]

1269 3.

1270 at least one polyol, at least one carbohydrate, and at least one sugar acid;

[0148]

1274 4.

1275 at least one polyol, at least one carbohydrate, and at least one nucleotide;

[0149]

1279 5.

1280 at least one polyol, at least one carbohydrate, and at least one organic acid;

[0150]

1284 6.

1285 at least one polyol, at least one carbohydrate, and at least one mineral acid;

[0151]

1289 7.

1290 at least one polyol, at least one carbohydrate, and at least one bitter compound;

[0152]

1294 8.

1295 at least one polyol, at least one carbohydrate, and at least one flavor or flavor ingredient;

[0153]

1299 9.

1300 at least one polyol, at least one carbohydrate, and at least one polymer;

[0154]

1304 10.

1305 at least one polyol, at least one carbohydrate and at least one protein or protein hydrolyzate or protein or protein hydrolyzate containing low molecular weight amino acids;

[0155]

1310 11.

1311 at least one polyol, at least one carbohydrate, and at least one surfactant;

[0156]

1315 12.

1316 at least one polyol, at least one carbohydrate, and at least one flavonoid;

[0157]

1320 13.

1321 at least one polyol, at least one carbohydrate, and at least one alcohol;

[0158]

1325 14.

1326 at least one polyol, at least one carbohydrate, and at least one emulsifier;

[0159]

1330 15.

1331 at least one polyol, at least one carbohydrate and at least one inorganic salt;

[0160]

1335 16.

1336 at least one polyol, at least one carbohydrate and at least one organic salt;

[0161]

1340 17.

1341 at least one polyol, at least one carbohydrate, at least one amino acid, and at least one other sweet taste improving additive;

[0162]

1346 18.

1347 at least one polyol, at least one carbohydrate, at least one polyamino acid, and at least one other sweet taste improving additive;

[0163]

1352 19.

1353 at least one polyol, at least one carbohydrate, at least one sugar acid, and at least one other sweet taste improving additive;

[0164]

1358 20.

1359 at least one polyol, at least one carbohydrate, at least one nucleotide, and at least one other sweet taste improving additive;

[0165]

1364 21.

1365 at least one polyol, at least one carbohydrate, at least one organic acid, and at least one other sweet taste improving additive;

[0166]

1370 22.

1371 at least one polyol, at least one carbohydrate, at least one mineral acid, and at least one other sweet taste improving additive;

[0167]

1376 23.

1377 at least one polyol, at least one carbohydrate, at least one bitter compound, and at least one other sweet taste improving additive;

[0168]

1382 24.

1383 at least one polyol, at least one carbohydrate, at least one flavor or flavor ingredient, and at least one other sweet taste improving additive;

[0169]

1388 25.

1389 at least one polyol, at least one carbohydrate, at least one polymer, and at least one other sweet taste improving additive;

[0170]

1394 26.

1395 at least one polyol, at least one carbohydrate, at least one protein or protein hydrolyzate, and at least one other sweet taste improving additive;

[0171]

1400 27.

1401 at least one polyol, at least one carbohydrate, at least one surfactant, and at least one other sweet taste improving additive;

[0172]

1406 28.

1407 at least one polyol, at least one carbohydrate, at least one flavonoid, and at least one other sweet taste improving additive;

[0173]

1412 29.

1413 at least one polyol, at least one carbohydrate, at least one alcohol, and at least one other sweet taste improving additive;

[0174]

1418 30.

1419 at least one polyol, at least one carbohydrate, at least one amino acid, and at least one polyamino acid;

[0175]

1423 31.

1424 at least one polyol, at least one carbohydrate, at least one amino acid, at least one polyamino acid, and at least one sugar acid;

[0176]

1429 32.

1430 at least one polyol, at least one carbohydrate, at least one amino acid, at least one polyamino acid, at least one sugar acid, and at least one nucleotide;

[0177]

1435 33.

1436 at least one polyol, at least one carbohydrate, at least one amino acid, at least one polyamino acid, at least one sugar acid, at least one nucleotide, and at least one organic acid;

[0178]

1441 34.

1442 at least one polyol, at least one carbohydrate, at least one amino acid, at least one polyamino acid, at least one sugar acid, at least one nucleotide, at least one organic acid, and at least one inorganic acid;

[0179]

1447 35.

1448 at least one polyol, at least one carbohydrate, at least one amino acid, at least one polyamino acid, at least one sugar acid, at least one nucleotide, at least one organic acid, at least one inorganic acid, and at least a bitter compound;

[0180]

1454 36.

1455 at least one polyol, at least one carbohydrate, at least one amino acid, at least one polyamino acid, at least one sugar acid, at least one nucleotide, at least one organic acid, at least one inorganic acid, at least one a bitter compound, and at least one polymer;

[0181]

1461 37.

1462 at least one polyol, at least one carbohydrate, at least one amino acid, at least one polyamino acid, at least one sugar acid, at least one nucleotide, at least one organic acid, at least one inorganic acid, at least one a bitter compound, at least one polymer, and at least one protein or protein hydrolyzate;

[0182]

1468 38.

1469 at least one polyol, at least one carbohydrate, at least one amino acid, at least one polyamino acid, at least one sugar acid, at least one nucleotide, at least one organic acid, at least one inorganic acid, at least one a bitter compound, at least one polymer, at least one protein or protein hydrolyzate, and at least one surfactant;

[0183]

1475 39.

1476 at least one polyol, at least one carbohydrate, at least one amino acid, at least one polyamino acid, at least one sugar acid, at least one nucleotide, at least one organic acid, at least one inorganic acid, at least one a bitter compound, at least one polymer, at least one protein or protein hydrolyzate, at least one surfactant, and at least one flavonoid;

[0184]

1483 40.

1484 at least one polyol, at least one carbohydrate, at least one amino acid, at least one polyamino acid, at least one sugar acid, at least one nucleotide, at least one organic acid, at least one inorganic acid, at least one a bitter compound, at least one polymer, at least one protein or protein hydrolyzate, at least one surfactant, at least one flavonoid, and at least one alcohol;

[0185]

1491 41.

1492 at least one polyol, at least one carbohydrate, at least one amino acid, and at least one sugar acid;

[0186]

1496 42.

1497 at least one polyol, at least one carbohydrate, at least one amino acid, and at least one nucleotide;

[0187]

1501 43.

1502 at least one polyol, at least one carbohydrate, at least one amino acid, and at least one organic acid;

[0188]

1506 44.

1507 at least one polyol, at least one carbohydrate, at least one amino acid, and at least one mineral acid;

[0189]

1511 45.

1512 at least one polyol, at least one carbohydrate, at least one amino acid, and at least one bitter compound;

[0190]

1516 46.

1517 at least one polyol, at least one carbohydrate, at least one amino acid, and at least one polymer;

[0191]

1521 47.

1522 at least one polyol, at least one carbohydrate, at least one amino acid, and at least one protein or protein hydrolyzate;

[0192]

1527 48.

1528 at least one polyol, at least one carbohydrate, at least one amino acid, and at least one surfactant;

[0193]

1532 49.

1533 at least one polyol, at least one carbohydrate, at least one amino acid, and at least one flavonoid;

[0194]

1537 50.

1538 at least one polyol, at least one carbohydrate, at least one amino acid, and at least one alcohol;

[0195]

1542 51.

1543 at least one polyol, at least one carbohydrate, at least one polyamino acid, and at least one sugar acid;

[0196]

1547 52.

1548 at least one polyol, at least one carbohydrate, at least one polyamino acid, and at least one nucleotide;

[0197]

1552 53.

1553 at least one polyol, at least one carbohydrate, at least one polyamino acid, and at least one organic acid;

[0198]

1557 54.

1558 at least one polyol, at least one carbohydrate, at least one polyamino acid, and at least one inorganic acid;

[0199]

1562 55.

1563 at least one polyol, at least one carbohydrate, at least one polyamino acid, and at least one bitter compound;

[0200]

1567 56.

1568 at least one polyol, at least one carbohydrate, at least one polyamino acid, and at least one polymer;

[0201]

1572 57.

1573 at least one polyol, at least one carbohydrate, at least one polyamino acid, and at least one protein or protein hydrolyzate;

[0202]

1578 58.

1579 at least one polyol, at least one carbohydrate, at least one polyamino acid, and at least one surfactant;

[0203]

1583 59.

1584 at least one polyol, at least one carbohydrate, at least one polyamino acid, and at least one flavonoid;

[0204]

1588 60.

1589 at least one polyol, at least one carbohydrate, at least one polyamino acid, and at least one alcohol;

[0205]

1593 61.

1594 at least one polyol, at least one carbohydrate, at least one sugar acid, and at least one nucleotide;

[0206]

1598 62.

1599 at least one polyol, at least one carbohydrate, at least one sugar acid, and at least one organic acid;

[0207]

1603 63.

1604 at least one polyol, at least one carbohydrate, at least one sugar acid, and at least one mineral acid;

[0208]

1608 64.

1609 at least one polyol, at least one carbohydrate, at least one sugar acid, and at least one bitter compound;

[0209]

1613 65.

1614 at least one polyol, at least one carbohydrate, at least one sugar acid, and at least one polymer;

[0210]

1618 66.

1619 at least one polyol, at least one carbohydrate, at least one sugar acid, and at least one protein or protein hydrolyzate;

[0211]

1624 67.

1625 at least one polyol, at least one carbohydrate, at least one sugar acid, and at least one surfactant;

[0212]

1629 68.

1630 at least one polyol, at least one carbohydrate, at least one sugar acid, and at least one flavonoid;

[0213]

1634 69.

1635 at least one polyol, at least one carbohydrate, at least one sugar acid, and at least one alcohol;

[0214]

1639 70.

1640 at least one polyol, at least one carbohydrate, at least one nucleotide, and at least one organic acid;

[0215]

1644 71.

1645 at least one polyol, at least one carbohydrate, at least one nucleotide, and at least one inorganic acid;

[0216]

1649 72.

1650 at least one polyol, at least one carbohydrate, at least one nucleotide, and at least one bitter compound;

[0217]

1654 73.

1655 at least one polyol, at least one carbohydrate, at least one nucleotide, and at least one polymer;

[0218]

1659 74.

1660 at least one polyol, at least one carbohydrate, at least one nucleotide, and at least one protein or protein hydrolyzate;

[0219]

1665 75.

1666 at least one polyol, at least one carbohydrate, at least one nucleotide, and at least one surfactant;

[0220]

1670 76.

1671 at least one polyol, at least one carbohydrate, at least one nucleotide, and at least one flavonoid;

[0221]

1675 77.

1676 at least one polyol, at least one carbohydrate, at least one nucleotide, and at least one alcohol;

[0222]

1680 78.

1681 at least one polyol, at least one carbohydrate, at least one organic acid, and at least one inorganic acid;

[0223]

1685 79.

1686 at least one polyol, at least one carbohydrate, at least one organic acid, and at least one bitter compound;

[0224]

1690 80.

1691 at least one polyol, at least one carbohydrate, at least one organic acid, and at least one polymer;

[0225]

1695 81.

1696 at least one polyol, at least one carbohydrate, at least one organic acid, and at least one protein or protein hydrolyzate;

[0226]

1701 82.

1702 at least one polyol, at least one carbohydrate, at least one organic acid, and at least one surfactant;

[0227]

1706 83.

1707 at least one polyol, at least one carbohydrate, at least one organic acid, and at least one flavonoid;

[0228]

1711 84.

1712 at least one polyol, at least one carbohydrate, at least one organic acid, and at least one alcohol;

[0229]

1716 85.

1717 at least one polyol, at least one carbohydrate, at least one mineral acid, and at least one bitter compound;

[0230]

1721 86.

1722 at least one polyol, at least one carbohydrate, at least one mineral acid, and at least one polymer;

[0231]

1726 87.

1727 at least one polyol, at least one carbohydrate, at least one mineral acid, and at least one protein or protein hydrolyzate;

[0232]

1732 88.

1733 at least one polyol, at least one carbohydrate, at least one mineral acid, and at least one surfactant;

[0233]

1737 89.

1738 at least one polyol, at least one carbohydrate, at least one mineral acid, and at least one flavonoid;

[0234]

1742 90.

1743 at least one polyol, at least one carbohydrate, at least one mineral acid, and at least one alcohol;

[0235]

1747 91.

1748 at least one polyol, at least one carbohydrate, at least one bitter compound, and at least one polymer;

[0236]

1752 92.

1753 at least one polyol, at least one carbohydrate, at least one bitter compound, and at least one protein or protein hydrolyzate;

[0237]

1758 93.

1759 at least one polyol, at least one carbohydrate, at least one bitter compound, and at least one surfactant;

[0238]

1763 94.

1764 at least one polyol, at least one carbohydrate, at least one bitter compound, and at least one flavonoid;

[0239]

1768 95.

1769 at least one polyol, at least one carbohydrate, at least one bitter compound, and at least one alcohol;

[0240]

1773 96.

1774 at least one polyol, at least one carbohydrate, at least one polymer, and at least one protein or protein hydrolyzate;

[0241]

1779 97.

1780 at least one polyol, at least one carbohydrate, at least one polymer, and at least one surfactant;

[0242]

1784 98.

1785 at least one polyol, at least one carbohydrate, at least one polymer, and at least one flavonoid;

[0243]

1789 99.

1790 at least one polyol, at least one carbohydrate, at least one polymer, and at least one alcohol;

[0244]

1794 100.

1795 at least one polyol, at least one carbohydrate, at least one protein or protein hydrolyzate, and at least one surfactant;

[0245]

1800 101.

1801 at least one polyol, at least one carbohydrate, at least one protein or protein hydrolyzate, and at least one

flavonoid;

[0246]

1806 102.

1807 at least one polyol, at least one carbohydrate, at least one surfactant, and at least one flavonoid;

[0247]

1811 103.

1812 at least one polyol, at least one carbohydrate, at least one surfactant, and at least one alcohol; and

[0248]

1816 104.

1817 at least one polyol, at least one carbohydrate, at least one flavonoid, and at least one alcohol.

[0249]

1821 According to the present invention, other combinations of sweet taste improving compositions include:

[0250]

1825 1.

1826 at least one polyol and at least one amino acid;

[0251]

1830 2.

1831 at least one polyol and at least one polyamino acid;

[0252]

1835 3.

1836 at least one polyol and at least one sugar acid;

[0253]

1840 4.

1841 at least one polyol and at least one nucleotide;

[0254]

1845 5.

1846 at least one polyol and at least one organic acid;

[0255]

1850 6.

1851 at least one polyol and at least one mineral acid;

[0256]

1855 7.

1856 at least one polyol and at least one bitter compound;

[0257]

1860 8.

1861 at least one polyol and at least one flavor or flavor ingredient;

[0258]

1865 9.

1866 at least one polyol and at least one polymer;

[0259]

1870 10.

1871 at least one polyol and at least one protein or protein hydrolyzate;

[0260]

1875 11.

1876 at least one polyol and at least one surfactant;

[0261]

1880 12.

1881 at least one polyol and at least one flavonoid;

[0262]

1885 13.

1886 at least one polyol and at least one alcohol;

[0263]

1890 14.

1891 at least one polyol and at least one emulsifier;

[0264]

1895 15.

1896 at least one polyol and at least one inorganic salt;

[0265]

1900 16.

1901 at least one polyol and at least one organic salt;

[0266]

1905 17.

1906 a mixture of at least one polyol and at least one protein or protein hydrolyzate or low molecular weight amino acids;

[0267]

1911 18.

1912 at least one polyol, at least one amino acid, and at least one other sweet taste improving additive;

[0268]

1916 19.

1917 at least one polyol, at least one polyamino acid, and at least one other sweet taste improving additive;

[0269]

1921 20.

1922 at least one polyol, at least one sugar acid, and at least one other sweet taste improving additive;

[0270]

1926 21.

1927 at least one polyol, at least one nucleotide, and at least one other sweet taste improving additive;

[0271]

1931 22.

1932 at least one polyol, at least one organic acid, and at least one other sweet taste improving additive;

[0272]

1936 23.

1937 at least one polyol, at least one mineral acid, and at least one other sweet taste improving additive;

[0273]

1941 24.

1942 at least one polyol, at least one bitter compound, and at least one other sweet taste improving additive;

[0274]

1946 25.

1947 at least one polyol, at least one flavor or flavor ingredient, and at least one other sweet taste improving additive;

[0275]

1952 26.

1953 at least one polyol, at least one polymer, and at least one other sweet taste improving additive;

[0276]

1957 27.

1958 at least one polyol, at least one protein or protein hydrolyzate, and at least one other sweet taste improving additive;

[0277]

1963 28.

1964 at least one polyol, at least one surfactant, and at least one other sweet taste improving additive;

[0278]

1968 29.

1969 at least one polyol, at least one flavonoid, and at least one other sweet taste improving additive;

[0279]

1973 30.

1974 at least one polyol, at least one alcohol, and at least one other sweet taste improving additive;

[0280]

1978 31.

1979 at least one polyol, at least one amino acid, and at least one polyamino acid;

[0281]

1983 32.

1984 at least one polyol, at least one amino acid, at least one polyamino acid, and at least one sugar acid;

[0282]

1988 33.

1989 at least one polyol, at least one amino acid, at least one polyamino acid, at least one sugar acid, and at least one nucleotide;

[0283]

1994 34.

1995 at least one polyol, at least one amino acid, at least one polyamino acid, at least one sugar acid, at least one nucleotide, and at least one organic acid;

[0284]

2000 35.

2001 at least one polyol, at least one amino acid, at least one polyamino acid, at least one sugar acid, at least one nucleotide, at least one organic acid, and at least one inorganic acid;

[0285]

2006 36.

2007 at least one polyol, at least one amino acid, at least one polyamino acid, at least one sugar acid, at least one nucleotide, at least one organic acid, at least one inorganic acid, and at least one bitter compound;

[0286]

2012 37.

2013 at least one polyol, at least one amino acid, at least one polyamino acid, at least one sugar acid, at least one nucleotide, at least one organic acid, at least one inorganic acid, at least one bitter compound, and at least one a polymer;

[0287]

2019 38.

2020 at least one polyol, at least one amino acid, at least one polyamino acid, at least one sugar acid, at least one nucleotide, at least one organic acid, at least one inorganic acid, at least one bitter compound, at least one a polymer, and at least one protein or protein hydrolyzate;

[0288]

2026 39.

2027 at least one polyol, at least one amino acid, at least one polyamino acid, at least one sugar acid, at least one nucleotide, at least one organic acid, at least one inorganic acid, at least one bitter compound, at least one A polymer, at least one protein or protein hydrolyzate, and at least one surfactant;

[0289]

2033 40.

2034 at least one polyol, at least one amino acid, at least one polyamino acid, at least one sugar acid, at least one nucleotide, at least one organic acid, at least one inorganic acid, at least one bitter compound, at least one A polymer, at least one protein or protein hydrolyzate, at least one surfactant, and at least one flavonoid;

[0290]

2040 41.

2041 at least one polyol, at least one amino acid, at least one polyamino acid, at least one sugar acid, at least one nucleotide, at least one organic acid, at least one inorganic acid, at least one bitter compound, at least one A polymer, at least one protein or protein hydrolyzate, at least one surfactant, at least one flavonoid, and at least one alcohol;

[0291]

2048 42.

2049 at least one polyol, at least one amino acid, and at least one sugar acid;

[0292]

2053 43.

2054 at least one polyol, at least one amino acid, and at least one nucleotide;

[0293]

2058 44.

2059 at least one polyol, at least one amino acid, and at least one organic acid;

[0294]

2063 45.

2064 at least one polyol, at least one amino acid, and at least one mineral acid;

[0295]

2068 46.

2069 at least one polyol, at least one amino acid, and at least one bitter compound;

[0296]

2073 47.

2074 at least one polyol, at least one amino acid, and at least one polymer;

[0297]

2078 48.

2079 at least one polyol, at least one amino acid, and at least one protein or protein hydrolyzate;

[0298]

2083 49.

2084 at least one polyol, at least one amino acid, and at least one surfactant;

[0299]

2088 50.

2089 at least one polyol, at least one amino acid, and at least one flavonoid;

[0300]

2093 51.

2094 at least one polyol, at least one amino acid, and at least one alcohol;

[0301]

2098 52.

2099 at least one polyol, at least one polyamino acid, and at least one sugar acid;

[0302]

2103 53.

2104 at least one polyol, at least one polyamino acid, and at least one nucleotide;

[0303]

2108 54.

2109 at least one polyol, at least one polyamino acid, and at least one organic acid;

[0304]

2113 55.

2114 at least one polyol, at least one polyamino acid and at least one organic salt;

[0305]

2118 56.

2119 at least one polyol, at least one polyamino acid, and at least one inorganic acid;

[0306]

2123 57.

2124 at least one polyol, at least one polyamino acid and at least one inorganic salt;

[0307]

2128 58.

2129 at least one polyol, at least one polyamino acid, and at least one bitter compound;

[0308]

2133 59.

2134 at least one polyol, at least one polyamino acid, and at least one polymer;

[0309]

2138 60.

2139 at least one polyol, at least one polyamino acid, and at least one protein or protein hydrolyzate;

[0310]

2143 61.

2144 at least one polyol, at least one polyamino acid and at least one surfactant;

[0311]

2148 62.

2149 at least one polyol, at least one polyamino acid, and at least one flavonoid;

[0312]

2153 63.

2154 at least one polyol, at least one polyamino acid, and at least one alcohol;

[0313]

2158 64.

2159 at least one polyol, at least one sugar acid, and at least one nucleotide;

[0314]

2163 65.

2164 at least one polyol, at least one sugar acid, and at least one organic acid;

[0315]

2168 66.

2169 at least one polyol, at least one sugar acid, and at least one mineral acid;

[0316]

2173 67.

2174 at least one polyol, at least one sugar acid, and at least one bitter compound;

[0317]

2178 68.

2179 at least one polyol, at least one sugar acid, and at least one polymer;

[0318]

2183 69.

2184 at least one polyol, at least one sugar acid, and at least one protein or protein hydrolyzate;

[0319]

2188 70.

2189 at least one polyol, at least one sugar acid, and at least one surfactant;

[0320]

2193 71.

2194 at least one polyol, at least one sugar acid, and at least one flavonoid;

[0321]

2198 72.

2199 at least one polyol, at least one sugar acid, and at least one alcohol;

[0322]

2203 73.

2204 at least one polyol, at least one nucleotide, and at least one organic acid;

[0323]

2208 74.

2209 at least one polyol, at least one nucleotide, and at least one inorganic acid;

[0324]

2213 75.

2214 at least one polyol, at least one nucleotide, and at least one bitter compound;

[0325]

2218 76.

2219 at least one polyol, at least one nucleotide, and at least one polymer;

[0326]

2223 77.

2224 at least one polyol, at least one nucleotide, and at least one protein or protein hydrolyzate;

[0327]

2228 78.

2229 at least one polyol, at least one nucleotide, and at least one surfactant;

[0328]

2233 79.

2234 at least one polyol, at least one nucleotide, and at least one flavonoid;

[0329]

2238 80.

2239 at least one polyol, at least one nucleotide, and at least one alcohol;

[0330]

2243 81.

2244 at least one polyol, at least one organic acid, and at least one inorganic acid;

[0331]

2248 82.

2249 at least one polyol, at least one organic acid, and at least one bitter compound;

[0332]

2253 83.

2254 at least one polyol, at least one organic acid, and at least one polymer;

[0333]

2258 84.

2259 at least one polyol, at least one organic acid, and at least one protein or protein hydrolyzate;

[0334]

2263 85.

2264 at least one polyol, at least one organic acid, and at least one surfactant;

[0335]

2268 86.

2269 at least one polyol, at least one organic acid, and at least one flavonoid;

[0336]

2273 87.

2274 at least one polyol, at least one organic acid, and at least one alcohol;

[0337]

2278 88.

2279 at least one polyol, at least one mineral acid, and at least one bitter compound;

[0338]

2283 89.

2284 at least one polyol, at least one inorganic acid, and at least one polymer;

[0339]

2288 90.

2289 at least one polyol, at least one mineral acid, and at least one protein or protein hydrolyzate;

[0340]

2293 91.

2294 at least one polyol, at least one inorganic acid, and at least one surfactant;

[0341]

2298 92.

2299 at least one polyol, at least one mineral acid, and at least one flavonoid;

[0342]

2303 93.

2304 at least one polyol, at least one mineral acid, and at least one alcohol;

[0343]

2308 94.

2309 at least one polyol, at least one bitter compound, and at least one polymer;

[0344]

2313 95.

2314 at least one polyol, at least one bitter compound, and at least one protein or protein hydrolyzate;

[0345]

2318 96.

2319 at least one polyol, at least one bitter compound, and at least one surfactant;

[0346]

2323 97.

2324 at least one polyol, at least one bitter compound, and at least one flavonoid;

[0347]

2328 98.

2329 at least one polyol, at least one bitter compound, and at least one alcohol;

[0348]

2333 99.

2334 at least one polyol, at least one polymer, and at least one protein or protein hydrolyzate;

[0349]

2338 100.

2339 at least one polyol, at least one polymer, and at least one surfactant;

[0350]

2343 101.

2344 at least one polyol, at least one polymer, and at least one flavonoid;

[0351]

²³⁴⁸ 102.

²³⁴⁹ at least one polyol, at least one polymer, and at least one alcohol;

[0352]

²³⁵³ 103.

²³⁵⁴ at least one polyol, at least one protein or protein hydrolyzate, and at least one surfactant;

[0353]

²³⁵⁸ 104.

²³⁵⁹ at least one polyol, at least one protein or protein hydrolyzate, and at least one flavonoid;

[0354]

²³⁶³ 105.

²³⁶⁴ at least one polyol, at least one surfactant, and at least one flavonoid;

[0355]

²³⁶⁸ 106.

²³⁶⁹ at least one polyol, at least one surfactant, and at least one alcohol;

[0356]

²³⁷³ 107.

²³⁷⁴ at least one polyol, at least one flavonoid, and at least one alcohol;

[0357]

²³⁷⁸ 108.

²³⁷⁹ at least one sweet taste improving additive and erythritol;

[0358]

²³⁸³ 109.

²³⁸⁴ at least one sweet taste improving additive and maltitol;

[0359]

²³⁸⁸ 110.

²³⁸⁹ at least one sweet taste improving additive and mannitol;

[0360]

2393 **111.**

2394 at least one sweet taste improving additive and sorbitol;

[0361]

2398 **112.**

2399 at least one sweet taste improving additive and lactitol;

[0362]

2403 **113.**

2404 at least one sweet taste improving additive and xylitol;

[0363]

2408 **114.**

2409 at least one sweet taste improving additive and isomalt;

[0364]

2413 **115.**

2414 at least one sweet taste improving additive and propylene glycol;

[0365]

2418 **116.**

2419 at least one sweet taste improving additive and glycerin;

[0366]

2423 **117.**

2424 at least one sweet taste improving additive and palatinose;

[0367]

2428 **118.**

2429 at least one sweet taste improving additive and reduced isomalto-oligosaccharides;

[0368]

2433 119.

2434 at least one sweet taste improving additive and reduced xylo-oligosaccharides;

[0369]

2438 120.

2439 at least one sweet taste improving additive and reduced gentio-oligosaccharides;

[0370]

2443 121.

2444 at least one sweet taste improving additive and reduced maltose syrup;

[0371]

2448 122.

2449 at least one sweet taste improving additive and reduced glucose syrup;

[0372]

2453 123.

2454 at least one sweet taste improving additive, erythritol, and at least one other polyol;

[0373]

2458 124.

2459 at least one sweet taste improving additive, maltitol, and at least one other polyol;

[0374]

2463 125.

2464 at least one sweet taste improving additive, mannitol, and at least one other polyol;

[0375]

2468 126.

2469 at least one sweet taste improving additive, sorbitol, and at least one other polyol;

[0376]

2473 127.

2474 at least one sweet taste improving additive, lactitol, and at least one other polyol;

[0377]

2478 128.

2479 at least one sweet taste improving additive, xylitol, and at least one other polyol;

[0378]

2483 129.

2484 at least one sweet taste improving additive, isomalt, and at least one other polyol;

[0379]

2488 130.

2489 at least one sweet taste improving additive, propylene glycol, and at least one other polyol;

[0380]

2493 131.

2494 at least one sweet taste improving additive, glycerin, and at least one other polyol;

[0381]

2498 132.

2499 at least one sweet taste improving additive, palatinose, and at least one other polyol;

[0382]

2503 133.

2504 at least one sweet taste improving additive, reduced isomalto-oligosaccharides, and at least one other polyol;

[0383]

2508 134.

2509 at least one sweet taste improving additive, reduced xylo-oligosaccharides, and at least one other polyol;

[0384]

2513 135.

2514 at least one sweet taste improving additive, reduced gentio-oligosaccharides, and at least one other polyol;

[0385]

2518 136.

2519 at least one sweet taste improving additive, reduced maltose syrup, and at least one other polyol; and

[0386]

2523 137.

2524 at least one sweet taste improving additive, reduced glucose syrup, and at least one other polyol.

[0387]

2528 According to an embodiment of the present invention, other combinations of sweet taste improving compositions include:

[0388]

2533 1.

2534 at least one polyol and tagatose;

[0389]

2538 2.

2539 at least one polyol and trehalose;

[0390]

2543 3.

2544 at least one polyol and galactose;

[0391]

2548 4.

2549 at least one polyol and rhamnose;

[0392]

2553 5.

2554 at least one polyol and dextrin;

[0393]

2558 6.

2559 at least one polyol and cyclodextrin;

[0394]

2563 7.

2564 at least one polyol and alpha-cyclodextrin, beta-cyclodextrin or gamma-cyclodextrin;

[0395]

2568 8.

2569 at least one polyol and maltodextrin;

[0396]

2573 9.

2574 at least one polyol and dextran;

[0397]

2578 10.

2579 at least one polyol and sucrose;

[0398]

2583 11.

2584 at least one polyol and glucose;

[0399]

2588 12.

2589 at least one polyol and fructose;

[0400]

2593 13.

2594 at least one polyol and isoerythrose;

[0401]

2598 14.

2599 at least one polyol and arabinose;

[0402]

2603 **15.**

2604 at least one polyol and xylose;

[0403]

2608 **16.**

2609 at least one polyol and lyxose;

[0404]

2613 **17.**

2614 at least one polyol and allose;

[0405]

2618 **18.**

2619 at least one polyol and altrose;

[0406]

2623 **19.**

2624 at least one polyol and mannose;

[0407]

2628 **20.**

2629 at least one polyol and idose;

[0408]

2633 **21.**

2634 at least one polyol and talose;

[0409]

2638 **22.**

2639 at least one polyol and lactose;

[0410]

2643 23.

2644 at least one polyol and maltose;

[0411]

2648 24.

2649 at least one polyol and invert sugar;

[0412]

2653 25.

2654 at least one polyol and trehalose;

[0413]

2658 26.

2659 at least one polyol and isotrehalose;

[0414]

2663 27.

2664 at least one polyol and neotrehalose;

[0415]

2668 28.

2669 at least one polyol and palatinose;

[0416]

2673 29.

2674 at least one polyol and galactose;

[0417]

2678 30.

2679 at least one polyol and beet oligosaccharide;

[0418]

2683 31.

2684 at least one polyol and isomalto-oligosaccharide;

[0419]

2688 32.

2689 at least one polyol and isomaltose;

[0420]

2693 33.

2694 at least one polyol and isomaltotriose;

[0421]

2698 34.

2699 at least one polyol and panose;

[0422]

2703 35.

2704 at least one polyol and xylo-oligosaccharide;

[0423]

2708 36.

2709 at least one polyol and xylotriose;

[0424]

2713 37.

2714 at least one polyol and xylobiose;

[0425]

2718 38.

2719 at least one polyol and gentio-oligosaccharide;

[0426]

2723 39.

2724 at least one polyol and gentiobiose;

[0427]

2728 40.

2729 at least one polyol and gentiotriose;

[0428]

2733 41.

2734 at least one polyol and gentiotetraose;

[0429]

2738 42.

2739 at least one polyol and sorbose;

[0430]

2743 43.

2744 at least one polyol and nigero-oligosaccharides;

[0431]

2748 44.

2749 at least one polyol and palatinose oligosaccharide;

[0432]

2753 45.

2754 at least one polyol and fructose;

[0433]

2758 46.

2759 At least one polyol and fructooligosaccharide;

[0434]

2763 47.

2764 at least one polyol and kestose;

[0435]

2768 48.

2769 at least one polyol and nystose;

[0436]

2773 49.

2774 at least one polyol and maltotetraol;

[0437]

2778 50.

2779 at least one polyol and maltotriol;

[0438]

2783 51.

2784 at least one polyol and malto-oligosaccharide;

[0439]

2788 52.

2789 at least one polyol and maltotriose;

[0440]

2793 53.

2794 at least one polyol and maltotetraose;

[0441]

2798 54.

2799 at least one polyol and maltopentaose;

[0442]

2803 55.

2804 at least one polyol and maltohexaose;

[0443]

2808 56.

2809 at least one polyol and maltoheptaose;

[0444]

2813 57.

2814 at least one polyol and lactulose;

[0445]

2818 58.

2819 at least one polyol and melibiose;

[0446]

2823 59.

2824 at least one polyol and raffinose;

[0447]

2828 60.

2829 at least one polyol and rhamnose;

[0448]

2833 61.

2834 at least one polyol and ribose;

[0449]

2838 62.

2839 at least one polyol and isomerized liquid sugar;

[0450]

2843 63.

2844 At least one polyol and high fructose corn syrup (such as HFCS55, HFCS42, or HFCS90) or starch syrup;

[0451]

2848 64.

2849 at least one polyol and a linking sugar;

[0452]

2853 65.

2854 at least one polyol and soybean oligosaccharide;

[0453]

2858 66.

2859 at least one polyol and glucose syrup;

[0454]

2863 67.

2864 at least one polyol, tagatose, and at least one other carbohydrate;

[0455]

2868 68.

2869 at least one polyol, trehalose, and at least one other carbohydrate;

[0456]

2873 69.

2874 at least one polyol, galactose, and at least one other carbohydrate;

[0457]

2878 70.

2879 at least one polyol, rhamnose, and at least one other carbohydrate;

[0458]

2883 71.

2884 at least one polyol, dextrin, and at least one other carbohydrate;

[0459]

2888 72.

2889 at least one polyol, cyclodextrin, and at least one other carbohydrate;

[0460]

2893 73.

2894 at least one polyol, beta-cyclodextrin, and at least one other carbohydrate;

[0461]

2898 74.

2899 at least one polyol, maltodextrin, and at least one other carbohydrate;

[0462]

2903 75.

2904 at least one polyol, dextran, and at least one other carbohydrate;

[0463]

2908 76.

2909 at least one polyol, sucrose, and at least one other carbohydrate;

[0464]

2913 77.

2914 at least one polyol, glucose, and at least one other carbohydrate;

[0465]

2918 78.

2919 at least one polyol, fructose, and at least one other carbohydrate;

[0466]

2923 79.

2924 at least one polyol, isoerythrose, and at least one other carbohydrate;

[0467]

2928 80.

2929 at least one polyol, arabinose, and at least one other carbohydrate;

[0468]

2933 81.

2934 at least one polyol, xylose, and at least one other carbohydrate;

[0469]

2938 82.

2939 at least one polyol, lyxose, and at least one other carbohydrate;

[0470]

2943 83.

2944 at least one polyol, allose, and at least one other carbohydrate;

[0471]

2948 84.

2949 at least one polyol, altrose, and at least one other carbohydrate;

[0472]

2953 85.

2954 at least one polyol, mannose, and at least one other carbohydrate;

[0473]

2958 86.

2959 at least one polyol, idose, and at least one other carbohydrate;

[0474]

2963 87.

2964 at least one polyol, talose, and at least one other carbohydrate;

[0475]

2968 88.

2969 at least one polyol, lactose, and at least one other carbohydrate;

[0476]

2973 89.

2974 at least one polyol, maltose, and at least one other carbohydrate;

[0477]

2978 90.

2979 at least one polyol, invert sugar, and at least one other carbohydrate;

[0478]

2983 91.

2984 at least one polyol, trehalose, and at least one other carbohydrate;

[0479]

2988 92.

2989 at least one polyol, isotrehalose, and at least one other carbohydrate;

[0480]

2993 93.

2994 at least one polyol, neotrehalose, and at least one other carbohydrate;

[0481]

2998 94.

2999 at least one polyol, palatinose, and at least one other carbohydrate;

[0482]

3003 95.

3004 at least one polyol, galactose, and at least one other carbohydrate;

[0483]

3008 96.

3009 at least one polyol, beet oligosaccharides, and at least one other carbohydrate;

[0484]

3013 97.

3014 at least one polyol, isomalto-oligosaccharide, and at least one other carbohydrate;

[0485]

3018 98.

3019 at least one polyol, isomaltose, and at least one other carbohydrate;

[0486]

3023 99.

3024 at least one polyol, isomaltotriose, and at least one other carbohydrate;

[0487]

3028 100.

3029 at least one polyol, palmose, and at least one other carbohydrate;

[0488]

3033 101.

3034 at least one polyol, xylo-oligosaccharide, and at least one other carbohydrate;

[0489]

3038 102.

3039 at least one polyol, xylo-oligosaccharide, and at least one other carbohydrate;

[0490]

3043 103.

3044 at least one polyol, xylobiose, and at least one other carbohydrate;

[0491]

3048 104.

3049 at least one polyol, gentio-oligosaccharide, and at least one other carbohydrate;

[0492]

3053 105.

3054 at least one polyol, gentiobiose, and at least one other carbohydrate;

[0493]

3058 106.

3059 at least one polyol, gentiotriose, and at least one other carbohydrate;

[0494]

3063 107.

3064 at least one polyol, gentiotetraose, and at least one other carbohydrate;

[0495]

3068 108.

3069 at least one polyol, sorbose, and at least one other carbohydrate;

[0496]

3073 109.

3074 at least one polyol, nigero-oligosaccharides, and at least one other carbohydrate;

[0497]

3078 110.

3079 at least one polyol, palatinose oligosaccharide, and at least one other carbohydrate;

[0498]

3083 111.

3084 at least one polyol, fructose, and at least one other carbohydrate;

[0499]

3088 112.

3089 at least one polyol, fructooligosaccharide, and at least one other carbohydrate;

[0500]

3093 113.

3094 at least one polyol, kestose, and at least one other carbohydrate;

[0501]

3098 114.

3099 at least one polyol, nissose, and at least one other carbohydrate;

[0502]

3103 115.

3104 at least one polyol, maltotetraol, and at least one other carbohydrate;

[0503]

3108 **116.**

3109 at least one polyol, maltotriol, and at least one other carbohydrate;

[0504]

3113 **117.**

3114 at least one polyol, malto-oligosaccharide, and at least one other carbohydrate;

[0505]

3118 **118.**

3119 at least one polyol, maltotriose, and at least one other carbohydrate;

[0506]

3123 **119.**

3124 at least one polyol, maltotetraose, and at least one other carbohydrate;

[0507]

3128 **120.**

3129 at least one polyol, maltopentose, and at least one other carbohydrate;

[0508]

3133 **121.**

3134 at least one polyol, maltohexaose, and at least one other carbohydrate;

[0509]

3138 **122.**

3139 at least one polyol, maltoheptaose, and at least one other carbohydrate;

[0510]

3143 **123.**

3144 at least one polyol, lactulose, and at least one other carbohydrate;

[0511]

3148 124.

3149 at least one polyol, melibiose, and at least one other carbohydrate;

[0512]

3153 125.

3154 at least one polyol, raffinose, and at least one other carbohydrate;

[0513]

3158 126.

3159 at least one polyol, rhamnose, and at least one other carbohydrate;

[0514]

3163 127.

3164 at least one polyol, ribose, and at least one other carbohydrate;

[0515]

3168 128.

3169 at least one polyol, isomerized liquid sugar, and at least one other carbohydrate;

[0516]

3173 129.

3174 at least one polyol, high fructose corn syrup (such as HFCS55, HFCS42, or HFCS90) or starch syrup, and at least one other carbohydrate;

[0517]

3179 130.

3180 at least one polyol, a linking sugar, and at least one other carbohydrate;

[0518]

3184 131.

3185 at least one polyol, soybean oligosaccharides, and at least one other carbohydrate;

[0519]

3189 132.

3190 at least one polyol, glucose syrup, and at least one other carbohydrate;

[0520]

3194 133.

3195 At least one carbohydrate and erythritol;

[0521]

3199 134.

3200 at least one carbohydrate and maltitol;

[0522]

3204 135.

3205 at least one carbohydrate and mannitol;

[0523]

3209 136.

3210 at least one carbohydrate and sorbitol;

[0524]

3214 137.

3215 at least one carbohydrate and lactitol;

[0525]

3219 138.

3220 at least one carbohydrate and xylitol;

[0526]

3224 139.

3225 at least one carbohydrate and isomalt;

[0527]

3229 140.

3230 at least one carbohydrate and propylene glycol;

[0528]

3234 141.

3235 at least one carbohydrate and glycerin;

[0529]

3239 142.

3240 at least one carbohydrate and palatinose;

[0530]

3244 143.

3245 at least one carbohydrate and reduced isomalto-oligosaccharides;

[0531]

3249 144.

3250 at least one carbohydrate and reduced xylo-oligosaccharides;

[0532]

3254 145.

3255 At least one carbohydrate and reduced gentio-oligosaccharides;

[0533]

3259 146.

3260 at least one carbohydrate and reduced maltose syrup;

[0534]

3264 147.

3265 At least one carbohydrate and reduced glucose syrup;

[0535]

3269 148.

3270 at least one carbohydrate, erythritol, and at least one other polyol;

[0536]

3274 **149.**

3275 at least one carbohydrate, maltitol, and at least one other polyol;

[0537]

3279 **150.**

3280 at least one carbohydrate, mannitol, and at least one other polyol;

[0538]

3284 **151.**

3285 at least one carbohydrate, sorbitol, and at least one other polyol;

[0539]

3289 **152.**

3290 at least one carbohydrate, lactitol, and at least one other polyol;

[0540]

3294 **153.**

3295 at least one carbohydrate, xylitol, and at least one other polyol;

[0541]

3299 **154.**

3300 at least one carbohydrate, isomalt, and at least one other polyol;

[0542]

3304 **155.**

3305 at least one carbohydrate, propylene glycol, and at least one other polyol;

[0543]

3309 **156.**

3310 at least one carbohydrate, glycerol, and at least one other polyol;

[0544]

3314 157.

3315 at least one carbohydrate, palatinose, and at least one other polyol;

[0545]

3319 158.

3320 at least one carbohydrate, reduced isomalto-oligosaccharides, and at least one other polyol;

[0546]

3324 159.

3325 at least one carbohydrate, reduced xylo-oligosaccharides, and at least one other polyol;

[0547]

3329 160.

3330 at least one carbohydrate, reduced gentio-oligosaccharides, and at least one other polyol;

[0548]

3334 161.

3335 at least one carbohydrate, reduced maltose syrup, and at least one other polyol; and

[0549]

3339 162.

3340 at least one carbohydrate, reduced glucose syrup, and at least one other polyol.

[0550]

3344 According to the present invention, other sweet taste improving compositions also include:

[0551]

3348 1.

3349 at least one carbohydrate and at least one amino acid;

[0552]

3353 2.

3354 at least one carbohydrate and at least one polyamino acid;

[0553]

3358 3.

3359 at least one carbohydrate and at least one sugar acid;

[0554]

3363 4.

3364 at least one carbohydrate and at least one nucleotide;

[0555]

3368 5.

3369 at least one carbohydrate and at least one organic acid;

[0556]

3373 6.

3374 at least one carbohydrate and at least one inorganic acid;

[0557]

3378 7.

3379 at least one carbohydrate and at least one bitter compound;

[0558]

3383 8.

3384 at least one carbohydrate and at least one flavor or flavor ingredient;

[0559]

3388 9.

3389 at least one carbohydrate and at least one polymer;

[0560]

3393 10.

3394 at least one carbohydrate and at least one protein or protein hydrolyzate;

[0561]

3398 11.

3399 at least one carbohydrate and at least one surfactant;

[0562]

3403 12.

3404 at least one carbohydrate and at least one flavonoid;

[0563]

3408 13.

3409 at least one carbohydrate and at least one alcohol;

[0564]

3413 14.

3414 A mixture of at least one carbohydrate and at least one protein or protein hydrolyzate or low molecular weight amino acids;

[0565]

3419 15.

3420 at least one carbohydrate and at least one emulsifier;

[0566]

3424 16.

3425 at least one carbohydrate and at least one inorganic salt;

[0567]

3429 17.

3430 at least one carbohydrate, at least one amino acid, and at least one other sweet taste improving additive;

[0568]

3434 18.

3435 at least one carbohydrate, at least one polyamino acid, and at least one other sweet taste improving additive;

[0569]

3439 19.

3440 at least one carbohydrate, at least one sugar acid, and at least one other sweet taste improving additive;

[0570]

3444 20.

3445 at least one carbohydrate, at least one nucleotide, and at least one other sweet taste improving additive;

[0571]

3449 21.

3450 at least one carbohydrate, at least one organic acid, and at least one other sweet taste improving additive;

[0572]

3454 22.

3455 at least one carbohydrate, at least one mineral acid, and at least one other sweet taste improving additive;

[0573]

3459 23.

3460 at least one carbohydrate, at least one bitter compound, and at least one other sweet taste improving additive;

[0574]

3464 24.

3465 at least one carbohydrate, at least one flavor or flavor ingredient, and at least one other sweet taste improving additive;

[0575]

3470 25.

3471 at least one carbohydrate, at least one polymer, and at least one other sweet taste improving additive;

[0576]

3475 26.

3476 at least one carbohydrate, at least one protein or protein hydrolyzate, and at least one other sweet taste improving additive;

[0577]

3481 27.

3482 at least one carbohydrate, at least one surfactant, and at least one other sweet taste improving additive;

[0578]

3486 28.

3487 at least one carbohydrate, at least one flavonoid, and at least one other sweet taste improving additive;

[0579]

3491 29.

3492 at least one carbohydrate, at least one alcohol, and at least one other sweet taste improving additive;

[0580]

3496 30.

3497 at least one carbohydrate, at least one amino acid, and at least one polyamino acid;

[0581]

3501 31.

3502 at least one carbohydrate, at least one amino acid, at least one polyamino acid, and at least one sugar acid;

[0582]

3506 32.

3507 at least one carbohydrate, at least one amino acid, at least one polyamino acid, at least one sugar acid, and at least one nucleotide;

[0583]

3512 33.

3513 at least one carbohydrate, at least one amino acid, at least one polyamino acid, at least one sugar acid, at least one nucleotide, and at least one organic acid;

[0584]

3518 34.

3519 at least one carbohydrate, at least one amino acid, at least one polyamino acid, at least one sugar acid, at least one nucleotide, at least one organic acid, and at least one inorganic acid;

[0585]

3524 35.

3525 at least one carbohydrate, at least one amino acid, at least one polyamino acid, at least one sugar acid, at least one nucleotide, at least one organic acid, at least one inorganic acid, and at least one bitter compound;

[0586]

3530 36.

3531 at least one carbohydrate, at least one amino acid, at least one polyamino acid, at least one sugar acid, at least one nucleotide, at least one organic acid, at least one inorganic acid, at least one bitter compound, and at least one a polymer;

[0587]

3537 37.

3538 at least one carbohydrate, at least one amino acid, at least one polyamino acid, at least one sugar acid, at least one nucleotide, at least one organic acid, at least one inorganic acid, at least one bitter compound, at least one a polymer, and at least one protein or protein hydrolyzate;

[0588]

3544 38.

3545 at least one carbohydrate, at least one amino acid, at least one polyamino acid, at least one sugar acid, at least one nucleotide, at least one organic acid, at least one inorganic acid, at least one bitter compound, at least one A polymer, at least one protein or protein hydrolyzate, and at least one surfactant;

[0589]

3551 39.

3552 at least one carbohydrate, at least one amino acid, at least one polyamino acid, at least one sugar acid, at least one nucleotide, at least one organic acid, at least one inorganic acid, at least one bitter compound, at least one A polymer, at least one protein or protein hydrolyzate, at least one surfactant, and at least one flavonoid;

[0590]

3558 40.

3559 at least one carbohydrate, at least one amino acid, at least one polyamino acid, at least one sugar acid, at least one nucleotide, at least one organic acid, at least one inorganic acid, at least one bitter compound, at least one A polymer, at least one protein or protein hydrolyzate, at least one surfactant, at least one flavonoid, and at least one alcohol;

[0591]

3566 41.

3567 at least one carbohydrate, at least one amino acid, and at least one sugar acid;

[0592]

3571 42.

3572 at least one carbohydrate, at least one amino acid, and at least one nucleotide;

[0593]

3576 43.

3577 at least one carbohydrate, at least one amino acid, and at least one organic acid;

[0594]

3581 44.

3582 at least one carbohydrate, at least one amino acid, and at least one mineral acid;

[0595]

3586 45.

3587 at least one carbohydrate, at least one amino acid, and at least one bitter compound;

[0596]

3591 46.

3592 at least one carbohydrate, at least one amino acid, and at least one polymer;

[0597]

3596 47.

3597 at least one carbohydrate, at least one amino acid, and at least one protein or protein hydrolyzate;

[0598]

3601 48.

3602 at least one carbohydrate, at least one amino acid, and at least one surfactant;

[0599]

3606 49.

3607 at least one carbohydrate, at least one amino acid, and at least one flavonoid;

[0600]

3611 50.

3612 at least one carbohydrate, at least one amino acid, and at least one alcohol;

[0601]

3616 51.

3617 at least one carbohydrate, at least one polyamino acid, and at least one sugar acid;

[0602]

3621 52.

3622 at least one carbohydrate, at least one polyamino acid, and at least one nucleotide;

[0603]

3626 53.

3627 at least one carbohydrate, at least one polyamino acid, and at least one organic acid;

[0604]

3631 54.

3632 at least one carbohydrate, at least one polyamino acid, and at least one inorganic acid;

[0605]

3636 55.

3637 at least one carbohydrate, at least one polyamino acid, and at least one bitter compound;

[0606]

3641 56.

3642 at least one carbohydrate, at least one polyamino acid, and at least one polymer;

[0607]

3646 57.

3647 at least one carbohydrate, at least one polyamino acid, and at least one protein or protein hydrolyzate;

[0608]

3651 58.

3652 at least one carbohydrate, at least one polyamino acid and at least one surfactant;

[0609]

3656 59.

3657 at least one carbohydrate, at least one polyamino acid, and at least one flavonoid;

[0610]

3661 60.

3662 at least one carbohydrate, at least one polyamino acid, and at least one alcohol;

[0611]

3666 61.

3667 at least one carbohydrate, at least one sugar acid, and at least one nucleotide;

[0612]

3671 62.

3672 at least one carbohydrate, at least one sugar acid, and at least one organic acid;

[0613]

3676 63.

3677 at least one carbohydrate, at least one sugar acid, and at least one inorganic acid;

[0614]

3681 64.

3682 at least one carbohydrate, at least one sugar acid, and at least one bitter compound;

[0615]

3686 65.

3687 at least one carbohydrate, at least one sugar acid, and at least one polymer;

[0616]

3691 66.

3692 at least one carbohydrate, at least one sugar acid, and at least one protein or protein hydrolyzate;

[0617]

3696 67.

3697 at least one carbohydrate, at least one sugar acid, and at least one surfactant;

[0618]

3701 68.

3702 at least one carbohydrate, at least one sugar acid, and at least one flavonoid;

[0619]

3706 69.

3707 at least one carbohydrate, at least one sugar acid and at least one alcohol;

[0620]

3711 70.

3712 at least one carbohydrate, at least one nucleotide, and at least one organic acid;

[0621]

3716 71.

3717 at least one carbohydrate, at least one nucleotide, and at least one inorganic acid;

[0622]

3721 72.

3722 at least one carbohydrate, at least one nucleotide, and at least one bitter compound;

[0623]

3726 73.

3727 at least one carbohydrate, at least one nucleotide, and at least one polymer;

[0624]

3731 74.

3732 at least one carbohydrate, at least one nucleotide and at least one protein or protein hydrolyzate;

[0625]

3736 75.

3737 at least one carbohydrate, at least one nucleotide, and at least one surfactant;

[0626]

3741 76.

3742 at least one carbohydrate, at least one nucleotide, and at least one flavonoid;

[0627]

3746 77.

3747 at least one carbohydrate, at least one nucleotide, and at least one alcohol;

[0628]

3751 78.

3752 at least one carbohydrate, at least one organic acid, and at least one inorganic acid;

[0629]

3756 79.

3757 at least one carbohydrate, at least one organic acid, and at least one bitter compound;

[0630]

3761 80.

3762 at least one carbohydrate, at least one organic acid, and at least one polymer;

[0631]

3766 81.

3767 at least one carbohydrate, at least one organic acid, and at least one protein or protein hydrolyzate;

[0632]

3771 82.

3772 at least one carbohydrate, at least one organic acid, and at least one surfactant;

[0633]

3776 83.

3777 at least one carbohydrate, at least one organic acid, and at least one flavonoid;

[0634]

3781 84.

3782 at least one carbohydrate, at least one organic acid, and at least one alcohol;

[0635]

3786 85.

3787 at least one carbohydrate, at least one mineral acid, and at least one bitter compound;

[0636]

3791 86.

3792 at least one carbohydrate, at least one inorganic acid, and at least one polymer;

[0637]

3796 87.

3797 at least one carbohydrate, at least one mineral acid, and at least one protein or protein hydrolyzate;

[0638]

3801 88.

3802 at least one carbohydrate, at least one inorganic acid, and at least one surfactant;

[0639]

3806 89.

3807 at least one carbohydrate, at least one inorganic acid, and at least one flavonoid;

[0640]

3811 90.

3812 at least one carbohydrate, at least one inorganic acid and at least one alcohol;

[0641]

3816 91.

3817 at least one carbohydrate, at least one bitter compound, and at least one polymer;

[0642]

3821 92.

3822 at least one carbohydrate, at least one bitter compound, and at least one protein or protein hydrolyzate;

[0643]

3826 93.

3827 at least one carbohydrate, at least one bitter compound, and at least one surfactant;

[0644]

3831 94.

3832 at least one carbohydrate, at least one bitter compound, and at least one flavonoid;

[0645]

3836 95.

3837 at least one carbohydrate, at least one bitter compound, and at least one alcohol;

[0646]

3841 96.

3842 at least one carbohydrate, at least one polymer, and at least one protein or protein hydrolyzate;

[0647]

3846 97.

3847 at least one carbohydrate, at least one polymer, and at least one surfactant;

[0648]

3851 98.

3852 at least one carbohydrate, at least one polymer, and at least one flavonoid;

[0649]

3856 99.

3857 at least one carbohydrate, at least one polymer, and at least one alcohol;

[0650]

3861 100.

3862 at least one carbohydrate, at least one protein or protein hydrolyzate, and at least one surfactant;

[0651]

3866 101.

3867 at least one carbohydrate, at least one protein or protein hydrolyzate, and at least one flavonoid;

[0652]

3871 102.

3872 at least one carbohydrate, at least one surfactant, and at least one flavonoid;

[0653]

3876 103.

3877 at least one carbohydrate, at least one surfactant, and at least one alcohol;

[0654]

3881 104.

3882 at least one carbohydrate, at least one flavonoid, and at least one alcohol;

[0655]

3886 105.

3887 at least one sweet taste improving additive and D-tagatose;

[0656]

3891 106.

3892 at least one sweet taste improving additive and trehalose;

[0657]

3896 107.

3897 at least one sweet taste improving additive and D-galactose;

[0658]

3901 108.

3902 at least one sweet taste improving additive and rhamnose;

[0659]

3906 109.

3907 at least one sweet taste improving additive and dextrin;

[0660]

3911 110.

3912 at least one sweet taste improving additive and cyclodextrin;

[0661]

3916 111.

3917 at least one sweet taste improving additive and beta-cyclodextrin;

[0662]

3921 112.

3922 at least one sweet taste improving additive and maltodextrin;

[0663]

3926 113.

3927 at least one sweet taste improving additive and dextran;

[0664]

3931 114.

3932 at least one sweet taste improving additive and sucrose;

[0665]

3936 115.

3937 at least one sweet taste improving additive and glucose;

[0666]

3941 116.

3942 at least one sweet taste improving additive and fructose;

[0667]

3946 117.

3947 at least one sweet taste improving additive and isoerythrose;

[0668]

3951 118.

3952 at least one sweet taste improving additive and arabinose;

[0669]

3956 119.

3957 at least one sweet taste improving additive and xylose;

[0670]

3961 120.

3962 at least one sweet taste improving additive and lyxose;

[0671]

3966 121.

3967 at least one sweet taste improving additive and allose;

[0672]

3971 122.

3972 at least one sweet taste improving additive and altrose;

[0673]

3976 123.

3977 at least one sweet taste improving additive and mannose;

[0674]

3981 124.

3982 at least one sweet taste improving additive and idose;

[0675]

3986 125.

3987 at least one sweet taste improving additive and talose;

[0676]

3991 126.

3992 at least one sweet taste improving additive and lactose;

[0677]

3996 127.

3997 at least one sweet taste improving additive and maltose;

[0678]

4001 128.

4002 at least one sweet taste improving additive and invert sugar;

[0679]

4006 129.

4007 at least one sweet taste improving additive and trehalose;

[0680]

4011 130.

4012 at least one sweet taste improving additive and isotrehalose;

[0681]

4016 131.

4017 At least one sweet taste improving additive and neotrehalose;

[0682]

4021 132.

4022 at least one sweet taste improving additive and palatinose;

[0683]

4026 133.

4027 at least one sweet taste improving additive and galactose;

[0684]

4031 134.

4032 at least one sweet taste improving additive and beet oligosaccharides;

[0685]

4036 135.

4037 at least one sweet taste improving additive and isomalto-oligosaccharides;

[0686]

4041 136.

4042 at least one sweet taste improving additive and isomaltose;

[0687]

4046 137.

4047 at least one sweet taste improving additive and isomaltotriose;

[0688]

4051 138.

4052 at least one sweet taste improving additive and pannose;

[0689]

4056 139.

4057 at least one sweet taste improving additive and xylo-oligosaccharides;

[0690]

4061 140.

4062 at least one sweet taste improving additive and xylotriose;

[0691]

4066 141.

4067 at least one sweet taste improving additive and xylobiose;

[0692]

4071 **142.**

4072 at least one sweet taste improving additive and gentio-oligosaccharides;

[0693]

4076 **143.**

4077 at least one sweet taste improving additive and gentiobiose;

[0694]

4081 **144.**

4082 at least one sweet taste improving additive and gentiotriose;

[0695]

4086 **145.**

4087 at least one sweet taste improving additive and gentiotetraose;

[0696]

4091 **146.**

4092 at least one sweet taste improving additive and sorbose;

[0697]

4096 **147.**

4097 at least one sweet taste improving additive and nigero-oligosaccharides;

[0698]

4101 **148.**

4102 at least one sweet taste improving additive and palatinose oligosaccharides;

[0699]

4106 **149.**

4107 at least one sweet taste improving additive and fructose;

[0700]

4111 **150.**

4112 at least one sweet taste improving additive and fructooligosaccharides;

[0701]

4116 151.

4117 at least one sweet taste improving additive and kestose;

[0702]

4121 152.

4122 at least one sweet taste improving additive and nissose;

[0703]

4126 153.

4127 at least one sweet taste improving additive and maltotetraol;

[0704]

4131 154.

4132 at least one sweet taste improving additive and maltotriol;

[0705]

4136 155.

4137 at least one sweet taste improving additive and malto-oligosaccharides;

[0706]

4141 156.

4142 at least one sweet taste improving additive and maltotriose;

[0707]

4146 157.

4147 at least one sweet taste improving additive and maltotetraose;

[0708]

4151 158.

4152 at least one sweet taste improving additive and maltopentaose;

[0709]

4156 **159.**

4157 at least one sweet taste improving additive and maltohexaose;

[0710]

4161 **160.**

4162 At least one sweet taste improving additive and maltoheptaose;

[0711]

4166 **161.**

4167 at least one sweet taste improving additive and lactulose;

[0712]

4171 **162.**

4172 at least one sweet taste improving additive and melibiose;

[0713]

4176 **163.**

4177 at least one sweet taste improving additive and raffinose;

[0714]

4181 **164.**

4182 at least one sweet taste improving additive and rhamnose;

[0715]

4186 **165.**

4187 at least one sweet taste improving additive and ribose;

[0716]

4191 **166.**

4192 at least one sweet taste improving additive and isomerized liquid sugar;

[0717]

4196 **167.**

4197 At least one sweet taste improving additive and high fructose corn syrup (such as HFCS55, HFCS42, or HFCS90) or starch syrup;

[0718]

4202 **168.**

4203 at least one sweet taste improving additive and linking sugar;

[0719]

4207 **169.**

4208 at least one sweet taste improving additive and soybean oligosaccharides;

[0720]

4212 **170.**

4213 at least one sweet taste improving additive and glucose syrup;

[0721]

4217 **171.**

4218 at least one sweet taste improving additive, D-tagatose, and at least one other carbohydrate;

[0722]

4222 **172.**

4223 at least one sweet taste improving additive, trehalose, and at least one other carbohydrate;

[0723]

4227 **173.**

4228 at least one sweet taste improving additive, D-galactose, and at least one other carbohydrate;

[0724]

4232 **174.**

4233 at least one sweet taste improving additive, rhamnose, and at least one other carbohydrate;

[0725]

4237 **175.**

4238 at least one sweet taste improving additive, dextrin, and at least one other carbohydrate;

[0726]

4242 176.

4243 at least one sweet taste improving additive, cyclodextrin, and at least one other carbohydrate;

[0727]

4247 177.

4248 at least one sweet taste improving additive, beta-cyclodextrin, and at least one other carbohydrate;

[0728]

4252 178.

4253 at least one sweet taste improving additive, maltodextrin, and at least one other carbohydrate;

[0729]

4257 179.

4258 at least one sweet taste improving additive, dextran, and at least one other carbohydrate;

[0730]

4262 180.

4263 at least one sweet taste improving additive, sucrose, and at least one other carbohydrate;

[0731]

4267 181.

4268 at least one sweet taste improving additive, glucose, and at least one other carbohydrate;

[0732]

4272 182.

4273 at least one sweet taste improving additive, fructose, and at least one other carbohydrate;

[0733]

4277 183.

4278 at least one sweet taste improving additive, isoerythrose, and at least one other carbohydrate;

[0734]

4282 **184.**

4283 at least one sweet taste improving additive, arabinose, and at least one other carbohydrate;

[0735]

4287 **185.**

4288 at least one sweet taste improving additive, xylose, and at least one other carbohydrate;

[0736]

4292 **186.**

4293 at least one sweet taste improving additive, lyxose, and at least one other carbohydrate;

[0737]

4297 **187.**

4298 at least one sweet taste improving additive, allose, and at least one other carbohydrate;

[0738]

4302 **188.**

4303 at least one sweet taste improving additive, altrose, and at least one other carbohydrate;

[0739]

4307 **189.**

4308 at least one sweet taste improving additive, mannose, and at least one other carbohydrate;

[0740]

4312 **190.**

4313 at least one sweet taste improving additive, idose, and at least one other carbohydrate;

[0741]

4317 **191.**

4318 at least one sweet taste improving additive, talose, and at least one other carbohydrate;

[0742]

4322 **192.**

4323 at least one sweet taste improving additive, lactose, and at least one other carbohydrate;

[0743]

4327 **193.**

4328 at least one sweet taste improving additive, maltose, and at least one other carbohydrate;

[0744]

4332 **194.**

4333 at least one sweet taste improving additive, invert sugar, and at least one other carbohydrate;

[0745]

4337 **195.**

4338 at least one sweet taste improving additive, trehalose, and at least one other carbohydrate;

[0746]

4342 **196.**

4343 at least one sweet taste improving additive, isotrehalose, and at least one other carbohydrate;

[0747]

4347 **197.**

4348 at least one sweet taste improving additive, neotrehalose, and at least one other carbohydrate;

[0748]

4352 **198.**

4353 at least one sweet taste improving additive, palatinose, and at least one other carbohydrate;

[0749]

4357 **199.**

4358 at least one sweet taste improving additive, galactose, and at least one other carbohydrate;

[0750]

4362 **200.**

4363 at least one sweet taste improving additive, beet oligosaccharides, and at least one other carbohydrate;

[0751]

4367 201.

4368 at least one sweet taste improving additive, isomalto-oligosaccharides, and at least one other carbohydrate;

[0752]

4372 202.

4373 at least one sweet taste improving additive, isomaltose, and at least one other carbohydrate;

[0753]

4377 203.

4378 at least one sweet taste improving additive, isomaltotriose, and at least one other carbohydrate;

[0754]

4382 204.

4383 at least one sweet taste improving additive, pannose, and at least one other carbohydrate;

[0755]

4387 205.

4388 at least one sweet taste improving additive, xylo-oligosaccharides, and at least one other carbohydrate;

[0756]

4392 206.

4393 at least one sweet taste improving additive, xylotriose, and at least one other carbohydrate;

[0757]

4397 207.

4398 at least one sweet taste improving additive, xylobiose, and at least one other carbohydrate;

[0758]

4402 208.

4403 at least one sweet taste improving additive, gentio-oligosaccharides, and at least one other carbohydrate;

[0759]

4407 209.

4408 at least one sweet taste improving additive, gentiobiose, and at least one other carbohydrate;

[0760]

4412 210.

4413 at least one sweet taste improving additive, gentiotriose, and at least one other carbohydrate;

[0761]

4417 211.

4418 at least one sweet taste improving additive, gentiotetraose, and at least one other carbohydrate;

[0762]

4422 212.

4423 at least one sweet taste improving additive, sorbose, and at least one other carbohydrate;

[0763]

4427 213.

4428 at least one sweet taste improving additive, nigero-oligosaccharides, and at least one other carbohydrate;

[0764]

4432 214.

4433 at least one sweet taste improving additive, palatinose oligosaccharides, and at least one other carbohydrate;

[0765]

4437 215.

4438 at least one sweet taste improving additive, fructose, and at least one other carbohydrate;

[0766]

4442 216.

4443 at least one sweet taste improving additive, fructooligosaccharides, and at least one other carbohydrate;

[0767]

4447 217.

4448 at least one sweet taste improving additive, kestose, and at least one other carbohydrate;

[0768]

4452 218.

4453 at least one sweet taste improving additive, nissose, and at least one other carbohydrate;

[0769]

4457 219.

4458 at least one sweet taste improving additive, maltotetraol, and at least one other carbohydrate;

[0770]

4462 220.

4463 at least one sweet taste improving additive, maltotriol, and at least one other carbohydrate;

[0771]

4467 221.

4468 at least one sweet taste improving additive, malto-oligosaccharides, and at least one other carbohydrate;

[0772]

4472 222.

4473 at least one sweet taste improving additive, maltotriose, and at least one other carbohydrate;

[0773]

4477 223.

4478 at least one sweet taste improving additive, maltotetraose, and at least one other carbohydrate;

[0774]

4482 224.

4483 at least one sweet taste improving additive, maltopentose, and at least one other carbohydrate;

[0775]

4487 225.

4488 at least one sweet taste improving additive, maltohexaose, and at least one other carbohydrate;

[0776]

4492 226.

4493 at least one sweet taste improving additive, maltoheptaose, and at least one other carbohydrate;

[0777]

4497 227.

4498 at least one sweet taste improving additive, lactulose, and at least one other carbohydrate;

[0778]

4502 228.

4503 at least one sweet taste improving additive, melibiose, and at least one other carbohydrate;

[0779]

4507 229.

4508 at least one sweet taste improving additive, raffinose, and at least one other carbohydrate;

[0780]

4512 230.

4513 at least one sweet taste improving additive, rhamnose, and at least one other carbohydrate;

[0781]

4517 231.

4518 at least one sweet taste improving additive, ribose, and at least one other carbohydrate;

[0782]

4522 232.

4523 at least one sweet taste improving additive, isomerized liquid sugar, and at least one other carbohydrate;

[0783]

4527 233.

4528 at least one sweet taste improving additive, high fructose corn syrup (such as HFCS55, HFCS42, or HFCS90) or starch syrup, and at least one other carbohydrate;

[0784]

4533 234.

4534 at least one sweet taste improving additive, a linking sugar, and at least one other carbohydrate;

[0785]

4538 235.

4539 at least one sweet taste improving additive, soy oligosaccharides, and at least one other carbohydrate; and

[0786]

4543 236.

4544 at least one sweet taste improving additive, glucose syrup, and at least one other carbohydrate.

[0787]

4548 In another specific example, the functional sweetener composition contains at least one natural and/or synthetic high-potency sweetener and at least one functional ingredient and a variety of sweet taste improving additives, preferably 3 or more A plurality of sweet taste improving additives, and more preferably 4 or more sweet taste improving additives, wherein each sweet taste improving additive is present in an amount such that none of the sweet taste improving additives substantially impairs the functional sweet taste Taste of flavor composition.

4554 In other words, the amount of the sweet taste improving additive in the functional sweetener composition is well balanced so that any sweet taste improving additive will not substantially impair the taste of the functional sweetener composition.

[0788]

4560 According to a particular embodiment of the present invention, the functional sweetener composition provided herein comprises at least one sweet taste improving composition in an amount effective to impart to the functional sweetener composition An aqueous solution of the composition having an osmotic pressure of at least 10 mOsmoles/L, wherein the at least one natural and/or synthetic high-potency sweetener is present in the aqueous solution in an amount sufficient to provide a maximum sweetness equivalent to that provided by a 10% by weight aqueous solution of sucrose serving size.

4566 As used herein, "mOsmoles/L" means milliosmoles per liter.

4567 According to another embodiment, the functional sweetener composition comprises at least one sweet taste improving composition in an amount effective to impart to an aqueous solution of the functional sweetener composition 10 to 500 mOsmoles/L, preferably 25 to 500 mOsmoles/L, more preferably 100 to 500 mOsmoles/L, more preferably 200 to 500 mOsmoles/L, and Optimally an osmolality of 300 to 500 mOsmoles/L, wherein the at least one natural and/or synthetic high-potency sweetener is present in the aqueous solution in an amount sufficient to provide a maximum sweetness equivalent to that provided by a 10% by weight aqueous solution of sucrose The portion.

4574 When multiple sweet taste improving compositions are combined with at least one natural and/or synthetic high-potency sweetener and at least one functional ingredient, the osmotic pressure provided is the osmotic pressure after all the various sweet taste improving compositions are combined pressure.

[0789]

4580 Osmotic pressure refers to the measured value of solvent osmolarity per liter of solution, where osmolarity is equivalent to the number of moles of osmotically active particles in an ideal solution (for example, one mole of glucose is one osmolarity), and one mole of sodium chloride is two osmolarity degrees (one mole of sodium and one mole of chloride ions).

4584 Therefore, in order to improve the taste quality of the functional sweetener composition, the osmotically active compounds or compounds capable of providing osmotic pressure must not lead to a significant deterioration of the taste of the blend.

[0790]

4590 In one embodiment, suitable sweet taste improving carbohydrate additives of the present invention have a molecular weight of less than or equal to 500, and preferably have a molecular weight in the range of 50 to 500.

4593 In certain embodiments, suitable carbohydrates with a molecular weight of less than or equal to 500 include, but are not limited to, sucrose, fructose, glucose, maltose, lactose, mannose, galactose, and tagatose.

4595 Generally, according to the preferred embodiment of the present invention, the amount of sweet taste improving carbohydrate additive in the functional sweetener composition is about 1,000 to about 100,000 ppm (in this entire specification, the term ppm means Parts per million by weight or volume.

4598 For example, 500ppm means 500mg per liter). According to another preferred embodiment of the present invention, the sweet taste improving carbohydrate additive is present in an amount of about 2,500 to about 10,000 ppm in the sweetened composition. In another embodiment, suitable sweet taste improving carbohydrate additives capable of imparting an osmotic pressure of about 10 mOsmoles/L to about 500 mOsmoles/L to the sweetenable composition include, but are not limited to, sweet taste improving carbohydrates with a molecular weight ranging from about 50 to about 500 With carbohydrate additives.

[0791]

4607 In one embodiment, suitable sweet taste improving polyol additives have a molecular weight of less than or equal to 500, and preferably have a molecular weight in the range of 76 to 500.

4609 In certain embodiments, suitable sweet taste improving polyol additives having a molecular weight of less than or equal to 500 include, but are not limited to, erythritol, glycerin, and propylene glycol. Generally, according to preferred embodiments of the present invention, the amount of sweet taste improving polyol additive in the functional sweetener composition is from about 100 ppm to about 80,000 ppm. According to another preferred embodiment of the present invention, the sweet taste improving polyol additive is present in an amount of about 400 to about 80,000 ppm in the sweetened composition. In a sub-embodiment, suitable sweet taste improving polyol additives that can impart an osmolarity of about 10 mOsmoles/L to

about 500 mOsmoles/L to the sweetenable composition include, but are not limited to, sweet taste in the molecular weight range of about 76 to 500 Modification polyol additive.

[0792]

4621 According to another preferred embodiment of the present invention, the amount of sweet taste improving polyol additive in the sweetener composition is about 400ppm to about 80,000ppm, more preferably about 5,000 to about 40,000ppm of the whole sweetener composition ppm, more preferably from about 10,000 to about 35,000 ppm.

4625 Preferably, the ratio of the at least one natural and/or synthetic high-potency sweetener and the at least one sweet taste improving polyol additive to the sweetener composition is about 1:4 to about 1:800; preferably The ratio is about 1:20 to about 1:600; more preferably about 1:50 to about 1:300; and more preferably about 1:75 to about 1:150.

[0793]

4632 Generally, according to another embodiment of the present invention, the amount of suitable sweet taste improving alcohol additive in the functional sweetener composition is about 625 ppm to about 10,000 ppm.

4634 In another embodiment, suitable sweet taste improving alcohol additives that can impart an osmotic pressure of about 10 mOsmoles/L to about 500 mOsmoles/L to the sweetenable composition include, but are not limited to, those with a molecular weight ranging from about 46 to about 500 Alcohol additives for improvement. Non-limiting examples of such sweet taste improving alcohol additives having a molecular weight ranging from about 46 to about 500 include ethanol.

[0794]

4642 In one embodiment, a suitable sweet taste improving amino acid additive has a molecular weight lower than or equal to 250, and preferably has a molecular weight in the range of 75 to 250.

4644 In specific examples, suitable sweet taste improving amino acid additives with a molecular weight lower than or equal to 250 include, but are not limited to, glycine, alanine, serine, valine, leucine, isoleucine, proline, Theanine and hydroxybutyridine. Preferred sweet taste improving amino acid additives include amino acids that taste sweet at high concentrations, although in embodiments of the invention such amino acids are preferably present in amounts below or above their sweet taste detection threshold . More preferably, it is a mixture of sweet taste improving amino acid additives in amounts below or above their sweet taste detection threshold. Generally speaking, according to a preferred embodiment of the present invention, the amount of the amino acid additive for improving sweet taste in the functional sweetener composition is about 100 ppm to about 25,000 ppm, more preferably about 1,000 to about 10,000 ppm, and further Preferably it is in the range of about 2,500 to about 5,000 ppm. According to another preferred embodiment of the present invention, the amount of the sweet taste improving amino acid additive in the sweetened composition is about 250 to about 7,500 ppm. In a sub-embodiment, suitable sweet taste improving amino acid additives that can impart an osmolality of about 10 mOsmoles/L to about 500 mOsmoles/L to the sweetenable composition include, but are not limited to, sweet taste in the molecular weight range of about 75 to about

[0795]

⁴⁶⁶² Generally speaking, according to yet another embodiment of the present invention, the amount of the amino acid salt additive for improving sweetness in the functional sweetener composition is about 25 ppm to about 10,000 ppm, more preferably about 1,000 to about 7,500 ppm, and more preferably in the range of about 2,500 to about 5,000 ppm.

⁴⁶⁶⁶ In another embodiment, suitable sweet taste improving amino acid salt additives that can impart an osmotic pressure of about 10 mOsmoles/L to about 500 mOsmoles/L to the sweetenable composition include but are not limited to sweeteners with molecular weights ranging from about 75 to about 300. Amino acid salt additives for taste improvement. Non-limiting examples of such sweet taste improving amino acid salt additives having a molecular weight ranging from about 75 to about 300 include salts of glycine, alanine, serine, theanine, and hydroxybutyridine.

[0796]

⁴⁶⁷⁵ Generally, according to yet another embodiment of the present invention, the amount of the sweet taste improving protein or protein hydrolyzate additive in the functional sweetener composition is about 200 ppm to about 50,000 ppm.

⁴⁶⁷⁸ In another embodiment, suitable sweet taste improving protein or protein hydrolyzate additives that can impart an osmotic pressure of about 10 mOsmoles/L to about 500 mOsmoles/L to the sweetenable composition include, but are not limited to, those with a molecular weight of about 75 to about 300 Sweet taste improving protein or protein hydrolyzate additive. Non-limiting examples of such sweet taste improving protein or protein hydrolyzate additives having a molecular weight ranging from about 75 to about 300 include proteins or protein hydrolyzates containing glycine, alanine, serine, and hydroxyalanine.

[0797]

⁴⁶⁸⁷ Generally, according to another embodiment of the present invention, the amount of suitable sweet taste improving mineral acid additive in the functional sweetener composition is about 25 ppm to about 5,000 ppm.

⁴⁶⁹⁰ In another embodiment, suitable sweet taste improving mineral acid additives that can impart an osmotic pressure of about 10 mOsmoles/L to about 500 mOsmoles/L to the sweetenable composition include but are not limited to phosphoric acid, hydrochloric acid, and sulfuric acid, and other commonly used An inorganic acid additive that is safe for human or animal consumption when used in acceptable amounts. In a sub-embodiment, suitable sweet taste improving inorganic acid additives that can impart an osmolality to the sweetenable composition of about 10 mOsmoles/L to about 500 mOsmoles/L include, but are not limited to, sweeteners with molecular weights ranging from about 36 to about 98. Inorganic acid additive for taste improvement.

[0798]

4701 Generally, according to yet another embodiment of the present invention, the amount of the sweet taste improving inorganic acid salt additive in the functional sweetener composition is about 25 ppm to about 5,000 ppm.

4704 In another specific example, suitable sweet taste improving inorganic acid salt additives that can impart an osmotic pressure of about 10 mOsmoles/L to about 500 mOsmoles/L to the sweetenable composition include but are not limited to salts of various inorganic acids, such as Sodium, potassium, calcium and magnesium salts of phosphoric acid and alkali metal or alkaline earth metal salts (such as sodium bisulphate) of other mineral acids which are safe for human or animal consumption when used in generally acceptable amounts. In a sub-embodiment, suitable sweet taste improving mineral acid salt additives that can impart an osmolality of about 10 mOsmoles/L to about 500 mOsmoles/L to the sweetenable composition include, but are not limited to, a molecular weight range of about 58 to about 120 Inorganic acid salt additives for sweet taste improvement.

[0799]

4716 Generally, according to yet another embodiment of the present invention, the amount of the sweet taste improving organic acid additive in the functional sweetener composition is about 10 ppm to about 5,000 ppm.

4719 In another embodiment, suitable sweet taste improving organic acid additives that can impart an osmotic pressure of about 10 mOsmoles/L to about 500 mOsmoles/L to the sweetenable composition include but are not limited to creatine, citric acid, malic acid, succinic acid acid, hydroxycitric acid, tartaric acid, fumaric acid, gluconic acid, glutaric acid, fatty acid, and any other organic acid additive which is safe for human or animal consumption when used in generally acceptable amounts. In one embodiment, the sweet taste improving organic acid additive has a molecular weight ranging from about 60 to about 208.

[0800]

4728 Generally, according to yet another embodiment of the present invention, the amount of the appropriate sweet taste improving organic acid salt additive in the functional sweetener composition is about 20 ppm to about 10,000 ppm.

4731 In another specific example, suitable sweet taste-improving organic acid salt additives that can impart an osmotic pressure of about 10 mOsmoles/L to about 500 mOsmoles/L to the sweetenable composition include but are not limited to sweet taste-improving organic acid additives Salts of citric acid, malic acid, tartaric acid, fumaric acid, gluconic acid, glutaric acid, fatty acid, hydroxycitric acid, succinic acid sodium salt, potassium salt, calcium salt, magnesium salt and other alkali metal and Salts of alkaline earth metals, and any other salts of sweet taste improving organic acid additives which are safe for human or animal consumption when used in generally acceptable amounts. In one embodiment, the sweet taste improving organic acid salt additive has a molecular weight ranging from about 140 to about 208.

[0801]

4742 Generally, according to yet another embodiment of the present invention, the amount of the appropriate sweet taste improving organic base salt additive in the functional sweetener composition is about 10 ppm to about 5,000 ppm.

4745 In another specific example, suitable sweetness-improving organic base salt additives that can impart an osmotic pressure of about 10 mOsmoles/L to about 500 mOsmoles/L to the sweetenable composition include but are not limited to organic bases, inorganic acids and organic acids Salts, such as glucosamine salts, choline salts and guanidine salts, etc.

[0802]

4752 Generally, according to yet another embodiment of the present invention, the amount of the suitable sweet taste improving astringent taste additive in the functional sweetener composition is about 25 ppm to about 1,000 ppm.

4755 In another specific example, suitable astringent taste additives for improving sweet taste that can impart an osmotic pressure of about 10 mOsmoles/L to about 500 mOsmoles/L to the sweetenable composition include but are not limited to tannic acid, tea polyphenols, catechu element, aluminum sulfate, $\text{AlNa}(\text{SO}_4)_2$, $\text{AlK}(\text{SO}_4)_2$ and other forms of alum.

[0803]

4762 Generally, according to yet another embodiment of the present invention, the amount of suitable sweet taste improving nucleotide additives in the functional sweetener composition is about 5 ppm to about 1,000 ppm.

4764 In another embodiment, suitable sweet taste improving nucleotide additives that can impart an osmotic pressure of about 10 mOsmoles/L to about 500 mOsmoles/L to the sweetenable composition include but are not limited to adenosine monophosphate.

[0804]

4770 Generally speaking, according to yet another embodiment of the present invention, the amount of the sweet taste improving polyamino acid additive in the functional sweetener composition is about 30 ppm to about 2,000 ppm.

4773 In another embodiment, suitable sweet taste improving polyamino acid additives that can impart an osmotic pressure of about 10 mOsmoles/L to about 500 mOsmoles/L to the sweetenable composition include but are not limited to poly-L-lysine (such as poly-L- α -lysine or poly-L- ϵ -lysine), poly-L-ornithine (such as poly-L- α -ornithine or poly-L- ϵ -ornithine), and poly-L-arginine.

[0805]

4780 Generally, according to yet another embodiment of the present invention, the amount of suitable sweet taste improving polymer additives in the functional sweetener composition is about 30 ppm to about 2,000 ppm.

4782 In another embodiment, suitable sweet taste improving polymer additives that can impart an osmotic pressure of about 10 mOsmoles/L to about 500 mOsmoles/L to the sweetenable composition include but are

not limited to chitosan, sodium hexametaphosphate and Their salts, pectin, hydrocolloids such as Senegal gum arabic, propylene glycol, polyethylene glycol and poly(ethylene glycol methyl ether).

[0806]

4789 Generally, according to yet another embodiment of the present invention, the amount of suitable sweet taste improving surfactant additive in the functional sweetener composition is from about 1 ppm to about 5,000 ppm.

4792 In another embodiment, suitable sweet taste improving surfactant additives that can impart an osmotic pressure of about 10 mOsmoles/L to about 500 mOsmoles/L to the sweetenable composition include but are not limited to polysorbate, cholelin Alkali, sodium taurate, lecithin, sucrose oleate, sucrose stearate, sucrose palmitate and sucrose laurate.

[0807]

4799 Generally, according to yet another embodiment of the present invention, the amount of suitable sweet taste improving flavonoid additive in the functional sweetener composition is about 0.1 ppm to about 1,000 ppm.

4801 In another embodiment, suitable sweet taste improving flavonoid additives that can impart an osmotic pressure of about 10 mOsmoles/L to about 500 mOsmoles/L to the sweetenable composition include but are not limited to naringin, catechins, rutin class, neohesperidin and neohesperidin dihydrochalcone.

[0808]

4807 In a preferred embodiment, non-limiting examples of sweet taste improving compositions that can make the osmotic taste of natural and/or synthetic high-potency sweeteners more sugar-like include sweet taste improving carbohydrate additives, sweet taste improving Alcohol additives, polyol additives for sweetness improvement, amino acid additives for sweetness improvement, amino acid salt additives for sweetness improvement, inorganic salt additives for sweetness improvement, polymer additives for sweetness improvement, sweetness improvement Protein or protein hydrolyzate additive.

[0809]

4816 In another embodiment, suitable sweet taste improving carbohydrate additives that can make the osmotic taste of the natural and/or synthetic high-potency sweeteners more sugar-like include, but are not limited to, sweet taste in the molecular weight range of about 50 to about 500 Carbohydrate additive for improvement.

4819 Non-limiting examples of such sweet taste improving carbohydrate additives having a molecular weight ranging from about 50 to about 500 include sucrose, fructose, glucose, maltose, lactose, mannose, galactose, ribose, rhamnose, trehalose, HFCS, and tagat sugar.

[0810]

4825 In another embodiment, suitable sweet taste improving polyol additives that can make the osmotic taste of

the natural and/or synthetic high-potency sweeteners more sugar-like include, but are not limited to, sweet taste in the molecular weight range of about 76 to about 500 Modification polyol additive.

4828 Non-limiting examples of such sweet taste improving polyol additives having molecular weights ranging from about 76 to about 500 include erythritol, glycerin, and propylene glycol.

4830 In one sub-embodiment, other suitable sweet taste improving polyol additives include sugar alcohols.

[0811]

4834 In another embodiment, suitable sweet taste improving alcohol additives that can make the osmotic taste of the natural and/or synthetic high-potency sweeteners more sugar-like include, but are not limited to, sweet taste in the molecular weight range of about 46 to about 500 Alcohol additives for improvement.

4837 Non-limiting examples of such sweet taste improving alcohol additives having a molecular weight ranging from about 46 to about 500 include ethanol.

[0812]

4842 In another embodiment, suitable sweet taste improving amino acid additives that can make the osmotic taste of the natural and/or synthetic high-potency sweeteners more sugar-like include, but are not limited to, sweet taste improving amino acid additives having a molecular weight ranging from about 75 to about 250 with amino acid additives.

4846 Non-limiting examples of such sweet taste improving amino acid additives having a molecular weight ranging from about 75 to about 250 include glycine, alanine, serine, leucine, valine, isoleucine, proline, hydroxyproline, Glutamine, theanine and hydroxybutyridine.

[0813]

4852 In another embodiment, suitable sweet taste improving amino acid salt additives that can make the osmotic taste of the natural and/or synthetic high-potency sweeteners more sugar-like include, but are not limited to, sweeteners with molecular weights ranging from about 75 to about 300. Amino acid salt additives for taste improvement.

4856 Non-limiting examples of such sweet taste improving amino acid salt additives having a molecular weight ranging from about 75 to about 300 include glycine, alanine, serine, leucine, valine, isoleucine, proline, hydroxyproline Acid, glutamine, theanine and hydroxybutyrine salts.

[0814]

4862 In another embodiment, suitable sweet taste improving protein or protein hydrolyzate additives that can promote the osmotic taste of the natural and/or synthetic high-potency sweetener to be more sugar-like include, but are not limited to, a molecular weight range of about 75 to about 300 A protein or protein hydrolyzate additive for sweet taste improvement.

4866 Non-limiting examples of such sweet taste improving protein or protein hydrolyzate additives having a molecular weight ranging from about 75 to about 300 include glycine, alanine, serine, leucine, valine,

isoleucine, proline and Protein or protein hydrolyzate of hydroxybutyridine.

[0815]

⁴⁸⁷² In another specific example, suitable sweet taste improving inorganic salt additives that can promote the osmotic taste of the natural and/or synthetic high-potency sweetener to be more sugar-like include but are not limited to sodium chloride, potassium chloride, Magnesium Chloride, Potassium Monobasic Phosphate, and Sodium Monobasic Phosphate.

⁴⁸⁷⁶ Suitable sweet taste improving inorganic acid salt additives for improving osmotic taste include those in the molecular weight range of about 58 to about 120.

[0816]

⁴⁸⁸¹ In another embodiment, suitable sweet taste improving bitter taste additives that can make the osmotic taste of the natural and/or synthetic high-potency sweeteners more sugar-like include, but are not limited to, caffeine, quinine, urea, bitterwood, Tannic acid and naringin.

[0817]

⁴⁸⁸⁷ In a specific example, the provided functional sweetener composition contains at least one functional ingredient, at least one natural and/or synthetic high-potency sweetener, and at least one nucleotide additive for improving sweet taste; wherein The at least one nucleotide additive is selected from the group consisting of inosine monophosphate ("IMP"), guanosine monophosphate ("GMP"), adenosine monophosphate ("AMP"), cytosine monophosphate (CMP), urine Pyrimidine monophosphate (UMP), inosine diphosphate, guanosine diphosphate, adenosine diphosphate, cytosine diphosphate, uracil diphosphate, inosine triphosphate, guanosine triphosphate, adenosine triphosphate, cytosine triphosphate Phosphoric acid, uracil triphosphate, its nucleosides, its nucleic acid bases or their salts.

[0818]

⁴⁸⁹⁸ In one embodiment, the provided functional sweetener composition contains at least one functional ingredient and at least one natural and/or synthetic high-potency sweetener and at least one sweet taste improving carbohydrate additive; wherein the At least one carbohydrate additive selected from tagatose, trehalose, galactose, rhamnose, cyclodextrins (such as α -cyclodextrin, β -cyclodextrin, and γ -cyclodextrin), maltodextrin Ethin (including digestible maltodextrin such as Fibersol-2 TM), dextran, sucrose, glucose, ribulose, fructose, isoerythrose, arabinose, xylose, lyxose, allose, arabinose Drose, mannose, idose, lactose, maltose, invert sugar, isotrehalose, neotrehalose, palatinose or isomaltulose, erythrose, deoxyribose, gulose, idose, Talose, erythrulose, xylulose, psicose, turanose, cellobiose, pullulan, glucosamine, mannosamine, fucose, glucuronic acid, gluconic acid, gluconic acid Lactone, arbutose, galactosamine, beet-oligosaccharides, isomalto-oligosaccharides (isomaltose, isomaltotriose, panose, etc.), xylo-oligosaccharides (xylotriose, xylobiose, etc.), gentio-oligosaccharides (gentiobiose, gentiotriose, gentiotetraose, etc.), sorbose, nijero-oligosaccharides, palatinose oligosaccharides, fucose,

fructooligosaccharides (kestose, nissose, etc.), maltotetraol, maltotriol, malto-oligosaccharides (maltotriose, maltotetraose, maltopentaose, maltohexaose, maltoheptaose, etc.), lactulose, Melibiose, raffinose, rhamnose, ribose, isomerized liquid sugars such as high fructose corn/starch syrup (eg HFCS55, HFCS42 or HFCS90), linking sugars, soy oligosaccharides, or glucose syrup.

[0819]

⁴⁹¹⁷ In another embodiment, the provided functional sweetener composition contains at least one functional ingredient and at least one natural and/or synthetic high-potency sweetener and at least one sweet taste improving polyol additive; wherein The at least one sweet taste improving polyol additive is selected from the group consisting of erythritol, maltitol, mannitol, sorbitol, lactitol, xylitol, inositol, isomalt, propylene glycol, glycerin (glycerol)), threitol, galactitol, palatinose, reduced isomalt-oligosaccharides, reduced xylo-oligosaccharides, reduced gentio-oligosaccharides, reduced maltose syrup or reduced glucose syrup .

[0820]

⁴⁹²⁶ In another specific example, the provided functional sweetener composition contains at least one functional ingredient and at least one natural and/or synthetic high-potency sweetener and at least one sweet taste improving amino acid additive; wherein the At least one amino acid additive is selected from aspartic acid, arginine, glycine, glutamic acid, proline, hydroxybutyric acid, theanine, cysteine, cystine, alanine, valine Amino acid, tyrosine, leucine, isoleucine, asparagine, serine, lysine, histidine, ornithine, methionine, carnitine, aminobutyric acid (α -, β - and γ -isomers), glutamine, hydroxyproline, taurine, provaline, sarcosine, or salts thereof.

[0821]

⁴⁹³⁶ In another specific example, the provided functional sweetener composition contains at least one functional ingredient, at least one natural and/or synthetic high-potency sweetener, and at least one polyamino acid additive for improving sweet taste; wherein The at least one polyamino acid additive is selected from poly-L-aspartic acid, poly-L-lysine (such as poly-L- α -lysine or poly-L- ϵ -lysine), poly - L-ornithine (such as poly-L- α -ornithine or poly-L- ϵ -ornithine), poly-L-arginine, other polymeric forms of amino acids, or salts thereof.

[0822]

⁴⁹⁴⁵ In another specific example, the provided functional sweetener composition contains at least one functional ingredient, at least one natural and/or synthetic high-potency sweetener, and at least one sugar-acid additive for sweet taste improvement; wherein The at least one sugar acid additive is selected from aldonic acid, uronic acid, aldaric acid, alginic acid, gluconic acid, glucuronic acid, glucaric acid, galactaric acid, galacturonic acid, or salts thereof kind.

[0823]

⁴⁹⁵³ In another specific example, the provided functional sweetener composition contains at least one functional ingredient, at least one natural and/or synthetic high-potency sweetener, and at least one organic acid additive for sweet taste improvement; wherein The at least one organic acid additive is selected from C2-C30 carboxylic acids, substituted hydroxy C1-C30 carboxylic acids, benzoic acid, substituted benzoic acids (such as 2,4-dihydroxybenzoic acid), substituted cinnamonic acids, hydroxy acids, substituted hydroxybenzoic acids, substituted cyclohexyl carboxylic acids, tannic acid, lactic acid, tartaric acid, citric acid, gluconic acid, glucoheptanoic acid, glutaric acid, creatine, fatty acid, Hydroxycitric acid, malic acid, frutaric acid, fumaric acid, maleic acid, succinic acid, bleached acid, salicylic acid, caffeic acid, cholic acid, acetic acid, ascorbic acid, alginic acid, erythorbic acid, Polyglutamic acid, or its salts.

[0824]

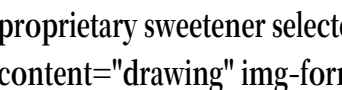
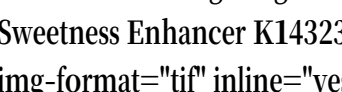
⁴⁹⁶⁵ In another embodiment, the provided functional sweetener composition contains at least one functional ingredient and at least one natural and/or synthetic high-potency sweetener and at least one inorganic acid additive for improving sweet taste; wherein The at least one inorganic acid additive is selected from phosphoric acid, phosphorous acid, polyphosphoric acid, hydrochloric acid, sulfuric acid, carbonic acid, sodium dihydrogen phosphate, or salts thereof.

[0825]

⁴⁹⁷³ In another embodiment, the provided functional sweetener composition contains at least one functional ingredient and at least one natural and/or synthetic high-potency sweetener and at least one bitter compound additive for sweet taste improvement; wherein The at least one bitter compound is selected from caffeine, quinine, urea, bitter orange oil, naringin, bitter wood, or salts thereof.

[0826]

⁴⁹⁸⁰ In another embodiment, the provided functional sweetener composition contains at least one functional ingredient and at least one natural and/or synthetic high-potency sweetener and at least one flavor additive for sweet taste improvement; wherein the At least one flavor additive selected from the group consisting of vanilla extract, vanilla extract, mango extract, cinnamon, citrus, coconut, ginger, viridiflorol, almond, menthol, grape skin extract, or grape seed extract .

⁴⁹⁸⁵ In another specific embodiment, the at least one sweet taste improving flavor additive system includes a proprietary sweetener selected from  Natural Flavoring Sweetness Enhancer K14323 ( Darmstadt, Germany), Symrise™ Natural Flavor Mask for Sweeteners 161453 or 164126 (Symrise™, Holzminden, Germany), Natural Advantage™ Bitterness Blockers 1, 2, 9 or 10 (Natural Advantage™, Freehold, New Jersey, USA), or Sucramask™ (Creative Research Management, Stockton, California, USA).

[0827]

⁴⁹⁹⁶ In another embodiment, the provided functional sweetener composition contains at least one functional ingredient and at least one natural and/or synthetic high-potency sweetener and at least one sweet taste improving polymer additive; wherein The at least one polymer additive is selected from chitosan, pectin, pectic acid, pectic ester acid, polyuronic acid, polygalacturonic acid, starch, food hydrocolloids or crude extracts thereof (such as Senegal gum arabic, seyal gum arabic, carrageenan), poly-L-lysine (such as poly-L- α -lysine or poly-L- ϵ -lysine), poly-L-ornithine (as poly-L- α -ornithine or poly-L- ϵ -ornithine), polypropylene glycol, polyethylene glycol, poly(ethylene glycol methyl ester), polyarginine, Polyaspartic acid, polyglutamic acid, polyethyleneimine, alginic acid, sodium alginate, propylene glycol alginate, polyethylene glycol sodium alginate, sodium hexametaphosphate and its salts, or other cationic and anionic polymers thing.

[0828]

⁵⁰⁰⁹ In another specific example, the provided functional sweetener composition contains at least one functional ingredient, at least one natural and/or synthetic high-potency sweetener, and at least one protein hydrolyzate additive for sweet taste improvement; It is selected from bovine serum albumin (BSA), whey protein (including its fractions or concentrates such as 90% instant whey protein isolate, 34% whey protein, 50% hydrolyzed whey protein, and 80% whey albumin concentrate), soluble rice protein, soy protein, protein isolate, protein hydrolyzate, reaction product of protein hydrolyzate, containing amino acids (such as glycine, alanine, serine, hydroxybutyrine, theanine, natural paragamine, glutamine, arginine, valine, isoleucine, leucine, provaline, methionine, proline, tyrosine, hydroxyproline, etc.) Proteins and/or proteoglycans.

[0829]

⁵⁰²¹ In another embodiment, the provided functional sweetener composition contains at least one functional ingredient, at least one natural and/or synthetic high-potency sweetener, and at least one surfactant additive for sweet taste improvement; Wherein the at least one surfactant additive is selected from polysorbate (such as polyoxyethylene sorbitan monooleate (polysorbate 80, polysorbate 20, polysorbate 60)), Sodium Dodecylbenzene Sulfonate, Dioctyl Sulfosuccinate or Dioctyl Sodium Sulfosuccinate, Sodium Lauryl Sulfate, Cetylpyridium Chloride, Cetyltrimethylammonium Bromide, Cholic Acid Sodium, Carbamoyl, Choline Chloride, Sodium Glycocholate, Sodium Taurocholate, Sodium Taurodeoxycholate, Lauryl Arginate, Sodium Stearoyl Lactyl Lactylate, Lecithin, Sucrose Oil Ester, sucrose stearate, sucrose palmitate, sucrose laurate and other emulsifiers.

[0830]

⁵⁰³³ In another embodiment, the provided functional sweetener composition contains at least one functional ingredient and at least one natural and/or synthetic high-potency sweetener and at least one flavonoid additive for sweet taste improvement; wherein The at least one flavonoid additive is selected from catechins,

polyphenols, rutins, neohesperidin, naringin, neohesperidin dihydrochalcone and the like.

[0831]

5040 In another embodiment, the provided functional sweetener composition contains at least one functional ingredient and at least one natural and/or synthetic high-potency sweetener and ethanol.

[0832]

5045 In another specific example, the provided functional sweetener composition contains at least one functional ingredient, at least one natural and/or synthetic high-potency sweetener, and at least one astringent taste additive for improving sweet taste; wherein The at least one astringent additive is selected from tannic acid, europium chloride (EuCl_3), gadolinium chloride (GdCl_3), terbium chloride (TbCl_3), alum, tannic acid and polyphenols (such as tea polyphenols) phenols).

[0833]

5053 In another embodiment, the provided functional sweetener composition contains at least one functional ingredient, at least one natural and/or synthetic high-potency sweetener, and at least one inorganic salt additive for sweet taste improvement; wherein The at least one inorganic salt additive is selected from sodium chloride, potassium chloride, sodium dihydrogen phosphate, sodium sulfate, potassium citrate, europium chloride (EuCl_3), gadolinium chloride (GdCl_3), terbium chloride (TbCl_3), magnesium sulfate, magnesium phosphate, alum, magnesium chloride, mono-, di- or tri-basic sodium or potassium salts of phosphoric acid, hydrochlorides, sodium carbonate, sodium bisulfate or sodium bicarbonate.

[0834]

5063 In another specific example, the provided functional sweetener composition contains at least one functional ingredient, at least one natural and/or synthetic high-potency sweetener, and at least one organic salt additive for improving sweet taste; Wherein the at least one organic salt additive is selected from choline chloride, sodium gluconate, potassium gluconate, guanidine hydrochloride, amiloride hydrochloride, glucosamine hydrochloride, monosodium glutamate (MSG), adenosine Glycoside Monophosphate, Magnesium Gluconate, Potassium Tartrate and Sodium Tartrate.

[0835]

5072 In another specific example, the provided functional sweetener composition contains at least one functional ingredient and at least one natural and/or synthetic high-potency sweetener and at least one sweet taste improving nucleotide additive, At least one sweet taste improving carbohydrate additive, at least one sweet taste improving amino acid additive; wherein the at least one nucleotide additive is selected from the group consisting of inosine monophosphate ("IMP"), guanosine monophosphate ("GMP"), adenosine monophosphate ("AMP"), cytosine monophosphate (CMP), uracil monophosphate (UMP), inosine

diphosphate, guanosine diphosphate, adenosine diphosphate, cytosine diphosphate, uridine diphosphate, inosine triphosphate, guanosine triphosphate, adenosine triphosphate, cytosine triphosphate, uracil triphosphate, their nucleosides, their nucleic acid bases or their salts; wherein the at least one carbohydrate additive is selected from tagatose, trehalose, galactose, rhamnose, cyclodextrin (such as α -cyclodextrin, β -cyclodextrin, and γ -cyclodextrin), maltodextrin (including digestible Maltodextrins such as Fibersol-2 TM), dextran, sucrose, glucose, ribulose, fructose, isoerythrose, arabinose, xylose, lyxose, allose, altrose, mannose, Idose, lactose, maltose, invert sugar, isotrehalose, neotrehalose, palatinose or isomaltulose, erythrulose, deoxyribose, gulose, idose, talose, red algae Ketulose, xylulose, psicose, turanose, cellobiose, pullulan, glucosamine, mannosamine, fucose, glucuronic acid, gluconic acid, gluconolactone, abico Sugar, galactosamine, beet-oligosaccharides, isomalt-oligosaccharides (isomaltose, isomaltotriose, panose, etc.), xylo-oligosaccharides (xylotriose, xylobiose, etc.), gentian-oligosaccharides Sugars (gentiobiose, gentiotriose, gentiotetraose, etc.), sorbose, nigerol-oligosaccharides, palatinose oligosaccharides, fucose, fructooligosaccharides (kestose, nigerol sugar, etc.), maltotetraol, maltotriol, malto-oligosaccharides (maltotriose, maltotetraose, maltopentaose, maltohexaose, maltoheptaose, etc.), lactulose, melibiose, raffinose, rhamnose, ribose, isomerized liquid sugar such as high fructose corn/starch syrup (such as HFCS55, HFCS42 or HFCS90), linking sugar, soybean oligosaccharide, or glucose syrup; wherein the at least one amino acid additive is selected from aspartic acid, arginine, glycine, glutamic acid, proline, hydroxybutyric acid, theanine, cysteine, cystine, alanine, valine, tyrosine, Leucine, Isoleucine, Asparagine, Serine, Lysine, Histidine, Ornithine, Methionine, Carnitine, GABA (α -, β - and γ -isomers substances), glutamine, hydroxyproline, taurine, provaline, sarcosine, or salts thereof.

[0836]

5101 In another specific example, the provided functional sweetener composition contains at least one functional ingredient and at least one natural and/or synthetic high-potency sweetener and at least one sweet taste improving nucleotide additive and At least one sweet taste improving carbohydrate additive; wherein the at least one nucleotide additive is selected from the group consisting of inosine monophosphate ("IMP"), guanosine monophosphate ("GMP"), adenosine monophosphate ("AMP"), cytosine monophosphate (CMP), uracil monophosphate (UMP), inosine diphosphate, guanosine diphosphate, adenosine diphosphate, cytosine diphosphate, uracil diphosphate, inosine triphosphate, guanosine Glycoside triphosphate, adenosine triphosphate, cytosine triphosphate, uracil triphosphate, its nucleoside, its nucleic acid base or its salts; wherein the at least one carbohydrate additive is selected from tagatose, trehalose, Galactose, rhamnose, cyclodextrin (such as α -cyclodextrin, β -cyclodextrin, and γ -cyclodextrin), maltodextrin (including digestible maltodextrin such as Fibersol-2 TM), Dextran, sucrose, glucose, ribulose, fructose, isoerythrose, arabinose, xylose, lyxose, allose, altrose, mannose, idose, lactose, maltose, invert sugar, Isotrehalose, Neotrehalose, Palatinose or Isomaltulose, Erythrulose, Deoxyribose, Gulose, Idose, Talose, Erythrulose, Xylulose, Allulose Sugar, turanose, cellobiose, pullulan, glucosamine, mannosamine, fucose, glucuronic acid, gluconic acid, gluconolactone, abicose, galactosamine, beet-oligosaccharides, Isomalt-oligosaccharides (isomaltose, isomaltotriose, panose, etc.), xylo-oligosaccharides (xylotriose, xylobiose, etc.), gentio-oligosaccharides (gentiobiose, gentian three sugar, gentiotetraose, etc.), sorbose, nigerol-oligosaccharides, palatinose oligosaccharides, fucose, fructooligosaccharides (kestose, nissose, etc.), maltotetral, malt Triols, malto-oligosaccharides (maltotriose,

maltotetraose, maltopentaose, maltohexaose, maltoheptaose, etc.), lactulose, melibiose, raffinose, rhamnose, ribose, isomerization Liquid sugars such as high fructose corn/starch syrup (such as HFCS55, HFCS42, or HFCS90), linked sugar, soy oligosaccharides, or glucose syrup.

[0837]

⁵¹²⁶ In another specific example, the provided functional sweetener composition contains at least one functional ingredient and at least one natural and/or synthetic high-potency sweetener and at least one sweet taste improving nucleotide additive and At least one sweet taste improving polyol additive; wherein the at least one nucleotide additive is selected from the group consisting of inosine monophosphate ("IMP"), guanosine monophosphate ("GMP"), adenosine monophosphate ("AMP")), cytosine monophosphate (CMP), uracil monophosphate (UMP), inosine diphosphate, guanosine diphosphate, adenosine diphosphate, cytosine diphosphate, uracil diphosphate, inosine triphosphate, guanosine Glycoside triphosphate, adenosine triphosphate, cytosine triphosphate, uracil triphosphate, its nucleoside, its nucleic acid base or its salts; wherein the at least one polyol additive is selected from erythritol, maltitol , mannitol, sorbitol, lactitol, xylitol, inositol, isomalt, propylene glycol, glycerin (glycerol), threitol, galactitol, palatinose, reduced isomalt-oligosaccharides Sugars, reduced xylo-oligosaccharides, reduced gentio-oligosaccharides, reduced maltose syrup or reduced glucose syrup.

[0838]

⁵¹⁴¹ In another specific example, the provided functional sweetener composition contains at least one functional ingredient and at least one natural and/or synthetic high-potency sweetener and at least one sweet taste improving nucleotide additive and At least one sweet taste improving amino acid; wherein the at least one nucleotide additive is selected from inosine monophosphate ("IMP"), guanosine monophosphate ("GMP"), adenosine monophosphate ("AMP") , cytosine monophosphate (CMP), uracil monophosphate (UMP), inosine diphosphate, guanosine diphosphate, adenosine diphosphate, cytosine diphosphate, uracil diphosphate, inosine triphosphate, guanosine triphosphate Phosphoric acid, adenosine triphosphate, cytosine triphosphate, uracil triphosphate, its nucleoside, its nucleic acid base or its salts; wherein the at least one amino acid additive is selected from aspartic acid, arginine, glycine , glutamic acid, proline, hydroxybutyrine, theanine, cysteine, cystine, alanine, valine, tyrosine, leucine, isoleucine, aspartame Amides, Serine, Lysine, Histidine, Ornithine, Methionine, Carnitine, GABA (α -, β - and γ -isomers), Glutamine, Hydroxyproline , taurine, provaline, sarcosine, or their salts.

[0839]

⁵¹⁵⁶ In another specific example, the provided functional sweetener composition contains at least one functional ingredient and at least one natural and/or synthetic high-potency sweetener and at least one sweet taste improving carbohydrate additive, at least A polyol additive for sweetness improvement and at least one amino acid additive for sweetness improvement; wherein the at least one carbohydrate additive is selected from tagatose, trehalose, galactose, rhamnose, cyclodextrin (such as α -cyclodextrin, β -cyclodextrin, and γ -cyclodextrin), maltodextrin (including digestible maltodextrin such as Fibersol-2 TM), dextran,

sucrose, glucose, ribulose, Fructose, Isochrylose, Arabinose, Xylose, Lyxose, Allose, Altrose, Mannose, Idose, Lactose, Maltose, Invert Sugar, Isotrehalose, Neotrehalose, Palakin Sugar or isomaltulose, erythrulose, deoxyribose, gulose, idose, talose, erythulose, xylulose, psicose, turanose, cellobiose, branched chain Starch, glucosamine, mannosamine, fucose, glucuronic acid, gluconic acid, gluconolactone, arbutose, galactosamine, beet-oligosaccharides, isomalt-oligosaccharides (isomaltose, isomaltotriose, isomaltotetraose, etc.), xylo-oligosaccharides (xylotriose, xylobiose, etc.), gentio-oligosaccharides (gentiobiose, gentiotriose, gentiotetraose, etc.), sorbose, Nijero-oligosaccharides, palatinose oligosaccharides, fucose, fructooligosaccharides (kestose, nissose, etc.), maltotetraol, maltotriol, malto-oligosaccharides (maltotriose, Maltotetraose, maltopentose, maltohexaose, maltoheptaose, etc.), lactulose, melibiose, raffinose, rhamnose, ribose, isomerized liquid sugars such as high fructose corn/starch syrup (such as HFCS55, HFCS42 or HFCS90), linking sugar, soybean oligosaccharides, or glucose syrup; wherein the at least one polyol additive is selected from erythritol, maltitol, mannitol, sorbitol, lactitol, wood Sugar alcohol, inositol, isomalt, propylene glycol, glycerin (glycerol), threitol, galactitol, palatinose, reduced isomalt-oligosaccharides, reduced xylo-oligosaccharides, reduced Gentian-oligosaccharides, reduced maltose syrup, or reduced glucose syrup; wherein the at least one amino acid additive is selected from aspartic acid, arginine, glycine, glutamic acid, proline, hydroxybutylamine acid, theanine, cysteine, cystine, alanine, valine, tyrosine, leucine, isoleucine, asparagine, serine, lysine, histidine, Ornithine, Methionine, Carnitine, GABA (α -, β - and γ -isomers), Glutamine, Hydroxyproline, Taurine, Provaline, Sarcosine acids, or their salts.

[0840]

⁵¹⁸⁴ In another embodiment, the provided functional sweetener composition contains at least one functional ingredient and at least one natural and/or synthetic high-potency sweetener and at least one sweet taste improving carbohydrate additive and at least A polyol additive for sweet taste improvement; wherein the at least one carbohydrate additive is selected from tagatose, trehalose, galactose, rhamnose, cyclodextrin (such as α -cyclodextrin, β -cyclodextrin Ethyl alcohol, and γ -cyclodextrin), maltodextrin (including digestible maltodextrin such as Fibersol-2 TM), dextran, sucrose, glucose, ribulose, fructose, isoerythralose, arabinose, Xylose, Lyxose, Allose, Altrose, Mannose, Idose, Lactose, Maltose, Invert Sugar, Isotrehalose, Neotrehalose, Palatinose or Isomaltulose, Erythralose , deoxyribose, gulose, idose, talose, erythrulose, xylulose, psicose, turanose, cellobiose, pullulan, glucosamine, mannosamine, rock Allose, glucuronic acid, gluconic acid, gluconolactone, abicose, galactosamine, beet-oligosaccharides, isomalt-oligosaccharides (isomaltose, isomaltotriose, panose, etc.), wood -Oligosaccharides (xylotriose, xylobiose, etc.), gentio-oligosaccharides (gentiobiose, gentiotriose, gentiotetraose, etc.), sorbose, nigero-oligosaccharides, palatin Sugar oligosaccharides, fucose, fructooligosaccharides (kestose, nissose, etc.), maltotetraol, maltotriol, malto-oligosaccharides (maltotriose, maltotetraose, maltopentaose, maltohexaose sugar, maltoheptaose, etc.), lactulose, melibiose, raffinose, rhamnose, ribose, isomerized liquid sugars such as high fructose corn/starch syrup (such as HFCS55, HFCS42 or HFCS90), linking sugar , soybean oligosaccharides, or glucose syrup; wherein the at least one polyol additive is selected from erythritol, maltitol, mannitol, sorbitol, lactitol, xylitol, inositol, isomalt, propylene glycol , glycerol (glycerol), threitol, galactitol, palatinose, reduced isomalt-oligosaccharides, reduced wood-oligosaccharides, reduced gentian-oligosaccharides, reduced maltose syrup, or reduced glucose syrup.

[0841]

⁵²⁰⁷ In another embodiment, the provided functional sweetener composition contains at least one functional ingredient and at least one natural and/or synthetic high-potency sweetener and at least one sweet taste improving carbohydrate additive and at least one amino acid additive for sweet taste improvement; wherein the at least one carbohydrate additive is selected from tagatose, trehalose, galactose, rhamnose, cyclodextrin (such as α -cyclodextrin, β -cyclodextrin, and γ -cyclodextrin), maltodextrin (including digestible maltodextrin such as Fibersol-2 TM), dextran, sucrose, glucose, ribulose, fructose, isoerythralose, arabinose, wood Sugar, Lyxose, Allose, Altrose, Mannose, Idose, Lactose, Maltose, Invert Sugar, Isotrehalose, Neotrehalose, Palatinose or Isomaltulose, Erythralose, Deoxyribose, gulose, idose, talose, erythrulose, xylulose, psicose, turanose, cellobiose, pullulan, glucosamine, mannosamine, fucose Sugar, glucuronic acid, gluconic acid, gluconolactone, abicose, galactosamine, beet-oligosaccharides, isomalt-oligosaccharides (isomaltose, isomaltotriose, panose, etc.), wood-oligosaccharides (xylotriose, xylobiose, etc.), gentio-oligosaccharides (gentiobiose, gentiotriose, gentiotetraose, etc.), sorbose, niger-oligosaccharides, palatinose Oligosaccharides, fucose, fructooligosaccharides (kestose, nissose, etc.), maltotetraol, maltotriol, malto-oligosaccharides (maltotriose, maltotetraose, maltopentaose, maltohexaose, maltoseptaose, etc.), lactulose, melibiose, raffinose, rhamnose, ribose, isomerized liquid sugar such as high fructose corn/starch syrup (such as HFCS55, HFCS42 or HFCS90), linking sugar, Soybean oligosaccharides, or glucose syrup; wherein the at least one amino acid additive is selected from aspartic acid, arginine, glycine, glutamic acid, proline, hydroxybutyric acid, theanine, cysteine, cystine, alanine, valine, tyrosine, leucine, isoleucine, asparagine, serine, lysine, histidine, ornithine, methionine, meat Toxic alkaloids, GABA (α -, β - and γ -isomers), glutamine, hydroxyproline, taurine, provaline, sarcosine, or their salts.

[0842]

⁵²³¹ In another embodiment, the provided functional sweetener composition contains at least one functional ingredient and at least one natural and/or synthetic high-potency sweetener and at least one sweet taste improving polyol additive and at least one amino acid additive for improving sweetness; wherein the at least one polyol additive for improving sweetness is selected from the group consisting of erythritol, maltitol, mannitol, sorbitol, lactitol, xylitol, inositol, Isomalt, propylene glycol, glycerin (glycerol), threitol, galactitol, palatinose, reduced isomalt-oligosaccharides, reduced wood-oligosaccharides, reduced gentian-oligosaccharides, reduced maltose syrup or reduced glucose syrup; wherein the at least one amino acid additive is selected from aspartic acid, arginine, glycine, glutamic acid, proline, hydroxybutyric acid, theanine, semi Cystine, cystine, alanine, valine, tyrosine, leucine, isoleucine, asparagine, serine, lysine, histidine, ornithine, methionine Acid, carnitine, GABA (α -, β - and γ -isomers), glutamine, hydroxyproline, taurine, provaline, sarcosine, or their salts.

[0843]

⁵²⁴⁵ In another embodiment, the provided functional sweetener composition contains at least one functional

ingredient and at least one natural and/or synthetic high-potency sweetener and at least one sweet taste improving polyol additive and at least An inorganic salt additive for improving sweetness; wherein the at least one polyol additive for improving sweetness is selected from the group consisting of erythritol, maltitol, mannitol, sorbitol, lactitol, xylitol, and inositol, isomalt, propylene glycol, glycerin (glycerol), threitol, galactitol, palatinose, reduced isomalt-oligosaccharides, reduced wood-oligosaccharides, reduced gentian-oligosaccharides class, reduced maltose syrup or reduced glucose syrup; wherein the at least one inorganic salt additive is selected from sodium chloride, potassium chloride, sodium dihydrogen phosphate, sodium sulfate, potassium citrate, europium chloride (EuCl_3), gadolinium chloride (GdCl_3), terbium chloride (TbCl_3), magnesium sulfate, alum, magnesium chloride, potassium chloride, mono-, di- or tri-basic sodium or potassium salts of phosphoric acid, hydrochlorides, Sodium Carbonate, Sodium Bisulfate or Sodium Bicarbonate.

[0844]

⁵²⁶⁰ In another embodiment, the provided functional sweetener composition contains at least one functional ingredient and at least one natural and/or synthetic high-potency sweetener and at least one sweet taste improving carbohydrate additive and at least An inorganic salt additive for sweet taste improvement; wherein the at least one carbohydrate additive is selected from tagatose, trehalose, galactose, rhamnose, cyclodextrin (such as α -cyclodextrin, β -cyclodextrin Ethyl alcohol, and γ -cyclodextrin), maltodextrin (including digestible maltodextrin such as Fibersol-2 TM), dextran, sucrose, glucose, ribulose, fructose, isoerythralose, arabinose, Xylose, Lyxose, Allose, Altrose, Mannose, Idose, Lactose, Maltose, Invert Sugar, Isotrehalose, Neotrehalose, Palatinose or Isomaltulose, Erythralose, deoxyribose, gulose, idose, talose, erythrulose, xylulose, psicose, turanose, cellobiose, pullulan, glucosamine, mannosamine, rock Allose, glucuronic acid, gluconic acid, gluconolactone, abicose, galactosamine, beet-oligosaccharides, isomalt-oligosaccharides (isomaltose, isomaltotriose, panose, etc.), wood-Oligosaccharides (xylotriose, xylobiose, etc.), gentio-oligosaccharides (gentiobiose, gentiotriose, gentiotetraose, etc.), sorbose, niger-oligosaccharides, palatin Sugar oligosaccharides, fucose, fructooligosaccharides (kestose, nissose, etc.), maltotetraol, maltotriol, malto-oligosaccharides (maltotriose, maltotetraose, maltopentaose, maltohexaose sugar, maltoheptaose, etc.), lactulose, melibiose, raffinose, rhamnose, ribose, isomerized liquid sugars such as high fructose corn/starch syrup (such as HFCS55, HFCS42 or HFCS90), linking sugar, soybean oligosaccharides, or glucose syrup; wherein the at least one inorganic salt additive is selected from sodium chloride, potassium chloride, sodium dihydrogen phosphate, sodium sulfate, potassium citrate, europium chloride (EuCl_3), chlorine Gadolinium chloride (GdCl_3), terbium chloride (TbCl_3), magnesium phosphate, magnesium sulfate, alum, magnesium chloride, potassium chloride, mono-, di- or tri-basic sodium or potassium salts of phosphoric acid, hydrochlorides, Sodium Carbonate, Sodium Bisulfate or Sodium Bicarbonate.

[0845]

⁵²⁸⁵ In another specific example, the provided functional sweetener composition contains at least one functional ingredient and at least one natural and/or synthetic high-potency sweetener and at least one sweet taste improving carbohydrate additive, at least An amino acid additive for improving sweet taste and at least one

inorganic salt additive for improving sweet taste; wherein the at least one carbohydrate additive is selected from tagatose, trehalose, galactose, rhamnose, cyclodextrin (Such as α -cyclodextrin, β -cyclodextrin, and γ -cyclodextrin), maltodextrin (including digestible maltodextrin such as Fibersol-2 TM), dextran, sucrose, glucose, ribulose , fructose, isoerythralose, arabinose, xylose, lyxose, allose, altrose, mannose, idose, lactose, maltose, invert sugar, isotrehalose, neotrehalose, para Golden sugar or isomaltulose, erythrose, deoxyribose, gulose, idose, talose, erythrulose, xylulose, psicose, turanose, cellobiose, Amylopectin, glucosamine, mannosamine, fucose, glucuronic acid, gluconic acid, gluconolactone, abicose, galactosamine, beet-oligosaccharides, isomalt-oligosaccharides (isomaltose, isomaltose, Maltotriose, pannoose, etc.), xylo-oligosaccharides (xylotriose, xylobiose, etc.), gentio-oligosaccharides (gentiobiose, gentiotriose, gentiotetraose, etc.), sorbose , Nijero-oligosaccharides, palatinose oligosaccharides, fucose, fructooligosaccharides (kestose, nissose, etc.), maltotetraol, maltotriol, malto-oligosaccharides (maltotriose , maltotetraose, maltopentose, maltohexaose, maltoheptaose, etc.), lactulose, melibiose, raffinose, rhamnose, ribose, isomerized liquid sugar such as high fructose corn/starch syrup (Such as HFCS55, HFCS42 or HFCS90), linking sugar, soybean oligosaccharide, or glucose syrup; wherein the at least one amino acid additive is selected from aspartic acid, arginine, glycine, glutamic acid, proline, hydroxyl Butyrine, Theanine, Cysteine, Cystine, Alanine, Valine, Tyrosine, Leucine, Isoleucine, Asparagine, Serine, Lysine, Histamine acid, ornithine, methionine, carnitine, GABA (α -, β - and γ -isomers), glutamine, hydroxyproline, taurine, provaline, Sarcosine, or its salts; wherein the at least one inorganic salt additive is selected from sodium chloride, potassium chloride, sodium sulfate, potassium citrate, europium chloride (EuCl_3), gadolinium chloride (GdCl_3), terbium chloride (TbCl_3), magnesium phosphate, magnesium sulfate, alum, magnesium chloride, potassium chloride, mono-, di- or tri-basic sodium or potassium phosphoric acid salts, hydrochlorides, sodium carbonate, sulfuric acid sodium bicarbonate or sodium bicarbonate.

[0846]

⁵³¹³ In another embodiment, the provided functional sweetener composition contains at least one functional ingredient and at least one natural and/or synthetic high-potency sweetener and at least one sweet taste improving polyol additive and at least A polyamino acid additive for sweet taste improvement; wherein the at least one polyol additive is selected from erythritol, maltitol, mannitol, sorbitol, lactitol, xylitol, inositol, isomalt, Propylene glycol, glycerin (glycerol), threitol, galactitol, palatinose, reduced isomalt-oligosaccharides, reduced wood-oligosaccharides, reduced gentian-oligosaccharides, reduced Maltose syrup or reduced glucose syrup; wherein the at least one polyamino acid additive is selected from poly-L-aspartic acid, poly-L-lysine (such as poly-L-alpha-lysine or poly-L- ϵ -lysine), poly-L-ornithine (such as poly-L- α -ornithine or poly-L- ϵ -ornithine), poly-L-arginine, amino acids and others in polymerized form, or its salts.

[0847]

⁵³²⁶ In another embodiment, the provided functional sweetener composition contains at least one functional ingredient, at least one natural and/or synthetic high-potency sweetener, and at least one sweet taste improving protein or protein hydrolyzate Additives and at least one sweet taste improving inorganic salt additive; wherein the at least one sweet taste improving protein or protein hydrolyzate additive is selected

from bovine serum albumin (BSA), whey protein (including fractions or concentrates thereof) Such as 90% instant whey protein isolate, 34% whey protein, 50% hydrolyzed whey protein, and 80% whey protein concentrate), soluble rice protein, soy protein, protein isolate, protein hydrolyzate, protein hydrolyzate Reaction products of substances, containing amino acids (such as glycine, alanine, serine, hydroxybutyramine, theanine, asparagine, glutamine, arginine, valine, isoleucine, leucine , provaline, methionine, proline, tyrosine, hydroxyproline, etc.), glycoproteins and/or proteoglycans, collagen (such as gelatin), partially hydrolyzed collagen (such as water fish collagen) and collagen hydrolyzate (such as porcine collagen hydrolyzate); wherein the at least one sweet taste improving inorganic salt additive is selected from sodium chloride, potassium chloride, sodium sulfate, potassium citrate Mono-, di- or tri-bases of , europium chloride (EuCl_3), gadolinium chloride (GdCl_3), terbium chloride (TbCl_3), magnesium phosphate, magnesium sulfate, alum, magnesium chloride, potassium chloride, phosphoric acid Sodium or potassium salts, hydrochlorides, sodium carbonate, sodium bisulfate or sodium bicarbonate.

[0848]

5345 In another embodiment, the provided functional sweetener composition includes at least one functional ingredient and rebaudioside A and at least one other natural and/or synthetic high-potency sweetener other than rebaudioside A. A flavoring agent and at least one sweet taste improving composition.

[0849]

5351 In another specific embodiment, the provided functional sweetener composition contains at least one functional ingredient and rebaudioside A and at least one synthetic high-potency sweetener, wherein the at least one synthetic high-potency sweetener The agent acts like a sweet taste improving composition.

5354 Non-limiting examples of suitable sweet taste improving synthetic sweet taste additives include sucralose, acesulfame potassium, aspartame, elitan, saccharin, neohesperidin dihydrochalcone, cyclamate, neotame , N-[N-[3-(3-hydroxy-4-methoxyphenyl)propyl]-L- α -aspartyl]-L-phenylalanine 1-methyl ester, N-[N-[3-(3-Hydroxy-4-methoxyphenyl)-3-methylbutyl]-L- α -aspartyl]-L-phenylalanine 1-methyl ester, N-[N-[3-(3-Methoxy-4-hydroxyphenyl)propyl]-L- α -aspartyl]-L-phenylalanine 1-methyl ester, and its salts, etc.

[0850]

5363 In a specific example, the provided functional sweetener composition comprises at least one functional ingredient and contains rebaudioside A (REBA), stevia, stevioside (stevioside), mogroside (mogroside) IV, Luo Han Guo Glycoside V, Luo Han Guo sweetener, monatin, curculin, sucralose, sweetener, saccharin, aspartame, acesulfame potassium or other salts, or neotame A sweetener, and at least one sweet taste improving amino acid additive and at least one sweet taste improving polyol additive.

5368 In a specific embodiment, the at least one sweet taste improving amino acid additive is present in an amount of about 100 ppm to about 25,000 ppm of the composition and the at least one sweet taste improving polyol additive is present in an amount of about 400ppm to about 80,000ppm.

5371 In yet another specific embodiment, the at least one sweet taste improving amino acid additive is glycine or

alanine, and the at least one sweet taste improving polyol additive is erythritol.

[0851]

- 5376 In a specific example, the provided functional sweetener composition comprises at least one functional ingredient and contains rebaudioside A (REBA), stevia, stevioside, mogroside IV, mogroside V, and the sweetness of mogroside sweetener, monatin, curculin, sucralose, saccharin, cyclamate, aspartame, acesulfame potassium or other salts, or sweeteners of neotame, and at least one sweet taste improving Amino acid additives and at least one sweet taste improving protein or protein hydrolyzate additive.
- 5381 In a specific embodiment, the at least one sweet taste improving amino acid additive is present in an amount of about 100 ppm to about 25,000 ppm of the composition and the at least one sweet taste improving protein or protein hydrolyzate additive is present in an amount of the composition From about 200 ppm to about 50,000 ppm of matter.
- 5385 In yet another specific embodiment, the at least one sweet taste improving amino acid additive is glycine or lysine, and the at least one sweet taste improving protein or protein hydrolyzate additive contains glycine, alanine, serine, Proteins, hydrolysates, or reaction products of protein hydrolysates of leucine, valine, isoleucine, proline, or hydroxybutyridine.

[0852]

- 5392 In a specific example, the provided functional sweetener composition comprises at least one functional ingredient and contains rebaudioside A (REBA), stevia, stevioside, mogroside IV, mogroside V, and the sweetness of mogroside sweetener, monatin, curculin, sucralose, saccharin, cyclamate, aspartame, acesulfame potassium or other salts, or sweeteners of neotame, and at least one sweet taste improving A protein or protein hydrolyzate additive and at least one sweet taste improving polyol additive.
- 5397 In a specific embodiment, the at least one sweet taste improving protein or protein hydrolyzate additive is present in an amount of about 200 ppm to about 50,000 ppm of the composition and the at least one sweet taste improving polyol additive is in an amount of the From about 400 ppm to about 80,000 ppm of the composition.
- 5401 In yet another specific embodiment, the at least one sweet taste improving protein or protein hydrolyzate additive contains glycine, alanine, serine, leucine, valine, isoleucine, proline or hydroxyl A protein, a hydrolyzate of tyrosine, or a reaction product of a protein hydrolyzate, and the at least one sweet taste improving polyol additive is erythritol.

[0853]

- 5408 In a specific example, the provided functional sweetener composition comprises at least one functional ingredient and contains rebaudioside A (REBA), stevia, stevioside, mogroside IV, mogroside V, and the sweetness of mogroside sweetener, monatin, curculin, sucralose, saccharin, cyclamate, aspartame, acesulfame potassium or other salts, or sweeteners of neotame, and at least one sweet taste improving Carbohydrate Additives.
- 5413 In a specific embodiment, the at least one sweet taste improving carbohydrate additive is present in an

amount from about 1,000 ppm to about 100,000 ppm of the composition.

5415 In yet another specific embodiment, the composition contains REBA and glucose, sucrose, HFCS or D-fructose in an amount from about 10,000 ppm to about 80,000 ppm of the composition.

[0854]

5420 In a specific example, the provided functional sweetener composition comprises at least one functional ingredient and contains rebaudioside A (REBA), stevia, stevioside, mogroside IV, mogroside V, and the sweetness of mogroside sweetener, monatin, curculin, sucralose, saccharin, cyclamate, aspartame, acesulfame potassium or other salts, or sweeteners of neotame, and at least one sweet taste improving Polyol Additives.

5425 In a specific embodiment, the at least one sweet taste improving polyol additive is present in an amount from about 400 ppm to about 80,000 ppm of the composition.

5427 In another specific embodiment, the at least one sweet taste improving polyol additive is present in an amount from about 5,000 ppm to about 60,000 ppm of the functional sweetener composition.

5429 Its non-limiting examples include at least one functional ingredient and contain rebaudioside A (REBA), stevia, stevioside, mogroside IV, mogroside V, monk fruit sweetener, monatin, curcululin, three Sucralose, saccharin, sweetener, aspartame, acesulfame potassium or other salts, or sweeteners of neotame, and propylene glycol, erythritol, or combinations thereof.

[0855]

5436 In one embodiment, the provided functional composition contains rebaudioside A (REBA) (containing at least 50% REBA in a steviol glycoside mixture) and at least one sweet taste improving polyol additive.

5438 Preferably, the at least one sweet taste improving polyol additive comprises erythritol.

5439 In certain embodiments of the functional sweetener composition, rebaudioside A is present in an amount of about 100 to about 3,000 ppm of the entire sweetener composition and erythritol is present in an amount of the entire sweetener composition From about 400 to about 80,000 ppm.

5442 In another embodiment of the functional sweetener composition, the amount of rebaudioside A is about 100 to about 3,000 ppm of the whole sweetener composition and the amount of erythritol is the whole sweetener composition About 5,000 to about 40,000 ppm of matter.

5445 In yet another embodiment of the functional sweetener composition, the amount of rebaudioside A is about 100 to about 3,000 ppm of the whole sweetener composition and the amount of erythritol is the whole sweetener composition About 1,000 to about 35,000 ppm of matter.

5448 In another specific embodiment of the functional sweetener composition, the ratio of rebaudioside A to erythritol in the sweetener composition is about 1:4 to about 1:800, respectively.

5450 In yet another specific embodiment of the functional sweetener composition, the ratio of rebaudioside A to erythritol in the sweetener composition is about 1:20 to about 1:600; preferably The ratio is about 1:50 to about 1:300; and more preferably about 1:75 to about 1:150.

[0856]

- 5456 In another specific example, the provided functional sweetener composition comprises at least one functional ingredient and contains rebaudioside A (REBA), stevia, stevioside, mogroside IV, mogroside V, mogroside A flavoring agent, a sweetener composition of monatin or curcululin, and at least one sweet taste improving synthetic sweet taste additive.
- 5460 In a specific embodiment, the functional sweetener composition contains at least one functional ingredient and a sweetener comprising rebaudioside A (REBA) and saccharin or acesulfame potassium or other salts.

[0857]

- 5465 In a specific example, the provided functional sweetener composition comprises at least one functional ingredient and contains rebaudioside A (REBA), stevia, stevioside, mogroside IV, mogroside V, and the sweetness of mogroside sweetener, monatin, curculin, sucralose, saccharin, cyclamate, aspartame, acesulfame potassium or other salts, or sweeteners of neotame, and at least one sweet taste improving A carbohydrate additive and at least one sweet taste improving polyol additive.
- 5470 In a specific embodiment, the at least one sweet taste improving carbohydrate additive is present in an amount of about 1,000 ppm to about 100,000 ppm of the composition and the at least one sweet taste improving polyol additive is present in an amount of the composition From about 400 ppm to about 80,000 ppm.
- 5474 Non-limiting examples thereof include at least one functional ingredient and ingredients containing rebaudioside A (REBA), stevia, stevioside, mogroside IV, mogroside V, monk fruit sweetener, monatin, curcululin, three Sucralose, saccharin, sweetener, aspartame, acesulfame potassium or other salts, or sweeteners of neotame, as well as tagatose, fructose or sucrose, and erythritol.

[0858]

- 5481 In a specific example, the provided functional sweetener composition comprises at least one functional ingredient and contains rebaudioside A (REBA), stevia, stevioside, mogroside IV, mogroside V, and the sweetness of mogroside sweetener, monatin, curculin, sucralose, saccharin, cyclamate, aspartame, acesulfame potassium or other salts, or sweeteners of neotame, and at least one sweet taste improving Inorganic salt additives.
- 5486 Its non-limiting examples include at least one functional ingredient and contain rebaudioside A (REBA), stevia, stevioside, mogroside IV, mogroside V, monk fruit sweetener, monatin, curcululin, three Sucralose, saccharin, sweetener, aspartame, acesulfame potassium or other salts, or sweeteners of neotame, and NaCl, KCl, $\text{NaHSO}_4 \cdot \text{H}_2\text{O}$, NaH_2PO_4 , MgSO_4 , $\text{KAl}(\text{SO}_4)_2$ (alum), magnesium phosphate, magnesium chloride, KCl and KH_2PO_4 , or other combinations thereof.
- 5491 A particularly preferred embodiment comprises at least one functional ingredient and contains rebaudioside A (REBA), stevia, stevioside, mogroside IV, mogroside V, monk fruit sweetener, monatin, curcululin, Mixture of sucralose, saccharin, sweetener, aspartame, acesulfame potassium or other salts, or sweeteners of neotame, and inorganic salt additives such as chlorides of sodium, magnesium, potassium and calcium, phosphates and sulfates (such as sodium chloride and potassium chloride; potassium phosphate and potassium chloride; sodium chloride and sodium phosphate; calcium phosphate and calcium sulfate; magnesium chloride and magnesium phosphate; and calcium phosphate, calcium sulfate and potassium

sulfate).

[0859]

5502 In a specific embodiment, the provided functional sweetener composition comprises at least one functional ingredient and a sweetener containing aspartame, acesulfame potassium or other salts and sucralose, and at least An inorganic salt additive for sweet taste improvement.

5505 In a specific embodiment, the at least one sweet taste improving inorganic salt additive is present in an amount ranging from about 25 to about 5,000 ppm of the composition.

5507 Non-limiting examples thereof include at least one functional ingredient and a sweetener containing aspartame, acesulfame potassium, and sucralose, and magnesium chloride; at least one functional ingredient and a sweetener containing aspartame, acesulfame potassium Sweeteners of potassium and sucralose, and magnesium sulfate; or at least one functional ingredient and sweeteners containing aspartame, acesulfame potassium, and sucralose, and magnesium sulfate and magnesium chloride.

[0860]

5515 In a specific example, the provided functional sweetener composition comprises at least one functional ingredient and contains rebaudioside A (REBA), stevia, stevioside, mogroside IV, mogroside V, and the sweetness of mogroside sweetener, monatin, curculin, sucralose, saccharin, cyclamate, aspartame, acesulfame potassium or other salts, or sweeteners of neotame, and at least one sweet taste improving Organic acid salt additives.

5520 Its non-limiting examples include at least one functional ingredient and contain rebaudioside A (REBA), stevia, stevioside, mogroside IV, mogroside V, monk fruit sweetener, monatin, curcululin, three Sucralose, saccharin, sweetener, aspartame, acesulfame potassium or other salts, or sweetener of neotame, and choline chloride in citrate buffer, D-gluconate sodium salt, hydrochloric acid Guanidine, D-glucosamine hydrochloride, amiloride hydrochloride, or combinations thereof.

[0861]

5528 In a specific example, the provided functional sweetener composition comprises at least one functional ingredient and contains rebaudioside A (REBA), stevia, stevioside, mogroside IV, mogroside V, and the sweetness of mogroside sweetener, monatin, curculin, sucralose, saccharin, cyclamate, aspartame, acesulfame potassium or other salts, or sweeteners of neotame, and at least one sweet taste improving Organic acid additives.

5533 Its non-limiting examples include at least one functional ingredient and contain rebaudioside A (REBA), stevia, stevioside, mogroside IV, mogroside V, monk fruit sweetener, monatin, curcululin, three Sucralose, saccharin, sweetener, aspartame, acesulfame potassium or other salts, or sweeteners of neotame, and fumaric acid, malic acid, tartaric acid, citric acid, fatty acid, ascorbic acid, tannin , succinic acid, glutaric acid, or combinations thereof.

[0862]

5541 In a specific example, the provided functional sweetener composition comprises at least one functional ingredient and contains rebaudioside A (REBA), stevia, stevioside, mogroside IV, mogroside V, and the sweetness of mogroside sweetener, monatin, curculin, sucralose, saccharin, cyclamate, aspartame, acesulfame potassium or other salts, or sweeteners of neotame, and at least one sweet taste improving Amino Acid Additive.

5546 In a specific embodiment, the at least one sweet taste improving amino acid additive is present in an amount of about 100 to about 25,000 ppm of the composition.

5548 Its non-limiting examples include at least one functional ingredient and contain rebaudioside A (REBA), stevia, stevioside, mogroside IV, mogroside V, monk fruit sweetener, monatin, curcululin, three Sucralose, saccharin, sweetener, aspartame, acesulfame potassium or other salts, or sweeteners of neotame, and glycine, L-alanine, L-serine, L-hydroxybutyric acid, β -Alanine, GABA (α -, β -, or γ -isomers), L-Aspartic Acid, L-Glutamic Acid, L-Lysine, Glycine, and L-Alanine Mixture, its salt derivatives or combinations.

[0863]

5556 In a specific example, the provided functional sweetener composition comprises at least one functional ingredient and contains rebaudioside A (REBA), stevia, stevioside, mogroside IV, mogroside V, and the sweetness of mogroside sweetener, monatin, curculin, sucralose, saccharin, cyclamate, aspartame, acesulfame potassium or other salts, or sweeteners of neotame, and at least one sweet taste improving Surfactant additive.

5561 Its non-limiting examples include at least one functional ingredient and contain rebaudioside A (REBA), stevia, stevioside, mogroside IV, mogroside V, monk fruit sweetener, monatin, curcululin, three Sucralose, saccharin, sweetener, aspartame, acesulfame potassium or other salts, or sweeteners of neotame, and dioctyl sodium sulfosuccinate, cetylpyridium chloride, decabromide Hexaalkyltrimethylammonium, sucrose oleate, polysorbate 20, polysorbate 80, lecithin, or combinations thereof.

[0864]

5569 In a specific example, the provided functional sweetener composition comprises at least one functional ingredient and contains rebaudioside A (REBA), stevia, stevioside, mogroside IV, mogroside V, and the sweetness of mogroside sweetener, monatin, curculin, sucralose, saccharin, cyclamate, aspartame, acesulfame potassium or other salts, or sweeteners of neotame, and at least one sweet taste improving polymer additives.

5574 Its non-limiting examples include at least one functional ingredient and contain rebaudioside A (REBA), stevia, stevioside, mogroside IV, mogroside V, monk fruit sweetener, monatin, curcululin, three Sucralose, saccharin, sweetener, aspartame, acesulfame potassium or other salts, or sweeteners of neotame, and cationic polymers such as polyethyleneimine, poly-L-lysine (such as poly-L- α -lysine or poly-L- ϵ -lysine), poly-L-ornithine (such as poly-L- α -ornithine or poly-L- ϵ -ornithine), Chitosan, or a combination thereof.

[0865]

- 5582 In a specific example, the provided functional sweetener composition comprises at least one functional ingredient and contains rebaudioside A (REBA), stevia, stevioside, mogroside IV, mogroside V, and the sweetness of mogroside sweetener, monatin, curculin, sucralose, saccharin, cyclamate, aspartame, acesulfame potassium or other salts, or sweeteners of neotame, and at least one sweet taste improving A polymer additive and at least one sweet taste improving polyol additive.
- 5587 In a specific embodiment, the at least one sweet taste improving polymer additive is present in an amount of about 30 to about 2,000 ppm of the composition and the at least one sweet taste improving polyol additive is present in an amount of From about 400 to about 80,000 ppm.
- 5590 Non-limiting examples thereof include at least one functional ingredient and ingredients containing rebaudioside A (REBA), stevia, stevioside, mogroside IV, mogroside V, monk fruit sweetener, monatin, curcululin, three Sucralose, saccharin, sweetener, aspartame, acesulfame potassium or other salts, or sweeteners of neotame, hydrocolloids (such as seyal gum arabic), and erythritol.

[0866]

- 5597 In a specific example, the provided functional sweetener composition comprises at least one functional ingredient and contains rebaudioside A (REBA), stevia, stevioside, mogroside IV, mogroside V, and the sweetness of mogroside sweetener, monatin, curculin, sucralose, saccharin, cyclamate, aspartame, acesulfame potassium or other salts, or sweeteners of neotame, and at least one sweet taste improving Protein or protein hydrolyzate additive.
- 5602 Its non-limiting examples include at least one functional ingredient and contain rebaudioside A (REBA), stevia, stevioside, mogroside IV, mogroside V, monk fruit sweetener, monatin, curcululin, three Sucralose, saccharin, sweetener, aspartame, acesulfame potassium or other salts, or sweetener of neotame, and bovine serum albumin (BSA), whey protein or a combination thereof.

[0867]

- 5609 In a specific example, the provided functional sweetener composition comprises at least one functional ingredient and contains rebaudioside A (REBA), stevia, stevioside, mogroside IV, mogroside V, and the sweetness of mogroside sweetener, monatin, curculin, sucralose, saccharin, cyclamate, aspartame, acesulfame potassium or other salts, or sweeteners of neotame, and at least one sweet taste improving Amino acid additives and at least one inorganic acid salt additive for improving sweet taste.
- 5614 In a particular embodiment, the at least one sweet taste improving amino acid additive is present in an amount of about 100 to about 25,000 ppm of the composition and the at least one sweet taste improving inorganic acid salt additive is present in an amount of the composition From about 25 to about 5,000 ppm.
- 5617 Its non-limiting examples include at least one functional ingredient and contain rebaudioside A (REBA), stevia, stevioside, mogroside IV, mogroside V, monk fruit sweetener, monatin, curcululin, three Sucralose, saccharin, sweetener, aspartame, acesulfame potassium or other salts, or sweeteners of neotame, and glycine and alum; rebaudioside A (REBA), stevia, stevioside, Mogroside IV, Mogroside V, Luo Han Guo sweetener, monatin, curculin, sucralose, saccharin, cyclamate, aspartame, acesulfame potassium or other salts, or neotame, and Glycine and Potassium Chloride; Rebaudioside A (REBA), Stevia, Stevioside, Mogroside IV, Mogroside V, Monk Fruit Sweetener, Monatin, Curculigoline, Sucralose, Saccharin,

Sweetener, aspartame, acesulfame potassium or other salts, or neotame, and glycine and sodium chloride; REBA and glycine, potassium dihydrogen phosphate, and potassium chloride; and rebaudioside A (REBA), Stevia, stevioside, mogroside IV, mogroside V, monk fruit sweetener, monatin, curculin, sucralose, saccharin, aspartame, acesulfame potassium or other salts, or neotame, and glycine, sodium chloride, and potassium chloride.

[0868]

⁵⁶³² In another specific example, the provided functional sweetener composition comprises at least one functional ingredient and contains rebaudioside A (REBA), stevia, stevioside, mogroside IV, mogroside V, mogroside Flavoring agents, monatin, curculin, sucralose, saccharin, cyclamate, aspartame, acesulfame potassium or other salts, or sweeteners of neotame, and at least one sweet taste modifier Carbohydrate additives and at least one inorganic acid salt additive for improving sweet taste are used.

⁵⁶³⁷ In a specific embodiment, the at least one sweet taste improving carbohydrate additive is present in an amount of about 1,000 to about 100,000 ppm of the composition and the at least one sweet taste improving mineral acid salt additive is present in an amount of about 25 To about 5,000ppm.

⁵⁶⁴⁰ Its non-limiting examples include at least one functional ingredient and contain rebaudioside A (REBA), stevia, stevioside, mogroside IV, mogroside V, monk fruit sweetener, monatin, curcululin, three Sucralose, saccharin, sweetener, aspartame, acesulfame potassium or other salts, or sweeteners of neotame, as well as fructose, sucrose or glucose and alum; at least one functional ingredient and containing rebaudi Glycoside A (REBA), Stevia, Stevioside, Mogroside IV, Mogroside V, Monk Fruit Sweetener, Monatin, Curculigoline, Sucralose, Saccharin, Sweetener, Aspartame, Acesulfame K Potassium or other salts, or sweeteners of neotame, fructose, sucrose or glucose, and potassium chloride; at least one functional ingredient containing rebaudioside A (REBA), stevia, stevioside, mogroside IV, Mogroside V, Luo Han Guo sweetener, monatin, curculin, sucralose, saccharin, sweetener, aspartame, acesulfame potassium or other salts, or sweeteners of neotame, And fructose, sucrose or glucose and sodium chloride; at least one functional ingredient and containing rebaudioside A (REBA), stevia, stevioside, mogroside IV, mogroside V, monk fruit sweetener, monatin, Curcululin, sucralose, saccharin, cyclamate, aspartame, acesulfame potassium or other salts, or sweeteners of neotame, and fructose, sucrose or glucose, potassium phosphate, and potassium chloride and at least one functional ingredient containing rebaudioside A (REBA), stevia, stevioside, mogroside IV, mogroside V, monk fruit sweetener, monatin, curculigo, sucralose, Saccharin, cyclamate, aspartame, acesulfame potassium or other salts, or sweeteners of neotame, as well as fructose, sucrose or glucose, sodium chloride and potassium chloride.

[0869]

⁵⁶⁶⁰ In another specific example, the provided functional sweetener composition comprises at least one functional ingredient and contains rebaudioside A (REBA), stevia, stevioside, mogroside IV, mogroside V, mogroside Flavoring agents, monatin, curculin, sucralose, saccharin, cyclamate, aspartame, acesulfame potassium or other salts, or sweeteners of neotame, and at least one sweet taste modifier Use bitter taste additives and one less inorganic salt additive for sweet taste improvement.

⁵⁶⁶⁵ Its non-limiting examples include at least one functional ingredient and contain rebaudioside A (REBA),

stevia, stevioside, mogroside IV, mogroside V, monk fruit sweetener, monatin, curculin, three Sucralose, saccharin, sweetener, aspartame, acesulfame potassium or other salts, or sweeteners of neotame, as well as urea and sodium chloride.

[0870]

⁵⁶⁷² In another specific example, the provided functional sweetener composition comprises at least one functional ingredient and contains rebaudioside A (REBA), stevia, stevioside, mogroside IV, mogroside V, mogroside Flavoring agents, monatin, curculin, sucralose, saccharin, cyclamate, aspartame, acesulfame potassium or other salts, or sweeteners of neotame, and at least one sweet taste modifier Amino acid additives and one polyamino acid additive for improving sweet taste are used.

⁵⁶⁷⁷ In a specific embodiment, the at least one sweet taste improving amino acid additive is present in an amount of about 100 to about 25,000 ppm of the composition and the at least one sweet taste improving polyamino acid additive is present in an amount of From about 30 to about 2,000 ppm.

⁵⁶⁸⁰ Its non-limiting examples include at least one functional ingredient and contain rebaudioside A (REBA), stevia, stevioside, mogroside IV, mogroside V, monk fruit sweetener, monatin, curcululin, three Sucralose, saccharin, cyclamate, aspartame, acesulfame potassium or other salts, or sweeteners of neotame, glycine and poly-L-alpha-lysine; and at least one functional ingredient And contains rebaudioside A (REBA), stevia, stevioside, mogroside IV, mogroside V, monk fruit sweetener, monatin, curculigo, sucralose, saccharin, cyclamate, aspartame sweetener, acesulfame potassium or other salts, or sweeteners of neotame, glycine and poly-L- ε -lysine.

[0871]

⁵⁶⁹⁰ In another specific example, the provided functional sweetener composition comprises at least one functional ingredient and contains rebaudioside A (REBA), stevia, stevioside, mogroside IV, mogroside V, mogroside Flavoring agents, monatin, curculin, sucralose, saccharin, cyclamate, aspartame, acesulfame potassium or other salts, or sweeteners of neotame, and at least one sweet taste modifier An amino acid additive and at least one sweet taste improving organic acid additive are used.

⁵⁶⁹⁵ In a specific embodiment, the at least one sweet taste improving amino acid additive is present in an amount of about 100 to about 25,000 ppm of the composition and the at least one sweet taste improving organic acid additive is present in an amount of From about 10 to about 5,000 ppm.

⁵⁶⁹⁸ Non-limiting examples thereof include at least one functional ingredient and contain rebaudioside A (REBA), stevia, stevioside, mogroside IV, mogroside V, monk fruit sweetener, monatin, curcululin, three Sucralose, saccharin, sweetener, aspartame, acesulfame potassium or other salts, or sweeteners of neotame, as well as glycine and sodium gluconate.

[0872]

⁵⁷⁰⁵ In another specific example, the provided functional sweetener composition comprises at least one functional ingredient and contains rebaudioside A (REBA), stevia, stevioside, mogroside IV, mogroside V, mogroside Flavoring agents, monatin, curculin, sucralose, saccharin, cyclamate, aspartame, acesulfame potassium or

other salts, or sweeteners of neotame, and at least one sweet taste modifier Amino acid additives and one carbohydrate additive for improving sweet taste are used.

5710 In a specific embodiment, the at least one sweet taste improving amino acid additive is present in an amount of about 100 to about 25,000 ppm of the composition and the at least one sweet taste improving carbohydrate additive is present in an amount of about 1,000 to about 100,000 ppm.

5713 Its non-limiting examples include at least one functional ingredient and contain rebaudioside A (REBA), stevia, stevioside, mogroside IV, mogroside V, monk fruit sweetener, monatin, curcululin, three Sucralose, saccharin, sweetener, aspartame, acesulfame potassium or other salts, or sweeteners of neotame, as well as L-alanine and fructose.

[0873]

5720 In another specific example, the provided functional sweetener composition comprises at least one functional ingredient and contains rebaudioside A (REBA), stevia, stevioside, mogroside IV, mogroside V, mogroside Flavoring agents, monatin, curculin, sucralose, saccharin, cyclamate, aspartame, acesulfame potassium or other salts, or sweeteners of neotame, and at least one sweet taste modifier Amino acid additives, at least one sweet taste improving polyol additive, at least one sweet taste improving inorganic salt additive and at least one sweet taste improving organic acid salt additive are used.

5726 In a particular embodiment, the at least one sweet taste improving amino acid additive is present in an amount of about 100 to about 25,000 ppm of the composition, and the at least one sweet taste improving polyol additive is present in an amount of about 25,000 ppm of the composition. 400 to about 80,000ppm, the amount of the at least one sweet taste improving inorganic salt additive is about 25 to about 5,000ppm of the composition, and the amount of the at least one sweet taste improving organic acid salt additive is the From about 20 to about 10,000 ppm of the composition.

5732 Its non-limiting examples include at least one functional ingredient and contain rebaudioside A (REBA), stevia, stevioside, mogroside IV, mogroside V, monk fruit sweetener, monatin, curculin, three Sucralose, saccharin, sweetener, aspartame, acesulfame potassium or other salts, or sweeteners of neotame, as well as erythritol, glycine, KCl, KH₂PO₄ and choline chloride.

[0874]

5739 In another specific example, the provided functional sweetener composition comprises at least one functional ingredient and contains rebaudioside A (REBA), stevia, stevioside, mogroside IV, mogroside V, mogroside Flavoring agents, monatin, curculin, sucralose, saccharin, cyclamate, aspartame, acesulfame potassium or other salts, or sweeteners of neotame, and at least one sweet taste modifier Amino acid additives, at least one sweet taste improving carbohydrate additive and at least one sweet taste improving polyol additive are used.

5744 In a specific embodiment, the at least one sweet taste improving amino acid additive is present in an amount of about 100 to about 25,000 ppm of the composition, and the at least one sweet taste improving carbohydrate additive is present in an amount of about 1,000 to about 100,000 ppm, and the at least one sweet taste improving polyol additive is present in an amount of about 400 to about 80,000 ppm of the composition.

5749 Its non-limiting examples include at least one functional ingredient and contain rebaudioside A (REBA),

stevia, stevioside, mogroside IV, mogroside V, monk fruit sweetener, monatin, curcululin, three Sucralose, saccharin, sweetener, aspartame, acesulfame potassium or other salts, or sweeteners of neotame, as well as L-alanine, fructose and erythritol.

[0875]

⁵⁷⁵⁶ In another specific example, the provided functional sweetener composition comprises at least one functional ingredient and contains rebaudioside A (REBA), stevia, stevioside, mogroside IV, mogroside V, mogroside Flavoring agents, monatin, curculin, sucralose, saccharin, cyclamate, aspartame, acesulfame potassium or other salts, or sweeteners of neotame, and at least one sweet taste modifier Amino acid additives, at least one polyol additive for improving sweet taste and at least one inorganic acid salt additive for improving sweet taste are used.

⁵⁷⁶² In a particular embodiment, the at least one sweet taste improving amino acid additive is present in an amount of about 100 to about 25,000 ppm of the composition, and the at least one sweet taste improving polyol additive is present in an amount of about 25,000 ppm of the composition. 400 to about 80,000 ppm, the at least one sweet taste improving mineral acid salt additive is present in an amount of about 25 to about 5,000 ppm of the composition.

⁵⁷⁶⁷ Its non-limiting examples include at least one functional ingredient and contain rebaudioside A (REBA), stevia, stevioside, mogroside IV, mogroside V, monk fruit sweetener, monatin, curcululin, three Sucralose, saccharin, sweetener, aspartame, acesulfame potassium or other salts, or sweeteners of neotame, as well as erythritol, glycine, KCl, and KH₂PO₄.

[0876]

⁵⁷⁷⁴ In another specific example, the provided functional sweetener composition comprises at least one functional ingredient and contains rebaudioside A (REBA), stevia, stevioside, mogroside IV, mogroside V, mogroside Flavoring agents, monatin, curculin, glycyrrhizin such as glycyrrhizinate monoammonium salt hydrate, sucralose, saccharin, sweetener, aspartame, acesulfame potassium or other salts, or The sweetener of neotame, and at least one inorganic acid salt additive for improving sweet taste.

⁵⁷⁷⁹ Non-limiting examples thereof include at least one functional ingredient and contain rebaudioside A (REBA), stevia, stevioside, mogroside IV, mogroside V, monk fruit sweetener, monatin, curculin, licorice Such as glycyrrhizinate monoammonium salt hydrate, sucralose, saccharin, cyclamate, aspartame, acesulfame potassium or other salts, or sweeteners of neotame, and sodium chloride.

[0877]

⁵⁷⁸⁶ In another specific example, the provided composition comprises at least one functional ingredient and contains rebaudioside A (REBA), stevia, stevioside, mogroside IV, mogroside V, monk fruit sweetener, mona Curculigo, curculin, liquiritigen such as glycyrrhizinate monoammonium salt hydrate, sucralose, saccharin, cyclamate, aspartame, acesulfame potassium or other salts, or sweeteners of neotame, and At least one sweet taste improving polyol additive and at least one sweet taste improving organic acid additive.

⁵⁷⁹¹ Preferably, the at least one sweet taste improving polyol additive is present in an amount of about 20,000 to

about 50,000 ppm of the composition, and the at least one sweet taste improving organic acid additive is present in an amount of about 10 ppm of the composition. To about 5,000ppm.

5794 When the composition contains more than one sweet taste improving organic acid additive, the amount of the plurality of sweet taste improving organic acid additives is from about 500 to about 2,500 ppm of the composition, more preferably About 500 to about 1,500 ppm.

5797 In a specific embodiment, the aforementioned composition further comprises at least one inorganic acid additive for improving sweet taste, at least one inorganic acid salt additive for improving sweet taste, and at least one organic acid for improving sweet taste Salt additives, or combinations thereof.

[0878]

5803 In another embodiment, the provided composition comprises at least one functional ingredient and a sweetener composition containing REBA, at least one sweet taste improving polyol additive and at least one sweet taste improving organic acid additive .

5806 Preferably, the REBA has a purity of from about 50 to about 100% REBA by weight in the steviol glycoside mixture, preferably from about 80 to about 99.5% by weight REBA, more preferably from about 97 to about 99.5% by weight % of REBA.

5809 In a particular embodiment, the REBA is present in an amount of about 100 to about 3,000 ppm of the composition, more preferably about 200 to about 2,000 ppm of the composition, more preferably about 250 to about 2,000 ppm of the composition 750ppm.

5812 Preferably, the at least one sweet taste improving polyol additive is present in an amount of about 20,000 to about 50,000 ppm of the composition, and the at least one sweet taste improving organic acid additive is present in an amount of about 10 ppm of the composition. To about 5,000ppm.

5815 In a particularly preferred embodiment, the at least one sweet taste improving polyol additive is present in an amount of about 30,000 to about 40,000 ppm of the composition, and the at least one sweet taste improving organic acid additive is present in an amount of the composition About 500 to about 2,500 ppm of matter.

5818 In a specific embodiment, the plurality of sweet taste improving organic acid additives is present in the sweetener composition in an amount of about 500 to about 2,500 ppm of the composition, the plurality of organic acid additives comprising about 40 to about A mixture of 250 ppm lactic acid, citric acid in an amount from about 150 to about 460 ppm, malic acid in an amount from about 150 to about 460 ppm, and tartaric acid in an amount from about 150 to about 460 ppm.

5823 Non-limiting examples thereof include REBA with erythritol, lactic acid, citric acid, malic acid, tartaric acid, or combinations thereof.

5825 In a specific embodiment, the composition contains 34,000 ppm erythritol, 80 ppm lactic acid, 310 ppm citric acid, 310 ppm malic acid, 310 ppm tartaric acid and 550 ppm REBA. Preferably, the REBA has a purity of about 80 to about 99.5 wt. % REBA, more preferably about 97 to about 99.5 wt. % REBA in the steviol glycoside mixture. Optionally, the composition may also contain flavoring agents such as caramel, vanilla, or other flavoring agents described herein, or combinations thereof. In a specific embodiment, these compositions are carbonated beverages such as cola, although other types of beverages are also contemplated. Those skilled in the art will appreciate that the amount of sweet taste improving organic acid additive in carbonated beverages can be adjusted to obtain a pH of about 2.3 to about 3.5. In addition, those skilled in the art will appreciate that sweet taste improving inorganic acid additives such as phosphoric acid,

benzoic acid, and sorbic acid may also be used alone or in combination in carbonated beverages to achieve a pH of about 2.3 to about 3.5.

[0879]

5839 In another specific example, the aforementioned sweetener composition comprising at least one functional ingredient and REBA, at least one sweet taste improving polyol additive and at least one sweet taste improving organic acid additive The composition may further contain at least one sweet taste improving inorganic acid additive.

5843 Preferably, the at least one sweet taste improving mineral acid additive is present in an amount from about 25 to about 5,000 ppm of the composition. Non-limiting examples of the sweet taste improving inorganic acid additive include phosphoric acid, benzoic acid, sorbic acid, and combinations thereof.

[0880]

5849 In yet another specific example, the aforementioned sweetener composition comprising at least one functional ingredient and REBA, at least one sweet taste improving polyol additive and at least one sweet taste improving organic acid additive The composition also contains at least one inorganic acid salt additive for sweet taste improvement and/or at least one organic acid salt additive for sweet taste improvement.

5853 Preferably, the at least one sweet taste improving mineral acid salt additive is present in an amount of about 25 to about 5,000 ppm, more preferably about 50 to about 250 ppm, most preferably about 150 ppm of the composition. Preferably, the at least one sweet taste improving organic acid salt additive is present in an amount of about 20 to about 10,000 ppm, more preferably about 50 to about 350 ppm, most preferably about 148 ppm of the composition. Non-limiting examples thereof include REBA with erythritol, sodium chloride or magnesium chloride, and lactic acid, citric acid, malic acid, tartaric acid, or combinations thereof; REBA with erythritol, potassium or sodium citrate, and lactic acid, citric acid, malic acid, tartaric acid, or combinations thereof; or REBA and erythritol, sodium chloride and sodium citrate, lactic acid, citric acid, malic acid, and tartaric acid, or combinations thereof.

[0881]

5865 In another specific example, the aforementioned sweetener composition comprising at least one functional ingredient and REBA, at least one sweet taste improving polyol additive, at least one sweet taste improving inorganic acid additive and The composition of at least one sweet taste improving organic acid additive may further contain at least one sweet taste improving inorganic acid salt and/or at least one sweet taste improving organic acid salt additive.

5870 Preferably, the at least one sweet taste improving mineral acid salt additive is present in an amount of about 25 to about 5,000 ppm, more preferably about 50 to about 250 ppm, most preferably about 150 ppm of the composition. Preferably, the at least one sweet taste improving organic acid salt additive is present in an amount of about 20 to about 10,000 ppm, more preferably about 50 to about 350 ppm, most preferably about 148 ppm of the composition. Non-limiting examples thereof include REBA with erythritol, phosphoric acid, sodium chloride, or magnesium chloride, and lactic acid, citric acid, malic acid, tartaric

acid, or combinations thereof; REBA with erythritol, phosphoric acid, potassium citrate, or citric acid Sodium, and lactic acid, citric acid, malic acid, tartaric acid, or combinations thereof; or REBA and erythritol, phosphoric acid, sodium chloride, and sodium citrate, lactic acid, citric acid, malic acid, and tartaric acid, or combinations thereof.

[0882]

- ⁵⁸⁸³ The preferred weight ratio of the natural and/or synthetic high-potency sweetener to the sweet taste improving composition in the functional sweetener composition will depend on the particular natural and/or synthetic high-potency sweetener, and the final product or edible composition Depending on the desired sweetness and other characteristics of the product.
- ⁵⁸⁸⁷ Natural and/or synthetic high-potency sweeteners vary widely in potency, ranging from 30 times more potent than sucrose to approximately 8,000 times more potent than sucrose on a weight basis. Generally, the weight ratio of the natural and/or synthetic high-potency sweetener to the sweet taste improving composition may range from, for example, 10,000:1 to about 1:10,000, and a further non-limiting example is about 9,000:1 to about 1: The range of 9,000, another example is about 8,000:1 to about 1:8,000, another example is about 7,000:1 to about 1:7,000, another example is about 6,000:1 to about 1:6,000 Range, another example is the range of about 5,000:1 to about 1:5,000, another example is the range of about 4,000:1 to about 1:4,000, and another example is the range of about 3,000:1 to about 1:3,000, Another example is in the range of about 2,000:1 to about 1:2,000, another example is in the range of about 1,500:1 to about 1:1,500, another example is in the range of about 1,000:1 to about 1:1,000, and yet another An example is in the range of about 900:1 to about 1:900, another example is in the range of about 800:1 to about 1:800, yet another example is in the range of about 700:1 to about 1:700, another example is A range of about 600:1 to about 1:600, another example is a range of about 500:1 to about 1:500, another example is a range of about 400:1 to about 1:400, and another example is about 300 :1 to about 1:300, another example is about 200:1 to about 1:200, another example is about 150:1 to about 1:150, another example is about 100:1 to about 1:100, another example is about 90:1 to about 1:90, another example is about 80:1 to about 1:80, and another example is about 70:1 to about The range of 1:70, another example is the range of about 60:1 to about 1:60, another example is the range of about 50:1 to about 1:50, another example is about 40:1 to about 1: The range of 40, another example is the range of about 30:1 to about 1:30, another example is the range of about 20:1 to about 1:20, and another example is about 15:1 to about 1:15 Range, another example is the range of about 10:1 to about 1:10, another example is the range of about 9:1 to about 1:9, another example is the range of about 8:1 to about 1:8, Yet another example is in the range of about 7:1 to about 1:7, another example is in the range of about 6:1 to about 1:6, yet another example is in the range of about 5:1 to about 1:5, another An example is in the range of about 4:1 to about 1:4, another example is in the range of about 3:1 to about 1:3, another example is in the range of about 2:1 to about 1:2, and another example is It is about 1:1, depending on the particular natural and/or synthetic high-potency sweetener selected.

[0883]

- ⁵⁹¹⁶ It is contemplated that the combination of the at least one natural and/or synthetic high-potency sweetener and the at least one sweet taste improving composition may be performed in any manner that does not

deteriorate or unduly affect the functional sweetener composition or the functionally already functional sweetener composition. The sweetening of the taste of the composition is carried out at a pH range.

⁵⁹²⁰ A non-limiting example of such a pH range can be between about 2 and about 8. Yet another example includes a pH range of about 2 to about 5.

[0884]

⁵⁹²⁵ Those skilled in the art may combine at least one natural and/or synthetic high-potency sweetener, at least one sweet taste improving composition, and at least one functional ingredient in any manner.

⁵⁹²⁷ For example, at least one natural and/or synthetic high-potency sweetener and at least one functional ingredient can be added to the functional sweetener composition prior to the addition of the at least one sweet taste improving composition. In another example, at least one natural and/or synthetic high-potency sweetener and at least one functional ingredient can be added to the functional sweetener composition after adding the at least one sweet taste improving composition. In yet another example, the at least one sweet taste improving composition is added to the functional sweetener composition simultaneously with at least one natural and/or synthetic high-potency sweetener and at least one functional ingredient. In another example, the at least one natural and/or synthetic high-potency sweetener can be added prior to adding the at least one sweet taste improving composition and at least one functional ingredient to the functional sweetener composition. In another example, the at least one natural and/or synthetic high-potency sweetener can be added after the at least one sweet taste improving composition and the at least one functional ingredient are added to the functional sweetener composition.

[0885]

⁵⁹⁴² In yet another embodiment, at least one natural and/or synthetic high-potency sweetener can be mixed with the at least one sweet taste improving composition and at least one functional ingredient before adding to the edible composition middle.

⁵⁹⁴⁵ For example, the at least one natural and/or synthetic high-potency sweetener (which may be in purified, diluted or concentrated form and in liquid (e.g. solution), solid (e.g. powder, slab, pellet, granule, cubes, crystals, etc.), suspension, gaseous state or combinations thereof) and the at least one sweet taste improving composition (which may be in purified, diluted or concentrated form and in liquid (such as solution), solid (such as powder, thick tablets, pellets, granules, cubes, crystals, etc.), suspension, gaseous state or combinations thereof) and with the at least one functional ingredient (which may be in purified, diluted or concentrated form and in liquid (such as solution), solid (such as powder, slabs, pellets, granules, cubes, crystals, etc.), suspension, gaseous state or a combination thereof) contact, and then contact with the edible composition together. In another embodiment, when there are multiple natural and/or synthetic high-potency sweeteners, multiple sweet taste improving compositions or multiple functional ingredients, each component of the functional sweetener composition can be simultaneously, in sequential form, in random form or in any other form.

[0886]

5960 IV.

5961 Tabletop functional sweetener composition

[0887]

5965 In a specific embodiment of the present invention, the functional sweetener composition includes a tabletop functional sweetener composition, which contains at least one natural and/or synthetic high-potency sweetener and: (i) at least one (ii) at least one bulking agent; and (iii) optionally at least one sweet taste improving composition and/or anti-caking agent with a preferred temporal and/or taste change profile.

5969 According to a particular embodiment, suitable "bulking agents" include maltodextrin (10DE, 18DE or 5DE), corn syrup solids (20 or 36DE), sucrose, fructose, glucose, invert sugar, sorbitol, xylose, kernel Ketose, mannose, xylitol, mannitol, galactitol, erythritol, maltitol, lactitol, isomalt, maltose, tagatose, lactose, inulin, glycerin, propylene glycol, polyols, polydextrose, fructooligosaccharides, cellulose and cellulose derivatives, etc., and mixtures thereof. Additionally, granulated sugar (sucrose) or other caloric sweeteners such as crystalline fructose, other carbohydrates, or sugar alcohols may also be used as bulking agents in accordance with other embodiments of the invention because they provide good content uniformity without adding significant heat. In one embodiment, a bulking agent can be used as a sweet taste improving composition.

[0888]

5981 As used herein, the terms "anti-caking agent" and "flow agent" refer to any agent that prevents, reduces, inhibits or suppresses the attachment, binding or interaction of at least one natural and/or synthetic high-potency sweetener molecule with other natural and/or Or synthetic high-efficiency sweetener molecular contact composition.

5985 Alternatively, the anti-caking agent can be any composition that contributes to content uniformity and uniform dissolution. According to certain embodiments, non-limiting examples of such anti-caking agents include cream of tartar, calcium silicate, silicon dioxide, microcrystalline cellulose (Avicel, FMC BioPolymer, Philadelphia, PA), and tricalcium phosphate. In one embodiment, the content of the anti-caking agent in the tabletop functional sweetener composition is about 0.001 to about 3% by weight of the tabletop functional sweetener composition.

[0889]

5994 Tabletop functional sweetener compositions are made and packaged in many different forms and by tabletop functional sweetener compositions of the present invention is meant any form known in the art.

5996 According to a particular embodiment, non-limiting examples thereof include powder forms, granular forms, packets, tablets, sachets, pellets, cubes, solids, and liquids.

[0890]

6001 In one embodiment, the tabletop functional sweetener composition comprises a single serving (portion

control) packet containing a dry-blend of a functional sweetener blend.

6003 Dry blend formulations generally contain powders or granules. Although the tabletop functional sweetener packet can be any size, a non-limiting example shown of a conventional portion control tabletop functional sweetener packet is 2.5 x 1.5 inches in size and contains about 1 grams, sweetener composition equivalent to 2 teaspoons of granulated sugar (approximately 8 grams). The amount of natural and/or synthetic high-potency sweeteners in the dry mix tabletop functional sweetener formulations varies based on the differences in potency of the various natural and/or synthetic high-potency sweeteners. In a specific embodiment, the dry mix tabletop functional sweetener blend contains natural and/or synthetic high-potency sweeteners in an amount of about 100% of the tabletop functional sweetener composition. 1% (w/w) to about 10% (w/w).

[0891]

6014 Specific examples of solid tabletop functional sweeteners include cubes and tablets.

6015 A non-limiting example of a conventional cube size is equivalent to a standard cube size of granulated sugar, which is approximately 2.2 x 2.2 x 2.2 cubic centimeters and weighs approximately 8 grams. In one embodiment, the solid tabletop sweetener is in the form of a tablet or any other form known in the art.

[0892]

6021 Tabletop functional sweetener compositions can also be in liquid form, wherein the NHPS is combined with a liquid carrier.

6023 Suitable non-limiting examples of carriers for liquid tabletop functional sweeteners include water, alcohols, polyols, glycerin bases or citric acid bases dissolved in water, and mixtures thereof. Based on the performance difference of different high-potency sweeteners, the amount of the high-potency sweeteners in the liquid tabletop functional sweetener blend is also different. The sweetness equivalents of any form of tabletop functional sweetener composition described herein or known in the art can be varied to obtain the desired profile of sweetness. For example, the sweetness of the tabletop functional sweetener composition is comparable to the sweetness of an equivalent amount of standard sugar. In another embodiment, the sweetness of the table-top functional sweetener composition can be as high as 100 times the sweetness of an equivalent amount of sugar. In other specific examples, the sweetness of the desktop functional sweetener composition is as high as 90 times, 80 times, 70 times, 60 times, 50 times, 40 times, 30 times, 20x, 10x, 9x, 8x, 7x, 6x, 5x, 4x, 3x and 2x.

[0893]

6037 In a specific example, the table-top functional sweetener composition can also be formulated for special purposes, such as for beverages, food, drugs, cosmetics, herbs/vitamins, tobacco and any other sweetened products.

6040 For example, a tabletop functional sweetener composition for baking can be formulated with additional protective agents, such as encapsulants. Other forms will also be apparent to those skilled in the tabletop sweetener art.

[0894]

6046 A commonly used method for making powdered or granular functional sweetener blends for packets involves fluidized bed granulation.

6048 Other methods of making tabletop sweetener compositions are also known to those skilled in the art.

[0895]

6052 Those skilled in the art will appreciate that the amounts and types of natural and/or synthetic high-potency sweeteners and sweet taste improving compositions, bulking agents, and/or anti-caking agents may be adjusted to modify the tabletop sweetener. The taste of the flavor composition is obtained to obtain the desired variation and applicable end use.

[0896]

6059 Specific examples of preparation methods for tabletop sweetener compositions and tabletop functional sweetener compositions are disclosed in U.S. Patent Provisional Application No. 60, filed June 19, 2006, to Prakash et al. /No. 805,209, which is hereby incorporated by reference in its entirety.

[0897]

6065 V.

6066 edible composition

[0898]

6070 As used herein, "edible composition" and "sweetenable composition" are synonymous and refer to substances that come into contact with the mouth of humans or animals, including substances that are placed in the mouth and then spit out, and Substances that are safe for human or animal ingestion (whether by drinking, eating, swallowing or otherwise ingesting) when used.

6074 Such compositions include food, beverages, drugs, tobacco, nutritional products, oral hygiene products/cosmetics, and the like.

6076 Non-limiting examples of such products include non-carbonated and carbonated beverages such as cola, ginger ale, root beers, cider, fruit-flavored refreshments (such as citrus-flavored refreshments such as lemon-lime or orange flavored soft drinks), powdered refreshing drinks, etc.; vegetable juices from fruits or vegetables, juices including squeezed juices, juices containing fruit particles, fruit drinks, juice drinks, drinks containing fruit juices, and Beverages flavored with fruit flavoring agents, vegetable juices, vegetable juices containing vegetables, and mixed vegetable juices containing fruits and vegetables; sports drinks, energy drinks, drinks similar to water, etc. (such as water containing natural or synthetic flavoring agents); tea Beverages of different types or preferences such as coffee, cocoa, black tea, green tea, oolong tea, etc.; beverages containing milk ingredients such as milk beverages, coffee containing milk ingredients, coffee with milk, milk tea, fruit juice milk drinks, yogurt, lactic acid bacteria drinks, etc.; Dairy products; Baked goods;

Desserts such as yogurt, jelly, drinking jelly, pudding, Bavarian cream, custard, pastry, chocolate brownie, mousse, etc., sweets for snack time or after meals; Frozen food; Cold desserts, Such as ice cream types such as ice cream, ice milk, lacto-ice, etc. (food; which is made by adding sweeteners and various other types of ingredients to milk products, stirring and freezing the resulting mixture), and ice desserts such as sherbet, dessert ices, etc. (food; which is prepared by adding various types of ingredients to a sugary liquid, stirring and freezing the resulting mixture); ice cream; generally Western desserts, such as baked or steamed snacks, such as pastries, crackers, biscuits, bean paste buns, etc.; rice cakes and snacks; table-top foods; general sugary snacks such as chewing gum (such as , including those containing a substantially water-insoluble, chewable gum base, such as gummies or substitutes thereof, including jetulong, guttakay rubber or certain edible natural synthetic resins or waxes composition), hard candy, soft candy, mint candy, nougat, jelly beans, etc.; sauces include fruit-flavored sauces, chocolate sauces, etc.; edible gels; creams include butter, masa , whipped cream, etc.; jams include strawberry jam, orange marmalade, etc.; breads include sweet bread, etc. or other starch products; spices; Soy sauce, tomato sauce, gravy, noodle soup, etc.; processed agricultural products, livestock products or seafood; processed meat products such as sausages, etc.; distilled food, pickles, pickles cooked with soy sauce, delicacies, side dishes; Snacks such as potato chips, biscuits, etc.; cereal products; drugs or quasi-drugs (such as vitamins, cough syrup, cough drops, chewable tablets, amino acids, bitter-tasting medicine substances or medicaments, acidifying agents, etc.), wherein the drug may be in solid, liquid, gel, or gaseous form such as pellets, tablets, sprays, capsules, syrups, drops, lozenges, powders, etc.; personal hygiene products Such as other oral compositions such as breath fresheners, mouthwashes, mouthwashes, toothpaste, teeth whiteners, dentifrices, breath fragrances, teeth whiteners, etc.; dietary supplements; smoking products including cigarettes and Smokeless tobacco products such as snuff, cigarettes, pipes and cigar products, and all forms of tobacco such as cut tobacco filler, its leaves, stems, stems, homogenized leaves after curing, re-bonding agent and from tobacco dust, Reconstituted tobacco obtained from particulate or other sources and in sheet, pellet or other form, smoke substitutes, tobacco infused or chewable tobacco from non-tobacco materials; animal feed; and nutritional products, including any Food or part of food that may provide medical or health benefits, including the prevention and treatment of diseases such as cardiovascular disease and high blood cholesterol levels, diabetes, osteoporosis, inflammation or autoimmune diseases.

[0899]

⁶¹¹⁷ In general, the amount of such natural and/or synthetic high-potency sweeteners in a sweetened composition will vary greatly depending on the particular type of sweetened composition and its desired level of sweetness.

⁶¹²⁰ Those skilled in the art can readily perceive the appropriate amount of sweetener to add to the sweetened composition.

⁶¹²² In certain embodiments, the at least one natural and/or synthetic high-potency sweetener is present in the sweetened composition in an amount ranging from about 1 to about 5,000 ppm of the sweetened composition, and the at least one sweetener The amount of the taste improving composition in the sweetened composition ranges from about 0.1 to about 100,000 ppm of the sweetened composition

[0900]

⁶¹²⁹ According to certain embodiments, suitable amounts of natural high-potency sweeteners in the sweetenable composition include about 100 ppm to about 3,000 ppm rebaudioside A; about 50 ppm to about 3,000 ppm stevia; about 50 ppm to about 3,000 ppm stevioside; about 50 ppm to about 3,000 ppm mogroside IV; about 50 ppm to about 3,000 ppm mogroside V; about 50 ppm to about 3,000 ppm monk fruit sweetener; about 5 ppm to about 300 ppm monatin; about 5 ppm to about 200 ppm thaumatin; and about 50 ppm to about 3,000 ppm glycyrrhizinate monoammonium salt hydrate.

[0901]

⁶¹³⁸ According to certain embodiments, suitable amounts of synthetic high-potency sweeteners in the sweetenable composition include about 1 ppm to about 60 ppm elitan; about 10 ppm to about 600 ppm aspartame; about 1 ppm to about 20 ppm neotame; 10 ppm to about 500 ppm acesulfame potassium; about 50 ppm to about 5,000 ppm cyclamate; about 10 ppm to about 500 ppm saccharin; about 5 ppm to about 250 ppm sucralose; about 1 ppm to about 20 ppm N-[N-[3-(3-Hydroxy-4-methoxyphenyl)propyl]-L- α -aspartyl]-L-phenylalanine 1-methyl ester; about 1 ppm to about 20 ppm of N-[N-[3-(3-Hydroxy-4-methoxyphenyl)-3-methylbutyl]-L- α -aspartyl]-L-phenylalanine 1-methyl ester; and about 1 ppm to about 20 ppm N-[N-[3-(3-methoxy-4-hydroxyphenyl)propyl]-L- α -aspartyl]-L-phenylalanine 1-methyl ester.

[0902]

⁶¹⁴⁹ In one embodiment, the edible composition is a carbonated beverage, which contains at least one natural and/or synthetic high-potency sweetener, at least one sweet taste improving composition and at least one functional ingredient; wherein the at least one Natural and/or synthetic high-potency sweeteners containing rebaudioside A (rebaudioside A), rebaudioside B, rebaudioside C, rebaudioside D, rebaudioside E, rebaudioside F, Dulcoside A, dulcoside B, rubusoside, stevia, stevioside, mogroside IV, mogroside V, monk fruit sweetener, siamenoside, monatin and its salts (Monatin SS, RR, RS, SR), curculin, glycyrrhizic acid and its salts, thaumatin, monellin, mabinlin, brazzein, hernandulcin, phyllodulcin, glycyphyllin, phlorizin (phloridzin), trilobatin, baiyunoside, osladin, polypodoside A, pterocaryoside A, pterocaryoside B, mukurozioside, phlomisioside I, periandrin I, abrusoside A and cyclocarioside I, sucralose, Acesulfame potassium or other salts, aspartame, elitan, saccharin, neohesperidin dihydrochalcone, sweetener, neotame, N-[N-[3-(3-hydroxy-4-Methoxyphenyl)propyl]-L- α -aspartyl]-L-phenylalanine 1-methyl ester, N-[N-[3-(3-hydroxy-4-methoxyphenyl)-3-methylbutyl]-L- α -aspartyl]-L-phenylalanine 1-methyl ester, N-[N-[3-(3-methoxy-4-hydroxy Phenyl)propyl]-L- α -aspartyl]-L-phenylalanine 1-methyl ester, salts thereof, or combinations thereof; wherein the at least one sweet taste improving composition is selected from Carbohydrates, polyols, amino acids and their corresponding salts, polyamino acids and their corresponding salts, sugar acids and their corresponding salts, organic acids, inorganic acids, organic salts, inorganic salts, bitter taste Compounds, Flavors, Astringent Compounds, Polymers, Proteins or Proteins quality hydrolyzate, surfactant, emulsifier, flavonoid, alcohols, and combinations thereof; and wherein the at least one functional ingredient contains at least one phytosterol (phytosterol), phytostanol (phytostanol), its ester, or a combination thereof.

⁶¹⁶⁹ Specific combinations of sweet taste improving compositions are disclosed in U.S. Patent Provisional

[0903]

⁶¹⁷⁴ In certain embodiments, the at least one functional ingredient may require special processing to be incorporated into the functional sweetened composition.

⁶¹⁷⁶ It is especially relevant when the functionally sweetened composition is an aqueous substance and the at least one functional ingredient is a hydrophobic substance.

⁶¹⁷⁸ Techniques for incorporating hydrophobic compositions into aqueous solutions are known to those skilled in the art, non-limiting examples of which include homogenization, encapsulation, emulsification, and addition of stabilizers, gums, and the like.

[0904]

⁶¹⁸⁴ In certain embodiments, the process of making the substantially stable dispersion of the at least one functional ingredient in the aqueous functional sweetened composition comprises mixing the at least one functional ingredient with the aqueous edible composition to form a first dispersion of particles, heating the first dispersion of particles, and homogenizing the heated first dispersion particles to obtain an aqueous solution containing particles of at least one functional ingredient having a particle size ranging from about 0.1 microns to about 50 microns. Functional sweetened composition.

⁶¹⁹⁰ This approach is further disclosed in US Patent Application Nos. 10/458,692 and 11/315,206, filed October 24, 2003 and December 23, 2005, respectively, the disclosures of which are hereby incorporated by reference in their entirety.

[0905]

⁶¹⁹⁶ The functional sweetener composition and edible compositions containing it can provide health benefits beyond basic nutrition.

⁶¹⁹⁸ For example, such benefits can be cardiovascular, including lowering blood cholesterol levels and preventing or treating heart disease (such as arteriosclerosis, restenosis, and thrombosis).

[0906]

⁶²⁰³ Description of drawings

[0907]

⁶²⁰⁷ Fig. 1 is a powder x-ray diffraction scan diagram obtained in the first polymorphic form of rebaudioside A of a specific example of the present invention in the plot of scattering intensity against scattering angle 2θ ;

[0908]

6212 The 2nd figure is the powder x-ray diffraction scanning figure that the second polymorphic form of rebaudioside A of a specific example of the present invention is obtained in the plot of scattering intensity against scattering angle 2θ ;

[0909]

6218 The 3rd figure is the powder x-ray diffraction scanning figure obtained in the 3A polymorphic form of rebaudioside A of a specific example of the present invention in the plot of the scattering intensity against the scattering angle 2θ ;

[0910]

6224 The 4th figure is the powder x-ray diffraction scanning picture obtained in the 3B polymorphic form of rebaudioside A of a specific example of the present invention in the plot of the scattering intensity against the scattering angle 2θ ;

[0911]

6230 Fig. 5 is a powder x-ray diffraction scan diagram obtained from the plot of scattering intensity versus scattering angle 2θ of the fourth polymorphic form of rebaudioside A according to a specific example of the present invention.

[0912]

6236 specific embodiment

[0913]

6240 The present invention is further illustrated by the following examples, which are not intended to limit the scope of the present invention in any way.

6242 On the contrary, it should be clearly understood that there are many other different embodiments, modifications and equivalents without departing from the spirit of the present invention and/or the scope of the appended claims, which are familiar Those skilled in the art will understand after having read the description of the present invention in detail.

6246 % are by weight unless specifically defined otherwise.

[0914]

6250 a.

6251 Example Group A

[0915]

6255 Example A1

[0916]

6259 Rebaudioside A low-sugar cola drink (sweetness equivalent to 10% sucrose equivalent) is prepared by containing 1g phytosterol, 400ppm rebaudioside A and 3.5% erythritol per serving (about 240ml).

[0917]

6264 Example A2

[0918]

6268 Rebaudioside A low-sugar lemon-lime drink (sweetness equivalent to 10% sucrose equivalent) is formulated with 1g phytosterol, 400ppm rebaudioside A and 3.5% erythritol per serving (about 240ml) .

[0919]

6273 Example A3

[0920]

6277 Commercially available Minute Maid orange juice (100% juice product) was diluted with 360ppm rebaudioside A/citrate composition at a ratio of 1:1.

6279 The product contains 1 g phytosterol and 180 ppm rebaudioside A (equivalent to 5% sucrose) per serving (about 240 ml).

[0921]

6284 Example A4

[0922]

6288 A commercially available Nestle Cool Lemon Iced Tea product was diluted 1:1 with a 360 ppm rebaudioside A/citrate composition.

6290 The product contains 1 g phytosterol and 180 ppm rebaudioside A (equivalent to 5% sucrose) per serving (about 240 ml).

[0923]

6295 The following examples B1-B3, C1-C3, D, E1-E3 and F show the method for producing purified

rebaudioside A in specific examples of the present invention.

[0924]

6300 b.

6301 Embodiment Group B

[0925]

6305 Table 2: Summary of Examples B1-3

[0926]

6309

[0927]

6314 Example B1

[0928]

6318 The crude Rebaudioside A (77.4% purity) mixture was obtained from a commercial source.

6319 Impurities were identified using HPLC and quantified on a dry weight basis (6.2% stevioside, 5.6% rebaudioside C, 0.6% rebaudioside F, 1.0% other steviol glycosides, 3.0% rebaudioside D, 4.9 % rebaudioside B, 0.3% steviol diglycoside), water content 4.7%.

[0929]

6325 Crude Rebaudioside A (400 g), ethanol (95%, 1200 ml), methanol (99%, 400 ml) and water (320 ml) were mixed and heated to 50 ° C. for 10 minutes.

6327 The clear solution was cooled for 16 hours until the temperature was 22 ° C.

6328 The white crystals were filtered off and washed twice with ethanol (2x200ml, 95%) and dried in a vacuum oven at 50 ° C under reduced pressure (20mm) for 16-24 hours.

[0930]

6333 The final composition of substantially pure rebaudioside A (130 g) contains 98.91% rebaudioside A, 0.06% stevioside, 0.03% rebaudioside C, 0.12% rebaudioside F, 0.13% other stevia Alcohol glycoside, 0.1% rebaudioside D, 0.49% rebaudioside B and 0.03% steviol diglycoside, all by weight.

[0931]

6339 Example B2

[0932]

6343 Crude Rebaudioside A (80.37% purity) was obtained from a commercial source.

6344 On a dry weight basis, impurities were identified using HPLC (6.22% stevioside, 2.28% rebaudioside C, 0.35% dulcoside, 0.78% rebaudioside F, 0.72% other steviol glycosides, 3.33% lysoside Baodiside B, 0.07% steviolbioside), water content 3.4%.

[0933]

6350 Crude Rebaudioside A (100 g), ethanol (95%, 320 ml), methanol (99%, 120 ml) and water (50 ml) were mixed and heated to 30-40 ° C for 10 minutes.

6352 The clear solution was cooled for 16 hours until the temperature was 22 ° C.

6353 The white crystals were filtered off and washed twice with ethanol (2x50ml, 95%).

6354 The wet cake (88g) was slurried with ethanol (95%, 1320ml) for 16 hours, filtered and washed with ethanol (95%, 2x100ml) and dried in a vacuum oven at 60 ° C under reduced pressure (20mm) for 16-24 hours.

[0934]

6359 The final composition (72 g) of substantially pure rebaudioside A contains 98.29% rebaudioside A, 0.03% stevioside, 0.02% rebaudioside C, 0.17% rebaudioside F, 0.06% lycoside Diglycoside D and 1.09% Rebaudioside B.

6362 Steviol diglucoside was not detected by HPLC.

[0935]

6366 Example B3

[0936]

6370 Crude Rebaudioside A (80.37% purity) was obtained from a commercial source.

6371 On a dry weight basis, impurities were identified using HPLC (6.22% stevioside, 2.28% rebaudioside C, 0.35% dulcoside, 0.78% rebaudioside F, 0.72% other steviol glycosides, 3.33% lysoside Baodiside B, 0.07% steviolbioside), water content 3.4%.

[0937]

6377 Crude Rebaudioside A (50 g), ethanol (95%, 160 ml), methanol (99%, 60 ml) and water (25 ml) were mixed and heated to about 30 ° C for 10 minutes.

6379 The clear solution was cooled for 16 hours until the temperature was 22 ° C.

6380 The white crystals were filtered off and washed twice with ethanol (2x25ml, 95%).

6381 The wet cake (40g) was slurried with methanol (99%, 600ml) for 16 hours, filtered and washed with methanol (99%, 2x25ml) and dried in a vacuum oven at 60 ° C under reduced pressure (20mm) for 16-24 hours.

[0938]

6386 The final composition (27.3 g) of substantially pure rebaudioside A contains 98.22% rebaudioside A, 0.04% stevioside, 0.04% rebaudioside C, 0.18% rebaudioside F, 0.08% lysine Baodiside D and 1.03% Rebaudioside B.

6389 Steviol diglucoside was not detected by HPLC.

[0939]

6393 C.

6394 Example C group

[0940]

6398 Table 3: Summary of Examples C1-3

[0941]

6402

[0942]

6407 Example C1

[0943]

6411 A mixture of crude rebaudioside A (purity 80.37%, 5 g), ethanol (95%, 15 ml), methanol (5 ml) and water (3.5 ml) was mixed and heated to reflux for 10 minutes.

6413 The clear solution was stirred and cooled for 16 hours until the temperature was 22 ° C.

6414 The white crystalline product was filtered off, washed twice with a mixture of ethanol:methanol (5.0ml, 3:1, v/v) and dried in a vacuum oven at 50 ° C under reduced pressure (20mm) for 16-24 hours to give 2.6g of pure product (according to HPLC, purity >99%).

[0944]

6420 Example C2

[0945]

6424 A mixture of crude rebaudioside A (purity 80.37%, 5 g), ethanol (95%, 15 ml), methanol (5 ml) and water (4.0 ml) was mixed and heated to reflux for 10 minutes.

6426 The clear solution was stirred and cooled for 16 hours until the temperature was 22 ° C.

6427 The white crystalline product was filtered off, washed twice with a mixture of ethanol:methanol (5.0ml, 3:1, v/v) and dried in a vacuum oven at 50 ° C under reduced pressure (20mm) for 16-24 hours to give 2.3g of pure product (according to HPLC, purity >99%).

[0946]

6433 Example C3

[0947]

6437 A mixture of crude rebaudioside A (purity 80.37%, 5 g), ethanol (95%, 16 ml), methanol (6 ml) and water (2.5 ml) was mixed and heated to reflux for 10 minutes.

6439 The clear solution was cooled for 2 hours until the temperature was 22 ° C.

6440 During this period crystallization begins to appear.

6441 The mixture was stirred at room temperature for 16 hours.

6442 The white crystalline product was filtered off, washed twice with a mixture of ethanol:methanol (5.0ml, 8:3, v/v) and dried in a vacuum oven at 50 ° C under reduced pressure (20mm) for 16-24 hours to obtain 3.2g of pure product (according to HPLC, purity >98%).

[0948]

6448 d.

6449 Example D group

[0949]

6453 Table 4: Summary of Example D

[0950]

6457

[0951]

6462 The crude Rebaudioside A (purity 80.37%, 50 g) mixture, ethanol (95%, 160 ml) and water (40 ml) were mixed and heated to reflux for 30 minutes.

6464 The mixture was cooled at room temperature for 16-24 hours.

6465 The white crystalline product was filtered off, washed twice with ethanol (95%, 25ml) and dried in a vacuum oven at 60 ° C under reduced pressure (20mm) for 16-24 hours to give 19.8g of pure product (purity 99.5% according to HPLC).

[0952]

6471 E.

6472 Embodiment Group E

[0953]

6476 Table 5: Summary of Examples E1-3

[0954]

6480

[0955]

6485 Example E1

[0956]

6489 The crude rebaudioside A mixture (purity 41%, 50g), ethanol (95%, 160ml), methanol (99.8%, 60ml) and water (25ml) were stirred and mixed at 22 ° C.

6491 A white product crystallizes out within 5-20 hours.

6492 The mixture was stirred for an additional 48 hours.

6493 The white crystalline product was filtered off and washed twice with ethanol (25 ml, 95%).

6494 The wet cake of white crystalline product was slurried with methanol (99.8%, 200ml) for 16 hours, filtered and washed twice with methanol (99.8%, 25ml) and dried in a vacuum oven at 60 ° C under reduced pressure (20mm) for 16-24 hours , resulting in 12.7 g of pure product (purity >97% by HPLC).

[0957]

6500 Example E2

[0958]

6504 The crude rebaudioside A mixture (purity 48%, 50g), ethanol (95%, 160ml), methanol (99.8%, 60ml) and water (25ml) were stirred and mixed at 22 ° C.

6506 A white product crystallizes out within 3-6 hours.

6507 The mixture was stirred for an additional 48 hours.

6508 The white crystalline product was filtered off and washed twice with ethanol (25 ml, 95%).

6509 The wet cake of white crystalline product was slurried with methanol (99.8%, 300ml) for 16 hours, filtered and washed twice with methanol (99.8%, 25ml) and dried in a vacuum oven at 60 ° C under reduced pressure (20mm) for 16-24 hours , resulting in 18.6 g of pure product (purity >97% by HPLC).

[0959]

6515 Example E3

[0960]

6519 The crude rebaudioside A mixture (purity 55%, 50g), ethanol (95%, 160ml), methanol (99.8%, 60ml) and water (25ml) were mixed and stirred at 22 ° C.

6521 A white product crystallizes out within 15-30 minutes.

6522 The mixture was stirred for an additional 48 hours.

6523 The white crystalline product was filtered off and washed twice with ethanol (25ml, 95%).

6524 The wet cake of white crystalline product was slurried with methanol (99.8%, 350ml) for 16 hours, filtered and washed twice with methanol (99.8%, 25ml) and dried in a vacuum oven at 60 ° C under reduced pressure (20mm) for 16-24 hours , resulting in 22.2 g of pure product (purity >97% by HPLC).

[0961]

6530 Example F

[0962]

6534 A solution of Rebaudioside A (purity >97% according to HPLC) was prepared by mixing Rebaudioside A (12.5 g in 50 ml, 25% concentration) with double distilled water and stirring the mixture at 40 ° C. for 5 minutes.

6537 The amorphous rebaudioside A polymorph was formed by immediately spray drying the clear solution with a Lab-Plant spray dryer SD-04 unit (Lab-Plant Ltd., West Yorkshire, UK).

6539 The solution was fed into a nozzle sprayer through a feed pump, and the solution was atomized into a droplet spray by means of a quantitative flow of nitrogen/air.

6541 Under the constant temperature (approximately 90 to 97 ° C) and airflow conditions in the drying chamber, the moisture will evaporate from the droplets and form dry particles.

6543 Dry powder (11-12 g, H₂O 6.74%) was continuously drained from the drying chamber and collected in bottles.

6545 It has been determined that its solubility in water at room temperature is >35.0%.

[0963]

6549 Embodiment Group G

[0964]

6553 The sensory evaluation results of the samples obtained in Example G group were carried out according to the following steps similar to those described above.

6555 During this test procedure, none of the samples were swallowed.

6556 All samples were spit out and rinsed with water after tasting.

6557 The sample was spit out immediately after the maximum sweetness was felt, the mouth was rinsed with water and the speed at which the sweetness faded ("sweet linger") was measured, paying particular attention to the sweetness experienced within 3-4 minutes after rinsing with water.

6560 After tasting the sample, chew some salty oyster crackers, rinse your mouth with water, and rest for at least 5 minutes before tasting the next sample.

6562 The sweetness lingering situation was evaluated by a panel of food and beverage sensory evaluation experts using the following scoring method: 0=no sweetness lingering, 1=slight sweetness lingering, 2=slight sweetness lingering, 3=sweetness Moderate procrastination, 4 = moderately high procrastination on sweetness, 5 = high procrastination on sweetness.

[0965]

6569 The degree of "sweetness linger" of sucrose measured by these methods was defined as 0.

6570 The sweetness lingering degree of 500ppm REBA control group sample was then defined as 5.

6571 Experimental samples were tasted using the same procedure, always with sufficient time between tastings to ensure that the sensory system was rebalanced.

6573 Personnel were allowed and encouraged to re-taste control samples during the experiment.

[0966]

6577 Comparative taste tests were conducted between two control groups and after addition of sweet taste improving additives for sweet taste onset and/or sweet taste linger.

[0967]

6582 control sample

[0968]

6586 REBA is a natural non-caloric sweetener with a very clean taste profile (i.e., only sweetness) and an acceptable rate of sweetness onset, but with significantly more Sweetness procrastinates the situation.

[0969]

6591 The effect of blend changes on the sweetness linger of 400 ppm REBA (equivalent to 8 g sucrose) in a citric acid/potassium citrate composition (equivalent to a low-sugar lemon-lime drink) was assessed.

6593 The sweetness lingering degree of this solution was set to 5.

[0970]

6597 Dissolve 8 g of sugar in 100 ml of citric acid buffer.

6598 The sweetness lingering degree of this control sample was set as 0.

[0971]

6602 The following Examples G1-51 show the combination of rebaudioside A and sweet taste improving composition in specific embodiments of the present invention.

[0972]

6607 Example G1

[0973]

6611 Dissolve 400ppm REBA in a citric acid/potassium citrate composition (equivalent to a low-sugar lemon-lime drink), then mix 1,250ppm trehalose into the base solution.

6613 The sweetness linger of this solution was determined to be 2.

[0974]

6617 Example G2

[0975]

6621 Dissolve 400ppm REBA in a citric acid/potassium citrate composition (equivalent to a low-sugar lemon-lime drink), then mix 10,000ppm fructo-oligosaccharide (55%) into the base solution.

6623 The sweetness linger rating of this solution was determined to be 3.

[0976]

6627 Example G3

[0977]

6631 400ppm REBA was dissolved in a citric acid/potassium citrate composition (equivalent to a low sugar lemon-

lime drink) and 200ppm Senegalese gum arabic was mixed into the base solution.
6633 The sweetness linger rating of this solution was determined to be 3.

[0978]

6637 Example G4

[0979]

6641 Dissolve 400ppm REBA in a citric acid/potassium citrate composition (equivalent to a low-sugar lemon-lime drink) and then mix 2,500ppm beta-cyclodextrin into the base solution.

6643 The sweetness linger of this solution was determined to be 3.

[0980]

6647 Example G5

[0981]

6651 Dissolve 400ppm REBA in a citric acid/potassium citrate composition (equivalent to a low sugar lemon-lime drink) and then mix 5,000ppm glycerin into this base solution.

6653 The sweetness linger rating of this solution was determined to be 3.

[0982]

6657 Example G6

[0983]

6661 Dissolve 400ppm REBA in a citric acid/potassium citrate composition (equivalent to a low-sugar lemon-lime drink), then mix 2,500ppm Fibersol-2 into this base solution.

6663 The sweetness linger of this solution was determined to be 1.

[0984]

6667 Example G7

[0985]

6671 400ppm REBA was dissolved in a citric acid/potassium citrate composition (equivalent to a low sugar lemon-lime drink) and 125ppm collagen (unflavored gelatin) was mixed into the base solution.

6673 The sweetness linger of this solution was determined to be 2.

⁶⁶⁷⁴ This blend was found to have sugar-like taste properties.

[0986]

⁶⁶⁷⁸ Example G8

[0987]

⁶⁶⁸² Dissolve 400ppm REBA in a citric acid/potassium citrate composition (equivalent to a low sugar lemon-lime drink) and then mix 2,000ppm collagen (unflavored gelatin) into this base solution.

⁶⁶⁸⁴ The sweetness linger of this solution was determined to be 3.

⁶⁶⁸⁵ This blend was found to have sugar-like taste properties.

[0988]

⁶⁶⁸⁹ Example G9

[0989]

⁶⁶⁹³ Dissolve 400ppm REBA in a citric acid/potassium citrate composition (equivalent to a low-sugar lemon-lime drink), then mix 10,000ppm D-trehalose into the base solution.

⁶⁶⁹⁵ The sweetness linger of this solution was determined to be 2.

[0990]

⁶⁶⁹⁹ Example G10

[0991]

⁶⁷⁰³ Dissolve 400ppm REBA in a citric acid/potassium citrate composition (equivalent to a low sugar lemon-lime drink) and then mix 150ppm sodium chloride into the base solution.

⁶⁷⁰⁵ The sweetness linger rating of this solution was determined to be 3.

[0992]

⁶⁷⁰⁹ Example G11

[0993]

⁶⁷¹³ Dissolve 400ppm REBA in a citric acid/potassium citrate composition (equivalent to a low sugar lemon-lime drink) and then mix 150ppm potassium chloride into the base solution.

⁶⁷¹⁵ The sweetness linger rating of this solution was determined to be 3.

[0994]

6719 Example G12

[0995]

6723 Dissolve 400ppm REBA in a citric acid/potassium citrate composition (equivalent to a low sugar lemon-lime drink) and then mix 300ppm potassium dihydrogen phosphate into the base solution.

6725 The sweetness linger of this solution was determined to be 3.

[0996]

6729 Example G13

[0997]

6733 Dissolve 500ppm REBA in 1 liter of carbon dioxide sparkling water and add phosphoric acid (75%) until the pH reaches pH 2.4 to 2.5, then mix 10,000ppm to 20,000ppm KH₂PO₄ into the base solution.

6735 The sweetness linger of this solution was determined to be 2.

[0998]

6739 Example G14

[0999]

6743 Dissolve 400ppm REBA in a citric acid/potassium citrate composition (equivalent to a low sugar lemon-lime drink) and then mix 500ppm sodium gluconate into the base solution.

6745 The sweetness linger of this solution was determined to be 4.

[1000]

6749 Example G15

[1001]

6753 Dissolve 400ppm REBA in a citric acid/potassium citrate composition (equivalent to a low sugar lemon-lime drink) and then mix 125-500ppm potassium tartrate monohydrate into this base solution.

6755 The sweetness linger rating of this solution was determined to be 3.

[1002]

6759 Example G16

[1003]

6763 400ppm REBA was dissolved in a citric acid/potassium citrate composition (equivalent to a low sugar lemon-lime drink) and 500ppm sodium tartrate dihydrate was mixed into the base solution.

6765 The sweetness linger of this solution was determined to be 2.

[1004]

6769 Example G17

[1005]

6773 Dissolve 400ppm REBA in a citric acid/potassium citrate composition (equivalent to a low-sugar lemon-lime drink), then mix 310-1,250ppm sodium glucoheptanate into the base solution.

6775 The sweetness linger of this solution was determined to be 2.

[1006]

6779 Example G18

[1007]

6783 Dissolve 400ppm REBA in a citric acid/potassium citrate composition (equivalent to a low-sugar lemon-lime drink), then mix 250-500ppm L-sodium lactate into the base solution.

6785 The sweetness linger of this solution was determined to be 3.

6786 This blend was found to have sugar-like taste properties.

[1008]

6790 Example G19

[1009]

6794 Dissolve 400ppm REBA in a citric acid/potassium citrate composition (equivalent to a low-sugar lemon-lime drink), then mix 1,000ppm L-sodium lactate into the base solution.

6796 The sweetness linger of this solution was determined to be 2.

6797 This blend was found to have sugar-like taste properties.

[1010]

6801 Example G20

[1011]

6805 Dissolve 400ppm REBA in a citric acid/potassium citrate composition (equivalent to a low sugar lemon-lime drink), then mix 600-800ppm malic acid into the base solution.

6807 The sweetness linger of this solution was determined to be 3.

[1012]

6811 Example G21

[1013]

6815 Dissolve 400ppm REBA in a citric acid/potassium citrate composition (equivalent to a low sugar lemon-lime drink) and then mix 500ppm hydroxycitric acid into the base solution.

6817 The sweetness linger of this solution was determined to be 3.

[1014]

6821 Example G22

[1015]

6825 Dissolve 400ppm REBA in a citric acid/potassium citrate composition (equivalent to a low sugar lemon-lime drink) and then mix 500ppm salicylic acid into the base solution.

6827 The sweetness linger rating of this solution was determined to be 3.

[1016]

6831 Example G23

[1017]

6835 Dissolve 400ppm REBA in a citric acid/potassium citrate composition (equivalent to a low sugar lemon-lime drink) and then mix 1,000ppm salicylic acid into this base solution.

6837 The sweetness linger of this solution was determined to be 2.

[1018]

6841 Example G24

[1019]

6845 Dissolve 400ppm REBA in a citric acid/potassium citrate composition (equivalent to a low sugar lemon-lime drink) and then mix 112ppm caffeic acid into the base solution.

6847 The sweetness linger of this solution was determined to be 1.

[1020]

6851 Example G25

[1021]

6855 Dissolve 400ppm REBA in a citric acid/potassium citrate composition (equivalent to a low sugar lemon-lime drink) and then mix 250ppm succinic acid into the base solution.

6857 The sweetness linger rating of this solution was determined to be 3.

[1022]

6861 Example G26

[1023]

6865 Dissolve 400ppm REBA in a citric acid/potassium citrate composition (equivalent to a low-sugar lemon-lime drink), then mix citric acid/malic acid in a ratio of 80:20 (weight/weight) into the base solution.

6867 The sweetness linger of this solution was determined to be 4.

[1024]

6871 Example G27

[1025]

6875 Dissolve 400ppm REBA in a citric acid/potassium citrate composition (equivalent to a low-sugar lemon-lime drink) and then mix 125ppm 2,4-dihydroxybenzoic acid into the base solution.

6877 The sweetness linger of this solution was determined to be 2.

[1026]

6881 Example G28

[1027]

⁶⁸⁸⁵ Dissolve 400ppm REBA in a citric acid/potassium citrate composition (equivalent to a low-sugar lemon-lime drink) and then mix 250ppm 2,4-dihydroxybenzoic acid into the base solution.

⁶⁸⁸⁷ The sweetness linger of this solution was determined to be 1.

[1028]

⁶⁸⁹¹ Example G29

[1029]

⁶⁸⁹⁵ Dissolve 400ppm REBA in a citric acid/potassium citrate composition (equivalent to a low-sugar lemon-lime drink), then mix 100ppm D/L alanine into the base solution.

⁶⁸⁹⁷ The sweetness linger of this solution was determined to be 3.

[1030]

⁶⁹⁰¹ Example G30

[1031]

⁶⁹⁰⁵ Dissolve 400ppm REBA in a citric acid/potassium citrate composition (equivalent to a low sugar lemon-lime drink) and then mix 100ppm theanine into this base solution.

⁶⁹⁰⁷ The sweetness linger of this solution was determined to be 1.

[1032]

⁶⁹¹¹ Example G31

[1033]

⁶⁹¹⁵ Dissolve 400ppm REBA in a citric acid/potassium citrate composition (equivalent to a low-sugar lemon-lime drink), then mix 5,000ppm to 10,000ppm glycine into the base solution.

⁶⁹¹⁷ The sweetness linger rating of this solution was determined to be 3.

[1034]

⁶⁹²¹ Example G32

[1035]

⁶⁹²⁵ Dissolve 400ppm REBA in a citric acid/potassium citrate composition (equivalent to a low sugar lemon-lime

drink) and then mix 2,500ppm creatine into this base solution.

⁶⁹²⁷ The sweetness linger of this solution was determined to be 2.

⁶⁹²⁸ This blend was found to have sugar-like taste properties.

[1036]

⁶⁹³² Example G33

[1037]

⁶⁹³⁶ Dissolve 400ppm REBA in a citric acid/potassium citrate composition (equivalent to a low-sugar lemon-lime drink), then mix 620ppm to 5,000ppm L-serine into the base solution.

⁶⁹³⁸ The sweetness linger of this solution was determined to be 2.

⁶⁹³⁹ This blend was found to have sugar-like taste properties.

[1038]

⁶⁹⁴³ Example G34

[1039]

⁶⁹⁴⁷ Dissolve 400ppm REBA in a citric acid/potassium citrate composition (equivalent to a low-sugar lemon-lime drink), then mix 1,250ppm to 2,500ppm glucosamine hydrochloride into the base solution.

⁶⁹⁴⁹ The sweetness linger of this solution was determined to be 3.

⁶⁹⁵⁰ This blend was found to have sugar-like taste properties.

[1040]

⁶⁹⁵⁴ Example G35

[1041]

⁶⁹⁵⁸ Dissolve 400ppm REBA in a citric acid/potassium citrate composition (equivalent to a low-sugar lemon-lime drink), then mix 2,500ppm to 5,000ppm taurine into the base solution.

⁶⁹⁶⁰ The sweetness linger rating of this solution was determined to be 3.

[1042]

⁶⁹⁶⁴ Example G36

[1043]

⁶⁹⁶⁸ Dissolve 400ppm REBA in a citric acid/potassium citrate composition (equivalent to a low-sugar lemon-lime drink), then mix 1,000ppm to 2,000ppm polypropylene glycol alginate (PGA) into the base solution.
⁶⁹⁷⁰ The sweetness linger rating of this solution was determined to be 5.
⁶⁹⁷¹ This blend was found to have a sugar-like taste profile.

[1044]

⁶⁹⁷⁵ Example G37

[1045]

⁶⁹⁷⁹ Two solutions were prepared.
⁶⁹⁸⁰ In each solution, 400ppm REBA was dissolved in a citric acid/potassium citrate composition (equivalent to a low-sugar lemon-lime drink), and then 78ppm to 156ppm and 1,250ppm soluble rice protein were mixed into the respective base solutions.
⁶⁹⁸³ The sweetness linger of these solutions was determined to be 3.
⁶⁹⁸⁴ This blend was found to have sugar-like taste properties.

[1046]

⁶⁹⁸⁸ Example G38

[1047]

⁶⁹⁹² Dissolve 400ppm REBA in a citric acid/potassium citrate composition (equivalent to a low sugar lemon-lime drink), then mix 312ppm to 625ppm soluble rice protein into this base solution.
⁶⁹⁹⁴ The sweetness linger of this solution was determined to be 2.
⁶⁹⁹⁵ This blend was found to have sugar-like taste properties.

[1048]

⁶⁹⁹⁹ Example G39

[1049]

⁷⁰⁰³ Dissolve 400ppm REBA in a citric acid/potassium citrate composition (equivalent to a low-sugar lemon-lime drink), then mix 25ppm naringin into the base solution.
⁷⁰⁰⁵ The sweetness linger of this solution was determined to be 2.

[1050]

⁷⁰⁰⁹ Example G40

[1051]

7013 400ppm REBA was dissolved in a citric acid/potassium citrate composition (equivalent to a low sugar lemon-lime drink) and 1.2ppm quinine was mixed into the base solution.

7015 The sweetness linger of this solution was determined to be 4.

[1052]

7019 Example G41

[1053]

7023 Dissolve 400ppm REBA in citric acid/potassium citrate composition (equivalent to low-sugar lemon-lime drink), and then add 125ppm enzyme-modified rutin Sanmelin TM AO (San-Ei Gen F.F.I., Inc., Osaka, Japan) Mix into this base solution.

7026 The sweetness linger of this solution was determined to be 4.

7027 This blend was found to have a sugar-like taste profile.

[1054]

7031 Example G42

[1055]

7035 Dissolve 400ppm REBA in citric acid/potassium citrate composition (equivalent to low-sugar lemon-lime drink), and then add 250ppm enzyme-modified rutin TM AO (San-Ei Gen F.F.I., Inc., Osaka, Japan) Mix into this base solution.

7038 The sweetness linger of this solution was determined to be 3.

7039 This blend was found to have a sugar-like taste profile.

[1056]

7043 Example G43

[1057]

7047 400ppm REBA was dissolved in a citric acid/potassium citrate composition (equivalent to a low-sugar lemon-lime drink), and 1.2ppm viridiflorol was mixed into the base solution.

7049 The sweetness linger of this solution was determined to be 2.

[1058]

7053 Example G44

[1059]

7057 Dissolve 400ppm REBA in a citric acid/potassium citrate composition (equivalent to a low-sugar lemon-lime drink) and then mix 625ppm grape skin extract into the base solution.

7059 The sweetness linger of this solution was determined to be 4.

7060 This blend was found to have sugar-like taste properties.

[1060]

7064 Example G45

[1061]

7068 400ppm REBA was dissolved in a citric acid/potassium citrate composition (equivalent to a low-sugar lemon-lime drink), and then 625ppm Symrise™ Natural Flavor Mask for Sweeteners, 164126 (Symrise™, Holzminden, Germany) was mixed into the base solution.

7071 The sweetness linger rating of this solution was determined to be 4.

7072 This blend was found to have sugar-like taste properties.

[1062]

7076 Example G46

[1063]

7080 Dissolve 400ppm REBA in a citric acid/potassium citrate composition (equivalent to a low-sugar lemon-lime drink), then mix 1,250ppm to 2,500ppm Symrise™ Natural Flavor Mask for Sweeteners, 164126 (Symrise™, Holzminden, Germany) into the in the base solution.

7083 The sweetness linger of this solution was determined to be 3.

7084 This blend was found to have sugar-like taste properties.

[1064]

7088 Example G47

[1065]

7092 Dissolve 400ppm REBA in citric acid/potassium citrate composition (equivalent to low-sugar lemon-lime drink), then mix 2ppm Natural Advantage™ Bitterness Blocker9 (Natural Advantage, Freehold, New

Jersey, USA) into the base solution .

⁷⁰⁹⁵ The sweetness linger of this solution was determined to be 2.

⁷⁰⁹⁶ This blend was found to have sugar-like taste properties.

[1066]

⁷¹⁰⁰ Example G48

[1067]

⁷¹⁰⁴ Dissolve 400ppm REBA in a citric acid/potassium citrate composition (equivalent to a low-sugar lemon-lime drink), then mix 1ppm to 2ppm Natural Advantage TM Bitterness Blocker2 (Natural Advantage, Freehold, NJ, USA) into the base in solution.

⁷¹⁰⁷ The sweetness linger of this solution was determined to be 2.

[1068]

⁷¹¹¹ Example G49

[1069]

⁷¹¹⁵ Dissolve 400ppm REBA in citric acid/potassium citrate composition (equivalent to low-sugar lemon-lime drink), then mix 2ppm Natural Advantage TM Bitterness Blocker1 (Natural Advantage, Freehold, New Jersey, USA) into the base solution .

⁷¹¹⁸ The sweetness linger rating of this solution was determined to be 3.

[1070]

⁷¹²² Example G50

[1071]

⁷¹²⁶ Dissolve 400ppm REBA in a citric acid/potassium citrate composition (equivalent to a low-sugar lemon-lime drink), then mix 4ppm to 8ppm Natural Advantage TM Bitterness Blocker 10 (Natural Advantage, Freehold, NJ, USA) into the base in solution.

⁷¹²⁹ The sweetness linger of this solution was determined to be 2.

[1072]

⁷¹³³ Example G51

[1073]

⁷¹³⁷ Dissolve 400ppm REBA in a citric acid/potassium citrate composition (equivalent to a low sugar lemon-lime drink) and then mix 25ppm AMP into this base solution.

⁷¹³⁹ The sweetness lingering degree of this solution was determined to be 3.

[1074]

⁷¹⁴³ Example H group

[1075]

⁷¹⁴⁷ The sweet taste improving composition was mixed with REBA solution to determine its effect on sweet taste linger.

⁷¹⁴⁹ The initial sample or further dilutions thereof are screened for concentrations just above the threshold, which is defined herein as "near-threshold concentration".

⁷¹⁵¹ Evaluations were performed at a near-threshold added level, a 6- to 100-fold higher added level (depending on the intensity of its deteriorating taste), and a median added level (which is the midpoint between the near-threshold added level and the higher added level) to determine Its protracted effect on the sweetness of REBA solutions.

[1076]

⁷¹⁵⁸ Before adding the additive at these three concentrations, a blend of 500 ppm REBA in phosphoric acid solution (75%) was prepared and adjusted to pH 2.5 with phosphoric acid or pH 3.1 with citric acid and potassium citrate.

[1077]

⁷¹⁶⁴ Then use the steps described in Example G group to carry out sensory evaluation to evaluate the sweetness of the REBA solution protracted situation.

[1078]

⁷¹⁶⁹ control group

[1079]

⁷¹⁷³ Dissolve 500ppm REBA in one liter of carbon-treated water and add phosphoric acid (75%) until the pH reaches between 2.4 and 2.5.

⁷¹⁷⁵ The sweetness lingering degree of this control sample was rated as 5.

[1080]

⁷¹⁷⁹ 10 g of sucrose was dissolved in 100 ml of carbon dioxide sparkling water and phosphoric acid (75%) was added until the pH reached between 2.4 and 2.5.

⁷¹⁸¹ The sweetness lingering degree of this control sample was set as 0.

[1081]

⁷¹⁸⁵ The following Examples H1-41 show the combination of Rebaudi A and the sweet taste improving composition in specific embodiments of the present invention.

[1082]

⁷¹⁹⁰ Example H1

[1083]

⁷¹⁹⁴ Dissolve 500ppm REBA in 1 liter of carbon dioxide sparkling water and add phosphoric acid (75%) until the pH reaches between 2.4 and 2.5, then mix 5,000ppm D-fructose into the base solution.

⁷¹⁹⁶ The sweetness linger of this solution was determined to be 3.

⁷¹⁹⁷ This blend was found to have sugar-like taste properties.

[1084]

⁷²⁰¹ Example H2

[1085]

⁷²⁰⁵ Dissolve 500ppm REBA in 1 liter of carbon dioxide sparkling water and add phosphoric acid (75%) until the pH value reaches between 2.4 and 2.5, then mix 1,000ppm fructooligosaccharide (55%) into the base solution.

⁷²⁰⁸ The sweetness linger of this solution was determined to be 3.

⁷²⁰⁹ This blend was found to have a sugar-like taste profile.

[1086]

⁷²¹³ Example H3

[1087]

⁷²¹⁷ Dissolve 500ppm REBA in 1 liter of carbon dioxide sparkling water and add phosphoric acid (75%) until the pH reaches between 2.4 and 2.5, then mix 5,000ppm D-fructose into the base solution.

⁷²¹⁹ The sweetness linger of this solution was determined to be 2.

[1088]

7223 Example H4

[1089]

7227 Dissolve 500ppm REBA in 1 liter of carbon dioxide sparkling water and add phosphoric acid (75%) until the pH value reaches between 2.4 and 2.5, then mix 450ppm KCl and 680ppm KH₂PO₄ into the base solution.

7230 The sweetness linger of this solution was determined to be 3.

7231 This blend was found to have a sugar-like taste profile.

[1090]

7235 Example H5

[1091]

7239 Dissolve 500ppm REBA in 1 liter of carbon dioxide sparkling water and add phosphoric acid (75%) until the pH reaches between 2.4 and 2.5, then mix 250ppm to 2,500ppm potassium benzoate into the base solution.

7241 The sweetness linger of this solution was determined to be 4.

[1092]

7245 Example H6

[1093]

7249 Dissolve 500ppm REBA in 1 liter of carbon dioxide sparkling water and add phosphoric acid (75%) until the pH reaches between 2.4 and 2.5, then mix 150ppm to 200ppm malic acid into the base solution.

7251 The sweetness linger of this solution was determined to be 3.

[1094]

7255 Example H7

[1095]

7259 Dissolve 500ppm REBA in 1 liter of carbon dioxide sparkling water and add phosphoric acid (75%) until the pH reaches between 2.4 and 2.5, then mix 50ppm to 200ppm citric acid into the base solution.

7261 The sweetness linger of this solution was determined to be 3.

[1096]

7265 Example H8

[1097]

7269 Dissolve 500ppm REBA in 1 liter of carbon dioxide sparkling water and add phosphoric acid (75%) until the pH reaches between 2.4 and 2.5, then mix 1,171ppm citric acid into the base solution.

7271 The sweetness linger of this solution was determined to be 3.

[1098]

7275 Example H9

[1099]

7279 Dissolve 500ppm REBA in 1 liter of carbon dioxide sparkling water and add phosphoric acid (75%) until the pH reaches between 2.4 and 2.5, then mix 50ppm to 1,400ppm adipic acid into the base solution.

7281 The sweetness linger of this solution was determined to be 3.

7282 This blend was found to have sugar-like taste properties.

[1100]

7286 Example H10

[1101]

7290 Dissolve 500ppm REBA in 1 liter of carbon dioxide sparkling water and add phosphoric acid (75%) until the pH reaches between 2.4 and 2.5, then mix 1,400ppm adipic acid into the base solution.

7292 The sweetness linger of this solution was determined to be 2.

7293 This blend was found to have sugar-like taste properties.

[1102]

7297 Example H11

[1103]

7301 Dissolve 500ppm REBA in 1 liter of carbon dioxide sparkling water and add phosphoric acid (75%) until the pH reaches between 2.4 and 2.5, then mix 608ppm of 6.2mM phosphoric acid into the base solution.

7303 The sweetness linger of this solution was determined to be 1.

[1104]

7307 Example H12

[1105]

7311 Dissolve 500ppm REBA in 1 liter of carbon dioxide sparkling water and add phosphoric acid (75%) until the pH reaches between 2.4 and 2.5, then mix 666ppm of 6.8mM phosphoric acid into the base solution.

7313 The sweetness linger of this solution was determined to be 1.

[1106]

7317 Example H13

[1107]

7321 Dissolve 500ppm REBA in 1 liter of carbon dioxide sparkling water and add phosphoric acid (75%) until the pH reaches between 2.4 and 2.5, then mix 500ppm to 2,000ppm potassium benzoate into the base solution.

7323 The sweetness linger of this solution was determined to be 4.

[1108]

7327 Example H14

[1109]

7331 Dissolve 500ppm REBA in 1 liter of carbon dioxide sparkling water and add phosphoric acid (75%) until the pH reaches between 2.4 and 2.5, then mix 5,000ppm L-GABA into the base solution.

7333 The sweetness linger of this solution was determined to be 3.

7334 This blend was found to have a sugar-like taste profile.

[1110]

7338 Example H15

[1111]

7342 Dissolve 500ppm REBA in 1 liter of carbon dioxide sparkling water and add phosphoric acid (75%) until the pH reaches between 2.4 and 2.5, then mix 5,000ppm 4-hydroxy-L-proline into the base solution.

7344 The sweetness linger of this solution was determined to be 3.

7345 This blend was found to have sugar-like taste properties.

[1112]

7349 Example H16

[1113]

7353 Dissolve 500ppm REBA in 1 liter of carbon dioxide sparkling water and add phosphoric acid (75%) until the pH reaches between 2.4 and 2.5, then mix 5,000ppm L-glutamine into the base solution.

7355 The sweetness linger of this solution was determined to be 4.

7356 This blend was found to have a sugar-like taste profile.

[1114]

7360 Example H17

[1115]

7364 Dissolve 500ppm REBA in 1 liter of carbon dioxide sparkling water and add phosphoric acid (75%) until the pH reaches between 2.4 and 2.5, then mix 15,000ppm glycine into the base solution.

7366 The sweetness linger of this solution was determined to be 1.

7367 This blend was found to have sugar-like taste properties.

[1116]

7371 Example H18

[1117]

7375 Dissolve 500ppm REBA in 1 liter of carbon dioxide sparkling water and add phosphoric acid (75%) until the pH reaches between 2.4 and 2.5, then mix 3,750ppm glycine into the base solution.

7377 The sweetness linger of this solution was determined to be 3.5.

7378 This blend was found to have sugar-like taste properties.

[1118]

7382 Example H19

[1119]

7386 Dissolve 500ppm REBA in 1 liter of carbon dioxide sparkling water and add phosphoric acid (75%) until the pH reaches between 2.4 and 2.5, then mix 7,000ppm glycine into the base solution.

7388 The sweetness linger of this solution was determined to be 2.

7389 This blend was found to have sugar-like taste properties.

[1120]

7393 Example H20

[1121]

7397 Dissolve 500ppm REBA in 1 liter of carbon dioxide sparkling water and add phosphoric acid (75%) until the pH reaches between 2.4 and 2.5, then mix 5,000ppm L-alanine into the base solution.

7399 The sweetness linger of this solution was determined to be 2.

7400 This blend was found to have sugar-like taste properties.

[1122]

7404 Example H21

[1123]

7408 Two solutions were prepared.

7409 In each solution, dissolve 500ppm REBA in 1 liter of carbon dioxide sparkling water and add phosphoric acid (75%) until the pH value reaches between 2.4 and 2.5, then mix 2,500ppm and 7,000ppm to 10,000ppm L-alanine respectively in the respective base solutions.

7412 The sweetness linger of these solutions was determined to be 3.

7413 This blend was found to have sugar-like taste properties.

[1124]

7417 Example H22

[1125]

7421 Two solutions were prepared.

7422 In each solution, 500ppm REBA was dissolved in 1 liter of carbon dioxide sparkling water and phosphoric acid (75%) was added until the pH value reached between 2.4 and 2.5, then 2,500ppm and 10,000ppm β -alanine were mixed into the respective bases in solution.

7425 The sweetness linger of these solutions was determined to be 2.

7426 This blend was found to have sugar-like taste properties.

[1126]

7430 Example H23

[1127]

7434 Dissolve 500ppm REBA in 1 liter of carbon dioxide sparkling water and add phosphoric acid (75%) until the pH reaches between 2.4 and 2.5, then mix 5,000ppm β -alanine into the base solution.

7436 The sweetness linger of this solution was determined to be 3.

7437 This blend was found to have a sugar-like taste profile.

[1128]

7441 Example H24

[1129]

7445 Dissolve 500ppm REBA in 1 liter of carbon dioxide sparkling water and add phosphoric acid (75%) until the pH reaches between 2.4 and 2.5, then mix 5,000ppm glycine and 2,500ppm L-alanine into the base solution.

7447 The sweetness linger of these solutions was determined to be 2.

7448 This blend was found to have sugar-like taste properties.

[1130]

7452 Example H25

[1131]

7456 Dissolve 500ppm REBA in 1 liter of carbon dioxide sparkling water and add phosphoric acid (75%) until the pH reaches between 2.4 and 2.5, then mix 3,750ppm glycine and 3,750ppm L-alanine into the base solution.

7458 The sweetness linger of this solution was determined to be 2.

7459 This blend was found to have a sugar-like taste profile.

[1132]

7463 Example H26

[1133]

7467 Dissolve 500ppm REBA in 1 liter of carbon dioxide sparkling water and add phosphoric acid (75%) until the pH reaches between 2.4 and 2.5, then mix 7,500ppm L-alanyl-L-glutamine into the base solution.

7469 The sweetness linger of this solution was determined to be 3.

7470 This blend was found to have sugar-like taste properties.

[1134]

7474 Example H27

[1135]

7478 Dissolve 500ppm REBA in 1 liter of carbon dioxide sparkling water and add phosphoric acid (75%) until the pH value reaches between 2.4 and 2.5, then mix 15,000ppm glycine and 375ppm $\text{KAl}(\text{SO}_4)_2 \cdot 12\text{H}_2\text{O}$ (alum) into the in the base solution.

7481 The sweetness linger of this solution was determined to be 2.

7482 This blend was found to have a sugar-like taste profile.

[1136]

7486 Example H28

[1137]

7490 Dissolve 500ppm REBA in 1 liter of carbon dioxide sparkling water and add phosphoric acid (75%) until the pH reaches between 2.4 and 2.5, then mix 1,500ppm urea and 584ppm sodium chloride into the base solution.

7493 The sweetness linger of this solution was determined to be 3.

7494 This blend was found to have sugar-like taste properties.

[1138]

7498 Example H29

[1139]

7502 Dissolve 500ppm REBA in 1 liter of carbon dioxide sparkling water and add phosphoric acid (75%) until the pH value reaches between 2.4 and 2.5, then mix 3,750ppm glycine and 60ppm to 90ppm poly-L- α -lysine into the base solution middle.

7505 The sweetness linger of this solution was determined to be 3.

7506 This blend was found to have a sugar-like taste profile.

[1140]

7510 Example H30

[1141]

7514 Dissolve 500ppm REBA in 1 liter of carbon dioxide sparkling water and add phosphoric acid (75%) until the pH reaches between 2.4 and 2.5, then mix 3,750ppm glycine and 10ppm poly-L- ε -lysine into the base solution.

7517 The sweetness linger of this solution was determined to be 3.

7518 This blend was found to have sugar-like taste properties.

[1142]

7522 Example H31

[1143]

7526 Dissolve 500ppm REBA in 1 liter of carbon dioxide sparkling water and add phosphoric acid (75%) until the pH reaches between 2.4 and 2.5, then mix 3,750ppm glycine and 119ppm potassium chloride into the base solution.

7529 The sweetness linger of this solution was determined to be 4.

7530 This blend was found to have sugar-like taste properties.

[1144]

7534 Example H32

[1145]

7538 Dissolve 500ppm REBA in 1 liter of carbon dioxide sparkling water and add phosphoric acid (75%) until the pH reaches between 2.4 and 2.5, then mix 15,000ppm glycine and 239ppm potassium chloride into the base solution.

7541 The sweetness linger of this solution was determined to be 2.

7542 This blend was found to have sugar-like taste properties.

[1146]

7546 Example H33

[1147]

7550 Dissolve 500ppm REBA in 1 liter of carbon dioxide sparkling water and add phosphoric acid (75%) until the pH reaches between 2.4 and 2.5, then mix 3,750ppm glycine and 238ppm sodium chloride into the base solution.

7553 The sweetness linger of this solution was determined to be 4.

7554 This blend was found to have sugar-like taste properties.

[1148]

7558 Example H34

[1149]

7562 Dissolve 500ppm REBA in 1 liter of carbon dioxide sparkling water and add phosphoric acid (75%) until the pH value reaches between 2.4 and 2.5, then mix 3,750ppm glycine, 43ppm NaCl and 51 ppm KCl into the base solution.

7565 The sweetness linger of this solution was determined to be 4.

7566 This blend was found to have a sugar-like taste profile.

[1150]

7570 Example H35

[1151]

7574 Dissolve 500ppm REBA in 1 liter of carbon dioxide sparkling water and add phosphoric acid (75%) until the pH value reaches between 2.4 and 2.5, then mix 15,000ppm glycine and 501ppm sodium gluconate into the base solution.

7577 The sweetness linger of this solution was determined to be 2.

7578 This blend was found to have a sugar-like taste profile.

[1152]

7582 Example H36

[1153]

7586 Dissolve 500ppm REBA in 1 liter of carbon dioxide sparkling water and add phosphoric acid (75%) until the pH reaches between 2.4 and 2.5, then mix 2,500ppm L-alanine and 5,000ppm fructose into the base solution.

7589 The sweetness linger of this solution was determined to be 4.

7590 This blend was found to have sugar-like taste properties.

[1154]

7594 Example H37

[1155]

7598 Dissolve 500ppm REBA in 1 liter of carbon dioxide sparkling water and add phosphoric acid (75%) until the pH reaches between 2.4 and 2.5, then mix 3,750ppm glycine and 35,000ppm erythritol into the base solution.

7601 The sweetness linger of this solution was determined to be 2.

7602 This blend was found to have a sugar-like taste profile.

[1156]

7606 Example H38

[1157]

7610 Dissolve 500ppm REBA in 1 liter of carbon dioxide sparkling water and add phosphoric acid (75%) until the pH value reaches between 2.4 and 2.5, then add 35,000ppm erythritol, 3,750ppm glycine, 450ppm KCl, 680ppm KH₂PO₄ and 1,175 ppm choline chloride was mixed into the base solution.

7613 The sweetness linger of this solution was determined to be 1.

7614 This blend was found to have sugar-like taste properties.

[1158]

7618 Example H39

[1159]

7622 Dissolve 500ppm REBA in 1 liter of carbon dioxide sparkling water and add phosphoric acid (75%) until the pH value reaches between 2.4 and 2.5, then mix 2,500ppm L-alanine, 5,000ppm fructose and 35,000ppm erythritol into the in the base solution.

7625 The sweetness linger of this solution was determined to be 4.

7626 This blend was found to have sugar-like taste properties.

[1160]

7630 Example H40

[1161]

7634 Dissolve 500ppm REBA in 1 liter of carbon dioxide sparkling water and add phosphoric acid (75%) until the pH value reaches between 2.4 and 2.5, then mix 35,000ppm erythritol, 3,750ppm glycine, 450ppm KCl and 680ppm KH₂PO₄ in the base solution.

7637 The sweetness linger of this solution was determined to be 4.

7638 This blend was found to have sugar-like taste properties.

[1162]

⁷⁶⁴² Example H41

[1163]

⁷⁶⁴⁶ Dissolve 360ppm REBA in 1 liter of carbon dioxide sparkling water and add phosphoric acid (75%) until the pH reaches between 2.4 and 2.5, then mix 400ppm Fibergum and 35,000ppm erythritol into the base solution.

⁷⁶⁴⁹ The sweetness linger of this solution was determined to be 2.

[1164]

⁷⁶⁵³ Although the present invention has been described in detail with respect to specific embodiments thereof, it should be understood that those skilled in the art can readily conceive of other variations, modifications and equivalent substitutions of those embodiments after understanding the foregoing description.

⁷⁶⁵⁶ Accordingly, the scope of the present invention should be defined in accordance with the field of claims of the appended claims and all equivalents thereof.