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(73) Patent holder 522216798
Tate & Lyle Solutions
USA LLC
United States, 60192 Illinois, Hoffman Estates, Prairie Stone Parkway 5450

(73) Patent holder 509178806
Tate & Lyle Technology Limited
United Kingdom W1H7EJ London Marble Arch 5

(74) Agent 110000796
Saegusa International Patent Attorneys Corporation

(72) Inventor: Fletcher Joshua Nehemiah
United States 60192 Illinois (continued on last page)

(54) [Title of Invention] Modification or enhancement of flavor in food and beverage products

(57) [Claims]

ÿRequest Item 1ÿ

A method for modifying or enhancing the flavor of a food or beverage product, comprising including allulose in the food or beverage product in an amount below its sweetness threshold (provided that the source of allulose used in the method does not include rare sugar-containing syrup containing 0.5 to 17% by mass of D-psicose and 0.2 to 10% by mass of D-allose), wherein the flavor is a sweet aromatic flavor.

ÿRequest Item 2ÿ

10. The method of claim 1, wherein the method is a method for enhancing the flavor of a food or beverage product.

ÿRequest Item 3ÿ

The method according to claim 1 or 2, wherein allulose is included in the food or beverage product in an amount of 2.695% by weight or less relative to the total weight of the food or beverage product.

ÿRequest Item 4ÿ

The method according to claim 3, wherein allulose is included in the food or beverage product in an amount of 2.20% by weight or less relative to the total weight of the food or beverage product.

ÿRequest Item 5ÿ

The method according to claim 3 or 4, wherein allulose is included in the food or beverage product in an amount of 0.10% to 2.20% by weight relative to the total weight of the food or beverage product.

ÿRequest Item 6ÿ

The method according to claim 5, wherein allulose is included in the food or beverage product in an amount of 0.50% to 2.20% by weight relative to the total weight of the food or beverage product.

ÿRequest Item 7ÿ

The method according to claim 5 or 6, wherein allulose is included in the food or beverage product in an amount of 1.00% to 2.20% by weight relative to the total weight of the food or beverage product.

ÿRequest Item 8ÿ

The method according to any one of claims 5 to 7, wherein allulose is included in the food or beverage product in an amount of 1.20% to 2.00% by weight relative to the total weight of the food or beverage product.

ÿRequest Item 9ÿ

The method according to any one of claims 5 to 8, wherein allulose is contained in the food or beverage product in an amount of 1.20% to 1.80% by weight, based on the total weight of the food or beverage product.

ÿRequest Item 10ÿ

The method according to any one of claims 5 to 9, wherein allulose is included in the food or beverage product in an amount of 1.40% to 1.60% by weight relative to the total weight of the food or beverage product.

ÿRequest Item 11ÿ

The method according to any one of claims 5 to 10, wherein allulose is included in the food or beverage product in an amount of 1.50% by weight relative to the total weight of the food or beverage product.

ÿRequest Item 12ÿ

The sweet aromatic flavor is perceived primarily or exclusively by retronasal odor.

12. The method according to any one of claims 1 to 11.

ÿRequest Item 13ÿ

The method according to any one of claims 1 to 12, wherein the sweet aromatic flavor is selected from the group consisting of caramel flavor, maple flavor, sugar flavor, and cotton candy flavor.

ÿRequest Item 14ÿ

The method according to any one of claims 1 to 13, wherein the sweet aromatic flavor is selected from the group consisting of caramel flavor and cotton candy flavor.

ÿRequest Item 15ÿ

The method according to claim 14, wherein the caramel flavor is salted caramel flavor.

ÿRequest Item 16ÿ

The method according to any one of claims 1 to 15, wherein the method is a method for modifying or enhancing the flavor of a beverage product.

ÿRequest Item 17ÿ

Use of allulose in the method according to any one of claims 1 to 16.

Detailed Description of the Invention

[Technical Field]

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The present invention relates to a method for modifying or enhancing the flavor of a food or beverage product. The present invention also relates to flavored food and beverage products having a modified or enhanced flavor.

[Background Technology]

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Flavoring agents are substances added to food and beverage products to impart or help impart flavor. Thus, synthetic and natural flavoring agents are often added during the manufacturing of food and beverage products to impart a pleasant flavor to these products. Many food and beverage products contain several of these flavoring agents in addition to flavors that may already be present in the ingredients that make up the food and beverage product. Achieving the correct balance of flavors in these products is critical to consumer acceptance.

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From the above perspective, there is a constant demand for new methods to modify or enhance the flavor of food and beverage products, making them more appealing to consumers.

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Furthermore, consumers typically exhibit a preference for strongly flavored food and beverage products. Traditionally, methods for enhancing flavor involve adding more flavoring agent(s) to food and beverage products. However, flavoring agents can be very expensive. Therefore, new cost-effective methods for enhancing the flavor of food or beverage products are needed.

Summary of the Invention

[Problem to be solved by the invention]

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Therefore, an object of the present invention is to provide a method for modifying or enhancing the flavor of food and beverage products.

[Means for solving the problem]

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According to a first aspect, the present invention includes including allulose in a food or beverage product in an amount below its sweetness threshold.

A method for modifying or enhancing the flavor of a beverage product is provided.

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In one embodiment, the method is a method for enhancing the flavor of a food or beverage product.

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In one embodiment, allulose is present in the food or beverage product in an amount of about 2.695% by weight or less, based on the total weight of the food or beverage product.

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In one embodiment, allulose is present in the food or beverage product in an amount of about 2.20% by weight or less, based on the total weight of the food or beverage product.

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In one embodiment, allulose is present in the food or beverage product in an amount of about 0.10% to about 2.20% by weight, based on the total weight of the food or beverage product. In one embodiment, allulose is present in the food or beverage product in an amount of about 0.50% to about 2.20% by weight, based on the total weight of the food or beverage product. In one embodiment, allulose is present in the food or beverage product in an amount of about 1.00% to about 2.20% by weight, based on the total weight of the food or beverage product. In one embodiment, allulose is present in the food or beverage product in an amount of about 1.20% to about 2.00% by weight, based on the total weight of the food or beverage product. In one embodiment, allulose is present in the food or beverage product in an amount of about 1.20% to about 1.80% by weight, based on the total weight of the food or beverage product.

In one embodiment, allulose is present in the food or beverage product in an amount of about 1.40% to about 1.60% by weight, based on the total weight of the food or beverage product.

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In one embodiment, allulose is included in a food or beverage product in an amount of about 1.50% by weight relative to the total weight of the food or beverage product.

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In one embodiment, the flavor is a sweet flavor. In one embodiment, the sweet flavor is a sweet aromatic flavor, particularly a sweet aromatic flavor perceived primarily or exclusively by a retronasal smell. For example, the sweet aromatic flavor is selected from the group consisting of caramel flavor, maple flavor, sugar flavor, and cotton candy flavor, all of which are perceived primarily or exclusively by a retronasal smell. In one embodiment, the flavor is selected from the group consisting of caramel flavor and cotton candy flavor. In one embodiment, the caramel flavor is salted caramel flavor.

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In another embodiment, allulose is provided to be used in an amount below its sweetness threshold to modify or enhance the flavor of a food or beverage product.

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The above-described embodiments of the method for modifying or enhancing the flavor of a food or beverage product are applied mutatis mutandis when allulose is used in an amount that is below its sweetness threshold for modifying or enhancing the flavor of a food or beverage product.

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In another embodiment, a flavored food or beverage product is provided that contains allulose in an amount below its sweetness threshold.

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In one embodiment, the flavored food or beverage product contains allulose in an amount of about 2.695% by weight or less relative to the total weight of the food or beverage product.

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In one embodiment, the flavored food or beverage product contains allulose in an amount of about 2.20% by weight or less relative to the total weight of the food or beverage product.

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In one embodiment, the flavored food or beverage product comprises allulose in an amount of about 0.10% to about 2.20% by weight, based on the total weight of the food or beverage product.

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In one embodiment, the flavored food or beverage product comprises allulose in an amount of about 0.50% to about 2.20% by weight, based on the total weight of the food or beverage product.

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In one embodiment, the flavored food or beverage product comprises allulose in an amount of about 1.00% to about 2.20% by weight, based on the total weight of the food or beverage product.

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In one embodiment, the flavored food or beverage product comprises allulose in an amount of about 1.20% to about 2.00% by weight, based on the total weight of the food or beverage product.

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In one embodiment, the flavored food or beverage product contains allulose in an amount of about 1.20% to about 1.80% by weight relative to the total weight of the food or beverage product.

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In one embodiment, the flavored food or beverage product comprises allulose in an amount of about 1.40% to about 1.60% by weight, based on the total weight of the food or beverage product.

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In one embodiment, the flavored food or beverage product comprises allulose in an amount of about 1.50% by weight, based on the total weight of the food or beverage product.

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The above-described embodiments of a method for modifying or enhancing the flavor of a food or beverage product are applied mutatis mutandis to the above-described flavored food or beverage product containing allolose in an amount below its sweetness threshold.

DETAILED DESCRIPTION OF THE INVENTION

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The present invention is based on the discovery that allulose, when included in a food or beverage product in an amount below its sweetness threshold, can modify or enhance the flavor of the food or beverage product. In particular, allulose exhibits the ability to enhance the flavor of a food or beverage product when included in a food or beverage product in an amount below its sweetness threshold.

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As used herein, the term "sweetness threshold" refers to the maximum concentration of a sweetener, such as allulose, that is not itself perceived as sweet. This specification also refers to allulose as having a "sub-sweetening" level.

amount" or "sub-sweetening level"

These terms refer to the use of allulose in food or beverage products. These terms refer to the use of allulose in food or beverage products that contain any sweet taste, not allulose per se.

It is used to indicate that the product contains a non-inducing amount of ste.

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Those skilled in the art will be able to readily determine the sweetness threshold of a sweetener such as allulose. Known methods for determining the sweetness threshold of a sweetener include using a two-choice forced-choice test for the threshold level of a given sweetener.

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A method for determining the sweetness threshold of allulose is described herein. The method is a two-option forced-choice test for sweetness threshold levels (ASTM designation E2164-08: Standard Test Method for Directional Difference Testing). This test is used to determine the amount of allulose that is less sweet than the perception threshold concentration of sucrose. The perception threshold concentration of sucrose is determined using the FEMA (The amount is 1.5% by weight, in accordance with the GRAS ™ guidelines of the Flavor Extracts Manufacturing Association (GRAS™) .

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In the context of food and beverage products, using a sweetener such as allulose below its sweetness threshold is commonly referred to as using it at the flavor level. Thus, in the methods of the present invention, allulose is present in an amount that modifies or enhances the flavor (e.g., sweet flavor) of the food or beverage product, but does not itself induce a sweet flavor.

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Allulose may also be referred to as being used as a flavor enhancer. As those skilled in the art will readily appreciate, a flavor enhancer is a substance added to complement, enhance, or modify the natural flavor of a food or beverage product without imparting a distinctive flavor of its own.

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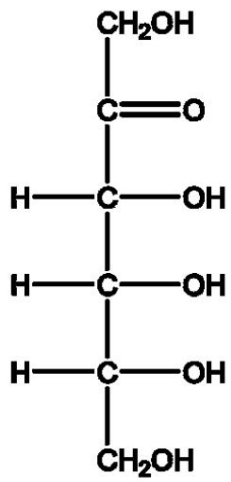
As used herein, the term "allulose" refers to the monosaccharide sugar with the structure shown as the Fischer projection of formula I below. It is also known as "D-psicose":

[Chemistry 1]

[式 I]



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Allulose is known as a "rare sugar" because it occurs naturally in extremely small amounts. Its sweetness is about 70% of that of sucrose, but provides only about 5% of the calories (about 0.2 kcal/g). Therefore, allulose can essentially be considered a "zero calorie" sweetener.

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Unless otherwise stated, all amounts given in weight percent are quoted relative to the total weight of the food or beverage product. Therefore, if ingredients are provided in other than their pure form, the amounts added/included represent the requisite amount of pure on a dry solids basis.

For example, if allulose is provided as a syrup, the amount of syrup used should be adjusted to provide the required amount of allulose dry solids on a weight percent basis.

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The present invention relates to a method for modifying or enhancing the flavor of a food or beverage product.

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Flavor is associated with the taste and aroma of a food or beverage product. While informally, the terms taste and flavor are used interchangeably, in practice, they have distinct meanings. Taste is the sensation produced when a substance interacts with taste receptors in the oral cavity. Five established taste intensities are: sweet, salty, bitter, sour, and umami. However, flavor is an integrated sensory experience that is primarily determined by a combination of taste and odor but can also be influenced by other sensory components, such as mouthfeel. Thus, flavor can be modified by modifying one or more of these sensory components. According to the present invention, flavor is primarily or exclusively modified or enhanced by modifying the aroma perceived by retronasal odor (particularly when chewing, as odor molecules enter the nasal passages from the mouth).

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Given the fact that flavor is an integrated sensory experience, one sensory component, particularly aroma, can bring out a particular flavor even in the absence of other sensory components. For example, the aroma of a sweet food, such as cotton candy, enhances the sweet flavor even in the absence of sweetness. Thus, flavoring agents used to provide such flavors in food or beverage products are often described as "sweet flavors," even though the flavoring agents themselves often do not have a sweet taste.

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The introduction of allulose into a food or beverage product in an amount below its sweetness threshold can result in the enhancement of certain flavor attributes, the reduction of certain flavor attributes, the reduction of off-notes or bitterness. The flavor of the food or beverage product can be modified or enhanced by altering flavor attributes, such as masking flavors or changing the onset and duration of perception of specific flavor aspects. For example, allulose can modify or enhance the flavor of the food and beverage product by altering the consumer's perception of flavor. Allulose can change the perception of flavor by altering the quality or intensity of the flavor, for example, by enhancing, strengthening, softening, or sharpening the flavor. Allulose can also modify any aspect of the flavor temporal profile of a food or beverage product. Without wishing to be bound by theory, it is believed that allulose can enhance the flavor of a beverage by suppressing undesirable, antagonistic flavors.

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When a content is described herein with reference to a range of values, all intervening amounts encompassed by said range are expressly disclosed herein, as are all intervening ranges based on said intervening amounts.

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According to a first aspect, the present invention provides a method for modifying or enhancing the flavor of a food or beverage product, comprising adding allulose to said food or beverage product in an amount below its sweetness threshold, wherein after being introduced into the food or beverage product, allulose is present in an amount below its sweetness threshold.

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In one embodiment, the method is a method for modifying the flavor of a food or beverage product. In one embodiment, the method is a method for enhancing the flavor of a food or beverage product. In one embodiment, the method is a method for modifying or enhancing the flavor of a beverage product. In one embodiment, the method is a method for modifying the flavor of a beverage product. In one embodiment,

Thus, the method is a method for enhancing the flavor of a beverage product.

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Allulose can enhance the flavor of a food or beverage product. Allulose can enhance the non-taste elements of the flavor of a food or beverage product. For example, allulose can enhance the flavor of a food or beverage product by enhancing the flavor. Allulose can enhance the flavor of a food or beverage product by enhancing the non-taste elements of the flavor.

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As described above, the introduction of allulose into a food or beverage product in an amount below its sweetness threshold can modify or enhance the flavor of the food or beverage product. The presence of subsweet amounts of allulose in a food or beverage product can also increase the preference for the food or beverage product over the same food or beverage product that does not contain allulose or does not contain allulose in an amount below its sweetness threshold.

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Unless otherwise specified, references to the amount of allulose used in the methods of the present invention are to the amount of allulose compound itself (i.e., the amount of pure allulose), and not to the amount of a source containing allulose (unless, of course, the source consists of 100% pure allulose).

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The source of allulose that can be used in the present invention is not particularly limited. The source of allulose used in the methods described herein can contain, consist essentially of, or consist of allulose. For example, the source of allulose used in the present invention has a purity of at least 50%, at least 60%, at least 70%, at least 80%, at least 90%, at least 95%, at least 96%, at least 97%, at least 98%, at least 99%, at least 99.5% or at least 99.9% (expressed as allulose weight % based on the total weight of the allulose source).

In one embodiment, the source of allulose can be 100% pure allulose. The source of allulose can even be a blend of allulose and one or more other sugars, such as fructose, glucose, sucrose, allose, tagatose, etc. Liquid forms of allulose can be used in the present invention. For example, allulose can be in the form of a syrup, such as that described in WO 2016/135458. Syrups containing allulose can contain various amounts (typically about 70 to about 90% by weight) of allulose based on dry solids (ds or DS). When used in solid form, amorphous or crystalline allulose can be used. Allulose can have any crystalline form, particle size, crystal shape, or other physical characteristics that may be suitable for the intended food or beverage application. For example, crystalline forms of allulose that can be used in the present invention can be produced by the method described in U.S. Patent Application No. 62/414280.

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In the methods of the present invention, allulose is included in the food or beverage product such that it is present in the food or beverage product in an amount below its sweetness threshold.

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In one embodiment, allulose is included in the food or beverage product in an amount of about 2.695% by weight or less, based on the total weight of the food or beverage product.

This may include including in beverage products 0.10, 0.20, 0.30, 0.40, 0.50, 0.60, 0.70, 0.80, 0.90, 1.00, 1.10, 1.20, 1.30, 1.40, 1.50, 1.60, 1.70, 1.80, 1.90, 2.00, 2.10, 2.20, 2.30, 2.40, 2.50, 2.60, 2.65, 2.69 weight percent, and all intermediate amounts, based on the total weight of the food or beverage product.

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In one embodiment, allulose is present in the food or beverage product in an amount of 0.10% to about 2.695% by weight, based on the total weight of the food or beverage product.

In a food or beverage product, the amount of the food or beverage product may be from about 0.20% to about 2.695%, from about 0.30% to about 2.695%, from about 0.40% to about 2.695%, from about 0.50% to about 2.695%, from about 0.60% to about 2.695%, from about 0.70% to about 2.695%, from about 0.80% to about 2.695%, from about 0.90% to about 2.695%, from about 1.00% to about 2.695%, or from about 1.10% to about 2.695% by weight, based on the total weight of the food or beverage product.
% to about 2.695% by weight, about 1.20% to about 2.695% by weight, about 1.30% to about 2.695% by weight, and
may be present in an amount from about 1.40% to about 2.695% by weight and all intermediate amounts therein.

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Allulose may be present in the food or beverage product in an amount of from about 1.40% to about 2.60%, from about 1.40% to about 2.50%, from about 1.40% to about 2.40%, from about 1.40% to about 2.30%, from about 1.40% to about 2.20%, from about 1.40% to about 2.10%, from about 1.40% to about 2.00%, from about 1.40% to about 1.90%, from about 1.40% to about 1.80%, from about 1.40% to about 1.70%, from about 1.40% to about 1.60%, from about 1.45% to about 1.55%, from about 1.46% to about 1.54%, or from about 1.47% to about 1.53% by weight, based on the total weight of the food or beverage product. , about 1.48% to about 1.52% by weight, or about 1.49% to about 1.51% by weight, and all intermediate values therein.

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For example, allulose may be present in a food or beverage product in an amount of about 1.00% to about 2.20% by weight, about 1.00% to about 2.10% by weight, about 1.00% to about 2.00% by weight, about 1.10% to about 2.00% by weight, about 1.10% to about 1.90% by weight, about 1.20% to about 1.90% by weight, about 1.20% to about 1.80% by weight, about 1.30% to about 1.80% by weight, about 1.30% to about 1.70% by weight, or about 1.30% to about 1.60% by weight, based on the total weight of the food or beverage product, and all intermediate amounts therein.

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In one embodiment, allulose is included in a food or beverage product in an amount of about 1.50% by weight relative to the total weight of the food or beverage product.

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As will be appreciated by those skilled in the art, allulose can be included by any means during the manufacture of a food or beverage product. Allulose can be added with one or more flavoring agents during the manufacture of a food or beverage product. For example, a flavor composition comprising allulose and one or more flavoring agents can be added during the manufacture of a food or beverage product. Alternatively, allulose can be added as a "finished" product, for example, by blending a source of allulose with the product.
It can be added to the "isched" product.

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In the case of beverage products that require dilution before consumer consumption (e.g., beverage concentrates (including, but not limited to, liquid concentrates and syrups, as well as non-liquid "concentrates" such as freeze-dried and/or powder products) or pre-made mixes that require reconstitution and possibly further processing to produce a final food or beverage product (e.g., pre-made sweet bakery mixes for producing sweet bakery products or pre-made bread mixes for producing bread products), the allulose will be present in the finished food or beverage product (e.g., the final manufactured beverage or baked food product) in an amount below its sweetness threshold.

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As used herein, the term "finished food or beverage product" is intended to mean the finished food or beverage product that is consumed by the consumer. In the case of a liquid concentrate, this would be the product after dilution to the concentration designated on the packaging by the manufacturer. In the case of a premade mix, the finished product is the product obtained after reconstitution and possible further processing (e.g., baking) in accordance with the manufacturer's instructions.

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Food or beverage products that may be considered in the context of the present invention include baked products; sweet bakery products (including, but not limited to, rolls, cakes, pies, pastries and cookies), pre-made sweet bakery mixes for making sweet bakery products; pie fillings (including, but not limited to, fruit pie fillings and nut pie fillings such as pecan pie fillings, as well as fillings for making cookies, cakes, pastries, confectionery products, etc., such as fat-based cream fillings); desserts, gelatins and puddings; frozen desserts (including, but not limited to, frozen dairy desserts such as ice cream - including regular ice cream, soft serve ice cream and all other types of ice cream - and frozen non-dairy desserts such as non-dairy ice cream, sorbet, etc.); carbonated beverages (including, but not limited to, soft carbonated beverages); non-carbonated beverages (including, but not limited to, flavored and soft non-carbonated beverages such as sweet tea or coffee-based beverages); beverage concentrates (including, but not limited to, freeze-dried ice creams, as well as liquid concentrates and syrups). yogurt (including, but not limited to, full-fat, low-fat, and non-fat dairy yogurt, as well as non-dairy yogurt and lactose-free yogurt, and all frozen equivalents thereof); table sweeteners (e.g., dry table sweeteners, which may be in tablet, granule, or powder form, or liquid table sweeteners); snack bars (including, but not limited to, cereal, nut, seed, and/or fruit bars); bakery products (including, but not limited to, leavened and unleavened breads, yeast breads and unleavened breads such as soda bread, breads containing any flour type, breads containing any non-flour type (such as potato, rice, and rye flour), and gluten-free breads); pre-made bread mixes for baking; sauces, syrups, and dressings; sweet spreads (jelly, jams, butters, nut souplets and other spreadable preserves, conserves, etc.); confectionery products (including, but not limited to, jelly candies, soft candies, hard candies, chocolates and gums); sweetened breakfast cereals (including, but not limited to, extruded (kix-type) breakfast cereals, flaked breakfast cereals and puffed breakfast cereals); and cereal coating compositions for use in making sweetened breakfast cereals.

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In a preferred embodiment, the flavor to be modified or enhanced is a sweet flavor. For example, the sweet flavor may be a sweet aromatic flavor, particularly one perceived primarily or exclusively by a posterior nasal odor.

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Types of sweet aromatic flavors that can be modified by including subsweet amounts of allulose in a food or beverage product include, but are not limited to, caramel, maple, sugar, or cotton candy flavors, all of which are perceived primarily or exclusively by retronasal odor. Caramel flavors include, but are not limited to, salted caramel flavor.

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In one embodiment, the method comprises including allulose in the beverage product in an amount below its sweetness threshold to modify or enhance the salted caramel flavor in the beverage product. For example, the method may comprise including allulose in the beverage product in an amount below its sweetness threshold to enhance the salted caramel flavor of the beverage product.

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In one embodiment, the method comprises including allulose in the beverage product in an amount below its sweetness threshold, thereby modifying or enhancing the cotton candy flavor of the beverage product. For example, the method may comprise including allulose in the beverage product in an amount below its sweetness threshold, thereby enhancing the cotton candy flavor of the beverage product.

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In one embodiment, the method involves adding allulose to the beverage product in an amount below its sweetness threshold.

A method for enhancing the cotton candy and/or salted caramel flavors in a beverage product, including by including them in the product.

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As one skilled in the art would understand, a flavoring agent is a substance that imparts or serves to impart flavor to a food or beverage product. The following list of flavoring agents is known in the art and has been prepared from a database compiled by "The Good Scents Company" (www.thegoodscentscompany.com).

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Examples of flavoring agents known to impart or help impart a sweet flavor include acetone alcohol, adonitol, agave flavor, allyl hexanoate, 4-amino-5,6-dimethylthieno(2,3-d)pyrimidin-2(1H)-one hydrochloride, 3-((4-amino-2,2-dioxide-1H-2,1,3-benzothiazin-5-yl)oxy)-2,2-dimethyl-N-propylpropanamide, isoamyl phenylacetate, star anise seed oil terpenes, benzyl salicylate, isobutyl acetoacetate, isobutyl 2-butenoate, isobutyl isovalerate, carameldione, caramel furanone, caramel furanone solution, caramel pentadione, coconut (cocos nucifera) fruit juice, ÿ-cyclodextrin, cyclotetramethylsilane, methylparaben ... cyclotene hydrate, 5,5'-diacetyl-dithienyl-2,2'-methane, dihydroxyacetone (monomer), 3',7-dihydroxy-4'-methoxyflavan, 2,5-dimethyl-3-acetyl-pyrrole, ethyl benzoate, ethyl benzoylacetate, ethyl cyclopentenolone, ethyl furaneol, ethyl 3-hydroxyhexanoate, ethyl 3-(2-hydroxyphenyl)propionate, ethyl lactate, ethyl maltol, ethyl methyl-p-tolylglycidate, ethyl myristate, ethyl octanoate, ethyl phenylacetate, ethyl pyruvate, ethyl salicylate, ethyl isovalerate, ethyl vanillin propylene glycol acetal, eugenol, isoeugenol, isoeugenyl phenyl acetate, dextrofagomine, ferrous lactate, 2-furylpentyl ketone, gene Absolute, geranyl isobutyrate, guaiacyl phenylacetate, heliotropyl

Acetone, 2-hexen-1-ol, (Z)-3-hexen-1-yl salicylic acid, hexyl benzoate, ÿ-hexyl cinnamaldehyde, honey enhancer, honey flavor, hydroxycitronellal, hydroxycitronellol, 2-hydroxymethylpyrazine levodopa, dextro-limonene, lovage tincture, maltitol, maltol, maltyl isobutyrate, maltyl propionate, maple distillate, maple furanone, 2-methoxy-4-vinylphenol, paramethylacetophenone, methyl anthranilate, 2-methylbutyl acetate, methyl isobutyrate, N-(2-methylcyclohexyl)-2,3,4,5,6-pentafluorobenzamide, 2-methyl-5, 7-Dihydrofuro[3,4-d]-pyrimidine, 5-methylfurfural, 1-(5-methylfuryl)-3-pentanone, methyl heptanoate, methyl salicylate, methyl valerate, 4-methyl-2-(1-methyl-1-butenyl)-1,3-dioxolane, molasses distillate, molasses flavor, ÿ-naphthyl methyl ketone, rambutan (nephelium lappa ceum) fruit, (E)-2-octenal, octyl propionate, levo-ornithine hydrochloride, phenethyl tiglate, phthalide, pineapple hydroxyhexanoate, sweet potato flavor, praline flavor, prenyl acetate, levoproline, propenylguaethol, propyl butyrate, isopropyl butyrate, propyl isobutyrate, isopropyl formate, hepta Propyl phosphate, propyl phenylacetate, isopropyl phenylacetate, propyl propionate, propylene glycol, pyruvic aldehyde, sodium 2-(4-methoxyphenoxy)propionate, strawberry furanone, strawberry furanone acetate, strawberry furanone liquid, strawberry glycidate 1, strawberry glycidate 2, sugar distillate, sugar extender, sugar flavor, brown sugar flavor, burnt sugar flavor, sweet and sour candy flavor, sweet and sour flavor, terpinyl propionate, tetrahydrofurfuryl acetate (E)-tiglic acid, 2,5,7-trimethyl-5,7-dihydroxybenzoate

Droflo-[3,4-d]-pyrimidine, tyramine, vanilla aromatica fruit extract, vanilla bean absolute (vanilla planifolia), vanilla bean aromatica, vanilla bean planifolia, vanilla concentrate, vanilla oleoresin bali, vanilla oleoresin bourbon, vanilla resinoids, vanilla tahitensis fruit extract, vanilla propylene glycol acetal, para-vanillyl alcohol, vanillyl isobutyrate, 2,6-xylenol, ammonium isovalerate (30% in propylene glycol), Aristotelia chilensis fruit juice, Aristotelia chilensis leaf extract, benzyl amyl carbinol, benzyl butyl carbinol, benzyl isobutyrate, clary sage absolute, cocoa pentenal, decyl methanesulfonate, ethyl para-anisate, ethyl butyrate, ethyl formate, (E,E)-isothiazolinone Ethyl benzoate, ethylene brassylate, furfural, furfuryl alcohol, guailotirioresin, (E)-2-heptenal, hexyl isobutyrate, levulinic acid, lime essence oil, lime pyran, menthyl isovalerate, para-methoxycinnamaldehyde, methyl R-3-acetoxyhexanoate, 3-methylbutyl 2-furylbutyrate, methylheptadienone, methyl propanesulfinate, (E,E)-methyl sorbate, delta-octalactone, phenethyl alcohol, (E)-propyl-2-furan acrylate, isopropyl 2-methylbutyrate, isopropyl octanoate, propylene glycol diacetate, rose oil (rosa damascena) Russia, rose oil (rosa damascena) Turkey, tropical ionone, vanilla carboxylate, veratraldehyde , 3,4-xylenol, acetoin, 2-acetyl-benzothiophene, 2-acetyl-5-methylthiophene, isobutyl angelate, isobutyl formate, bittersweet chocolate flavor, (E)-2-decenoic acid, 2,6-dimethylnaphthalene, ethyl acetate, ethyl decanoate, ethyl 3-(2-furyl)propanoate, 2-ethyl-1-hexanol, ethyl 3-hexenoate, ethyl propionate, ethyl valerate, ethyl vanillin, dextrose, fusel oil, 3-heptyldihydro-5-methyl-2(3H)-furanone, hexyl lactate, ÿ-ionol, linalyl isobutyrate, lucuma flavor, massoia bark oil (CO2 extract), ÿ-methylcinnamaldehyde, methyl 3-nonenoate, methyl (E)-3-nonenoate, (E)-2-methyl octenoate, mintlactone, (E,

Z)-3,6-Nonadien-1-yl acetate, 2-octen-1-ol, (E)-2-octen-1-ol, 2-pentanone, propyl hexanoate, 3-propylidenephthalide, rosinyl phenyl acetate, soy sauce furanone, terpinyl valerate, tolualdehyde (mixed ortho-, meta-, and para-), (E,Z,Z)-2,4,7-tridecatrienal, tuberose absolute (from pomade), paravanillic acid, vanillideneacetone, dill (anthum graveolens) herb tincture, butyl butyrate, cucumber essence, 2-ethylbutyraldehyde, 4-ethylguaiacol, ethyl 3-oxohexanoate, S-ethyl thioacetate, furfuryl valerate, (E)-2-hexenoic acid , hexyl acetate, 1-(2-hydroxy-4-methoxyphenyl)-3-(pyridin-2-yl)propan-1-one, methional diethyl acetal, ÿ-methyl-(E)-cinnamaldehyde, methyl 3-hexenoate, nonanoic acid, octahydrocoumarin, peppermint oil (USA), peppermint oil (Idaho), perillaldehyde, 4-phenyl-3-buten-2-ol, rose butanoate, 2,2,3-trimethylcyclopentaneethanol, benzyl acetate, isobutyl anthranilate, divanillin, (Z)-4-hepten-1-ol, neryl isobutyrate, nonanol, octyl butyrate, isovaleric acid, vanillin, para-acetanisole, acetophenone, isobutyl butyrate, butyl isovalerate It contains ethyl cinnamate, hexylphenyl acetate, methylphenyl acetate, ketoisophorone (2,6,6-trimethylcyclohex-2-ene-1,4-dione), (Z)-3-hexenyl methyl ether, and vanillyl acetate.

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Examples of flavoring agents known to impart or help impart a sweet aroma include acetyl longifolene, star anise seed oil, carameldione, caramelfuranone, caramelfuranone liquid, caramelpentadione, coffeedione, and cyclotene hydrate.

, Ethyl cyclopentenolone, Ethyl Furaneol, 4-ethyl-2-hydroxy-3-methyl-2-cyclopenten-1-one, Ethyl Maltol, Ethyl Vanillin Propylene Glycol Acetal, Hornwort Lichen, Hexyl 2-methyl-3-pentenoate, Homalomena Rubeskens Root Oil, Honey Specialty Products, 3(2)-Hydroxy-5-methyl-2(3)-hexanone, 2-Hydroxy-3,5,5-trimethyl-2-cyclopenten-1-one, Maltol, Maltyl Isobutyrate, Maltyl Propionate, Maple Furanone, Niaouli Water, Mesitene Lactone, 2-Methoxy-3,5-dimethyl-2-cyclopenten-1-one, 2-Methyl-5,7-dihydrofuro-[3,4-d]-pyri Midine, (Z)-4-octen-1-ol, 2-pentanoylfuran, 3-pentylbicyclo[3.2.1]octan-2-one, Periplocacepium root oil, (E)-2-phenyl-1(2)-propen-1-yl acetate, phthalide, pineapple hydroxhexanoate, black poplar bud oleoresin, common guava fruit, rose absolute Morocco, rose concrete (Rosa damascena), saffron resinoid, sandalwood oil CO2 extract , ÿ-sinensal, spikenard oil, spikenard oil CO2 extract , strawberry furanone, strawberry furanone acetate, strawberry furanone butyrate, strawberry furanone liquid, sugar scent, brown sugar scent, surfeul d'oranger oil, sweet pea absolute, sweet pea Fragrance, Tamarind Seed Extract, Dandelion Leaf Tincture, Tilia Cordata Flower, Toffee Furanone, Tolu Balsam Oil, 2,5,7-Trimethyl-5,7-Dihydrofuro-[3,4-d]-pyrimidine, Undecanal Propylene Glycol Acetal, Isovaleraldehyde Propylene Glycol Acetal, Vanilla Aroma Fruit Extract, Vanilla Bean Aromatica, Vanilla Bean Planifolia, French Vanilla Flavor, Vanilla Resinoids, Vanilla Tahitensis Fruit Extract, Vanilla Propylene Glycol Acetal, Vanillyl Isobutyrate, Woodruff Absolute, 2-Acetyl-3,5-Dimethylfuran, Isoamyl Acetoacetate, Amyl Hexanoate, Isoamyl Hexanoate, Amyl Octanoate, Arnica Montana Flower Oil, 2-Butoxyethyl Acetate, Cabreuva Wood Oil, Cabreuva Mutawassee seed oleoresin, carrot weed oil, citronellyl cinnamate, clo

Cyclohexyl benzoate, 2,5-dibutyl-4-methyloxazole, 1,3-dihydroxyacetone (dimer), epoxyoxophorone, 2-ethylbutyl-2-butenoic acid, 1-ethyl-2-methylpropyl-3-butenoic acid, ethyl pentadecanoate, Eucalyptus leucoxylon leaf oil Algeria, fenchyl acetate, furfuryl ethyl ether, gingergrass oil, green carboxylate, green heptenal, Garjun balsam oil, heliotropyl diethyl acetal, 2-hexyl-5 or 6-keto-1,4-dioxane, ÿ-ionol, ivy carbaldehyde/methyl anthranilate Schiff base, juniper berry concrete, lilac perfume base, chamomile flower oil, (-)-menthone, 50% musk gx (1,3,4,6) in benzyl benzoate , 7,8-hexahydro-4,6,6,7,8,8-hexamethylcyclopenta(g)-2-benzopyran), musknonane (1,8-dioxacycloheptadecan-9-one), 2-nonanone, nonyl benzoate, (E,E)-2,6-alloocimene ((4E,6E)-2,6-dimethylocta-2,4,6-triene), phenethyl acetate, phenoxyacetic acid, phenylacetaldehyde, phenylacetaldehyde 2,3-butylene glycol acetal, phenylethylideneacetone, 1-phenyl-2-pentanol, 2-propenyl-p-cymene, 4-propenylsyringol, propyl butyrate, propyl propanesulfinate, propyl isovalerate, 3-propylidenephthalide, isopregyl acetate, iso Safrole, Strawberry Furanone Methyl Ether, 1,3,4-Trimethylpentyl-2-butenoic Acid, 1,2,2-Trimethylpropyl 2-butenoate, Tropical Indene, Tuberose Absolute (from Concrete), Tuberose Absolute (from Pomade), Turmeric Root Oil (China), Vanilla Bean Oil (Vanilla Planifolia), Vanilla Planifolia Fruit Infusion, Artemisia Annua Oil (France), Acetaldehyde Benzyl 2-Methoxyethyl Acetal, Acetaldehyde Hexyl Isoamyl Acetal, Citric Acid

Cetyl tributyl, agarwood oil (aeoxylon sympetalum), isoamyl butyrate, angelica seed oil, benzaldehyde propylene glycol acetal, mufufu wood oil, isobutyl anthranilate, isobutyl propionate, ÿ-campholenic alcohol, chamomile oil of Morocco, (E)-cinnamic acid, citral, cocoa essence, (R)-delta-decalactone, 9-decen-5-olide-2,4-diethyl-5-propyloxazole, 2,5-diethyltetrahydrofuran, 3',4'-dimethoxyacetophenone, (R)-delta-dodecalactone, elderflower absolute (Sambucus nigra and Sambucus nigra), endo-ethyl bicyclo(2.2.1)-5-heptene-2-carboxylate, ethyl butyryl lactate, (S)-2 -Ethylhexanoic acid, ethyl 5-hydroxydecanoate, ethyl methyl anthranilate, 10-epi-ÿ-eudesmol, isoeugenyl formate, eugenyl phenyl acetate, (E)-ÿ-farnesene, white frangipani concrete, freesia acetate, gardenia absolute, grain of paradise oil, 2-heptanol, 3-heptanone, 4-heptanone, hexanal butane-2,3-diol acetal, (Z)-3-hexen-1-yl acetate, (Z)-3-hexen-1-yl lactate, sec-hexyl alcohol, 4-hydroxyphenethyl alcohol, 3-hydroxy-4-phenyl-2-butanone, cis-2-hydroxy-3,4,5-trimethyl-2-cyclopenten-1-one, trans-2-hydroxy-3,4,5-trimethyl- 2-Cyclopenten-1-one, ÿ-ionone, Cuda oil, lavender oil, lime oil exported from Florida, (3S,6S)-(Z)-linalool oxide (pyranoid), marigold oil from Mexico, massoia bark oil CO2 extract, menthyl isovalerate , 3-mercapto-3-methylbutanol, 3-mercapto-3-methyl-1-butyl acetate, methionol, para-methoxycinnamaldehyde, (E)-para-methoxycinnamaldehyde, methyl 2-hydroxy-4-methylvalerate, 2-methylnaphthalene, methyl octanoate, methyl sandalwood, 5-methyltetrahydrofuran-3-one, musk cyclopentenyl propionate (1,2-dimethyl-3-(2-methyl-5-prop-1-en-2-yl-1-cyclopentenyl)propyl)propanoate

Ingredients: Musk Decanolide (1,6-Dioxacycloheptadecan-7-one), Musk gx (1,3,4,6,7,8-Hexahydro-4,6,6,7,8,8-Hexamethylcyclopenta(g)-2-benzopyran) 100%, Narcissus Flower Absolute, ÿ-Nonalactone, Nonyl Anthranilate, Isooctyl Acetate, Octyloxyacetaldehyde, Opoponax Resinoid Substitute, Peach Pivalate, Pear Valeric Acid, Petitgrain Combava Oil, Sesquiphellandrene, Phenethyl Lactate, Phenethyl Phenyl Acetate, Phenethyl Tiglate, 4-Phenyl-2-Butyl Acetate, Isophorone, Ketoisophorone, Pineapple Pentenoic Acid, 2-Isopropoxy-3(5)-Methylpyrazole Ingredients: gin, propyl mercaptan, 2-isopropyl-4-methyl-3-thiazoline, isopropyl propionate, propyl pyruvate, propylene glycol dibutyrate, rhododendron anthopogon leaf oil, rose leaf absolute (rosa centifolia), styryl acetate, tea leaf absolute, (R)-tonkafuranone, (R)-N,N,ÿ-trimethylbenzylamine, 2,6,6-trimethyl-2-hydroxybenzoate

Dioxycyclohexanone, tuberose acetate, (R)-delta-undecalactone, (R)-ÿ-undecalactone, (S)-delta-undecalactone, (S)-ÿ-undecalactone, valerian rhizome absolute, vanilla bean absolute (vanilla planifolia), vanilla tahitensis fruit absolute, vanilla tahitensis fruit absolute CO2 extract , vanilla tahitensis fruit oil CO2 extract , paravanillic acid, vanillin hexylene glycol acetal, dextrose, ylang ylang flower absolute, acetylethyl tetramethyl tetralin substitute, 9-acetyl-5-methyl-tricyclo[6.2.1.0.sup.sup. 2,7] Undec-4-ene, Allyl isononylate, Isoamyl decanoate, Amyl propionate, Amyl salicylate, Homoanisaldehyde, Reiboborneol, Isobornyl acetate, Isobornylphenyl

Acetate, Isobutyl Formate, 2-Butylfuran, 1-Isobutyl-2-methylbutyl 2-butenoate, ÿ-Camphalen acetate, Capsicum oleoresin, Carbyl propionate, (Z)-Civet decenone, 2,6-dimethyl-3-oxatricyclo(4.2)nonane, 1,3-dithiolane, Erycampain root absolute

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, Deltaelemene, ÿ-ethoxy-ortho-cresol, ethyl (Z)-4-heptenoate, ethyl 3-mercaptobutyrate, 1-ethyl-2-methylpropyl-2-butenoate, asafoetida absolute, filbertheptanone, furfuryl alcohol, ginger root absolute; ginseng, Florida-folded grapefruit oil, isogreen methanoindene, 20% Gajakwood oil in Gajun balsam oil, (S)-ÿ-heptalactone, 3-heptyl acetate, (S)-ÿ-hexalactone, (E)-2-hexenoic acid, 3-hexenyl 2-methylbutyrate, hexoxyacetaldehyde dimethyl acetal, hexyl formate, hexyl 2-furoate, cypress root oil, hop oil, hydroxymethyl hexyl ethyl ketone, junipalm cone, laurel Rubark Oil, Laurel Stem Oil, Angelica Flower Absolute, Lovage Herb Oil, (Z)-Linalool Oxide (Furanoid), Lithospermum Oil Terpene, Melissa Oil (Slovak Republic), Menthyl Levoisobutyrate, Methylbenzyl Acetate (Mixed ortho-, meta-, para-), 2-Methylbutyl Propionate, ÿ-Methyl-(E)-Cinnamaldehyde, 6-Methylheptanal, Methyl Ionone Terpene, Methyl 4-Methylbenzoate, Methyl 4-phenylbutyrate, Musk Ambrette Substitute, Musk g x 50% in Diethyl Phthalate, Musk g x 50% in DPG, Myrtenol, Nirvanolide, (E)-2-Nonen-1-yl Acetate, 2-Nonyn-1-aldimethyl Acetal, Cis-Octanone, 3-Octanone, Marjoram Oil CO 2. Extract, Perillaldehyde, 2-Phenoxyethyl Formate, 4-Phenyl-2-Butanol, Phenyl Glycol Phenyl Acetate, 3-Phenylpropyl Cinnamate, Phenyl Salicylate, Acetic Acid

Isopropenyl, (R)-(+)-Pulegone, Reseda acetal, Rose absolute (Rosa damascena) Bulgaria, Rose undecene, Sandal glycol acetal,

Satin aldehyde, sodium ferulate, styrallyl alcohol, syringaldehyde, tea acetate, tetrahydrofurfuryl phenyl acetate, orthothioguaiacol, 3 (or 2), 4, 5-trimethyloctahydro-4, 7-methanoinden-5-yl acetate, 4, 6, 11-trimethyl-5-oxatricyclo(6.2.2.0)

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ÿÿÿ ÿ) Dodeca-6-en, vanilla bean absolute, vanilla oleore gin bourbon,

4-Vinylphenol and wine lactone, Aeolanthus dill oil, Amberna phthopyran, para-anisaldehyde/methyl anthranilate Schiff base, ÿ-bisabolol, Capsicum oleoresin CO2 extract , cuminyl acetate, (E)-ÿ-damascenone, (R)-ÿ-decalactone, (S)-delta-decalactone, 2,5-dimethylbicyclo(3.2.1)-2-octen-3-yl acetate + 1,4-dimethylbicyclo(3.2.1)-2-octen-3-yl acetate, (R)-ÿ-dodecalactone, 2-ethyl-1-hexanol, (R)-ÿ-heptalactone, hexanol, (Z)-3-hexen-1-yl phenyl acetate, hexyl acetate, labdanum absolute, para- Cetylbenzyl acetate, methylheptadienone, nonanal/methyl anthranilate Schiff base, ocimenol, passion fruit extract, phenylacetaldehyde/methyl anthranilate Schiff base, black locust absolute, methyl 2,4-dihydroxy-3-methylbenzoate (sea resorcylate), deltatetradecalactone, verbena absolute (France), vetiveryl acetate, cananga ylang flower oil I, cananga ylang flower oil, zedoary bark oil, agrumen nitrile, artemisia vestita (green alder) wall leaf oil, benzyl acetate, benzyl salicylate, butyl 2-naphthyl ether, kera oil, leafy acetal, (R)-ocean propanal, (S)-ocean propanal, octahydro-4,7-methano-1H-inde n-5-acetaldehyde + 6-methyl-octahydro-4,7-methanoindene-5-carbaldehyde, spearmint oil (USA), strawberry glycidate 1, vanilla oil

Resin, veratraldehyde, (Z)-3-hexenyl methyl ether, methyl para-anisate, vanillin, vanillyl acetate, 4-(3,3-dimethylbicyclo(2.2.1)hebut-2-yl)-1-methyl-2-oxabicyclo(2.2.2)octane, 2-phenyl-2-pentenal, and (E)-2,5,9-trimethyl-4,9-decadien-1-al.

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Examples of flavoring agents known to impart or assist in imparting a sugar flavor include caramel color, sugar cookie flavor, ethyl maltol, malt distillate, marzipan flavor, iris root absolute, iris root absolute, sugar cane distillate, brown sugar cassia flavor, burnt sugar flavor, maple brown sugar flavor, sweet flavor, sweetness enhancer carameldione, caramel furanone liquid, cinnamon bark sugar cookie flavor, ethyl furaneol, methyl 2-proate, praline flavor, pyruvic acid, vanilla sugar, caramel furanone, caramel pentadione, creme brulee flavor, creme brulee coffee flavor, and strawberry furanone.

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Examples of flavoring agents known to impart or help impart a sugar aroma include caramel color, cotton candy flavor, marzipan flavor, sugar cookie flavor, sugar flavor, brown sugar flavor, carameldione, diethyl malate, malt distillate, malt isobutyrate, mesitene lactone, caramel furanone, caramel furanone liquid, caramel pentadione, coffeedione, creme brûlée flavor, cyclotene hydrate, ethyl furaneol, 1-ethyl-2-methylpropyl-2-butenoic acid, barley malt extract, menthone lactone, 2-mercaptomethylpyrazine, methyl bicycloheptenylmethyloxiranecarboxylate, strawberry furanone liquid, soy sauce furanone, spicy pentanone, strawberry furanone, strawberry furanone acetate, toffee furanone, ethyl cyclopentenolone, ethyl maltol, barley extract (wheat), ÿ-damascenone, and 3-phenylpropyl

Contains isobutyrate.

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Examples of flavoring agents known to impart or assist in imparting a caramel flavor include 2-butyl-3,6-dimethylpyrazine, 2-butyl-3,5,6-trimethylpyrazine, caramel cappuccino flavor, caramel apple flavor, caramel candy flavor, caramel cashew flavor, caramel cocoa flavor, caramel coconut flavor, caramel coffee flavor, caramel corn flavor, caramel cream flavor, caramel custard flavor, caramel flavor, baked caramel flavor, caramel fudge flavor, caramel flanone, caramel latte flavor, caramel macchiato flavor, caramel malt mambo flavor, caramel mocha flavor, caramel nut cream flavor, caramel nut flavor, caramel nut fudge flavor, caramel peanut flavor, caramel pecan flavor, caramel toffee flavor, caramel walnut shortbread flavor, coffeedione, creme blanco, Luree flavor, cyclotene hydrate, 2-dimethyl-3-butylpyrazine, ethyl furaneol, 3-ethylpyridine, fenugreek distillate, roasted fenugreek flavor, fenugreek resinoids, fenugreek seed oil, 3,4-hexanedione, 2-hydroxy-2-cyclohexenone, barley malt extract, maple flavor, 2-(methoxymethyl)pyridine, 3-methylbutyl 2-furylbutyrate, methyl 2-furoate, 6-methylpyridine-2-aldehyde, 1-phenyl-1,2-propanedione, 5-propylthiophene-2-aldehyde, 2-pyridinecarboxaldehyde, pyruvaldehyde, dextrose sorbitol, strawberry furanone, strawberry furanone acetate, strawberry furanone liquid, toffee flavor, English toffee flavor, fenugreek extract Sense, fenugreek extract, fenugreek tincture, acetylpropionyl, banana Foster flavor, butter caramel flavor, butyl levoractate, isobutyl lactate, cajeta flavor, caramel pentadione, chocolate caramel

Flavoring, Chocolate Caramel Flavoring, White Chocolate Caramel Flavoring, Chocolate Caramel Nut Flavoring, 3,5-Cocoapyrazine, Coffee Caramel Flavoring, Crème Brûlée Coffee Flavoring, Crème Caramel Flavoring, Cyclohexylacetic Acid, 2,5-Dimethyl-3,6-Diisobutylpyrazine, Eggnog Crème Brûlée Flavoring, 3-Ethyl-1,2-Cyclopentadione, 5-Ethyl-3,4,5,6-Tetramethylcyclohexen-2-one, Ethyl Vanillin, Fur Flavoring, 2-Furonic Acid, Barley (Helichurrisum italicum) Flower Absolute, Honey Distillate, Lucuma Flavoring, 2,3-Lutidine, Maltyl Propionic Acid, Molasses Flavoring, Caramelized Onion Flavoring, Orange Caramel Flavoring, Peanut Brittle Flavoring, Pecan Caramel Flavoring, 4-F Phenylpyridine, caramel popcorn flavor, 2-propanoylthiophene, 2-isopropylpyrazine, soy sauce furanone, tetrahydrofurfuryl acetate, 5-thenyl-thiophene-2-aldehyde, vanilla caramel flavor, 2-vinylbenzofuran, (E)-aconitic acid, almond toffee crunch flavor, almond toffee flavor, butter maple flavor, butter praline flavor, butter toffee flavor, 2-oxo-butyric acid, coffee crème brûlée flavor, coffee distillate, cyclotene, fenugreek absolute, chocolate fudge caramel flavor, furfuryl alcohol, 2-(2-furyl)ethanethiol, honey maple flavor, maple cream flavor, maple nut flavor, maple pecan flavor, toasted marshmallow flavor, 2-(1-mercaptoethyl)furan, 5-methyl- Contains ethyl furfural, caramelized onion oleoresin, praline flavor, baked praline flavor, vanilla oleoresin varietal, aconitic acid, carameldione, ethyl crotonate, ethyl (E)-2-crotonate, malt distillate, maltyl isobutyrate, maple furanone, baked maple nut flavor, rum ether, hot acetoacetic acid, acetyl butyryl, ethyl lactate, 2,3-heptanedione, 2-pentyl furan, diacetyl trimer, furfural, furfuryl valerate, and 2-methylbutyraldehyde.

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Examples of flavorings known to impart or help impart a caramel flavor include:
4-acetyl-2,5-dimethyl-3(2H)-furanone, 6-acetyl-1,2,3,4-tetrahydropyridine, allyl 2-furoate, amyl 2-furoate, isoamyl pyruvate, butterscotch flavoring, 2-oxobutyric acid, caramel corn flavoring, caramel dione, caramel flavoring, caramel furanone, caramel furanone liquid, coffee dione, cyclotene, cyclotene hydrate, diethyl malate, alpha,alpha-dimethylanisylacetone, 3-ethyl-1,2-cyclopentadione, ethyl cyclopentenolone, ethyl furaneol, ethyl 4-hydroxybutyrate, ethyl 2-hydroxy-2-methylbutyrate, ethyl 4-hydroxymethyl-3(2H)-furanone, ethyl levulinate propylene glycol ketal, ethyl maltol, 5-ethyl-2,3,4,5-tetramethyl Ingredients: 2-Hydroxy-2-cyclohexen-1-one, 5-ethyl-3,4,5,6-tetramethylcyclohexen-2-one, fenugreek absolute, fenugreek concrete, fenugreek seed oil, geranyl crotonate, barley (helichrysum italicum) flower absolute, barley (helichrysum italicum) flower extract, barley sera (hordeum vulgare cer a), hydroxydimethylcyclopentenone, 2-hydroxy-3,5,5-trimethyl-2-cyclopenten-1-one, immortelle absolute, levulinic acid, barley malt extract, malt flavoring, maltol, maltyl isobutyrate, maltyl propionate, maple flavoring , maple furanone, menthone lactone, mesitelactone, 2-methoxy-3,5-dimethyl-2-cyclopenten-1-one, 5-methylfurfural, methyl levulinate, 2-pentanoylfuran, isopropenylpyrazine, propyl levulinate, propyl pyruvate, dog rose (rosa canina) seed extract, rose furan, soy sauce furanone, dextrose sorbitol, (S)-strawberry furanone, strawberry furanone acetate, strawberry furanone ethyl ether, (R)-strawberry furanone methyl ether, strawberry furanone liquid, toffee furanone, fenugreek essence,

Fenugreek extract, fenugreek tincture, acetone alcohol, acetyl butyryl, 2-acetyl-3,4,5,6-tetrahydropyridine, isoamyl levulinic acid, caramel pentadione, creme brulee flavoring, cyclotene propionate, diethyl 2-hydroxyglutarate, 2,5-diethyltetrahydrofuran, 3-ethyl-4-methylcyclotene, 5-ethyl-3-methylcyclotene, ethyl vanillin, furfuryl acetone, furfuryl decanoate, barley extract (wheat), 2-hydroxy-2-cyclopenten-1-one, 3-hydroxy-3-penten-2-one, cis-2-hydroxy-3,4,5-trimethyl-2-cyclopenten-1-one, isomaltol, mango furanone, 2-mercaptomethylpyrazine, nutty cyclohexenone, 4-pentenoic acid, 2-propanol Lopanoylthiophene, pyruvalaldehyde, pyruvic acid, strawberry furanone, 2-thiophenethiol, tonka bean absolute substitute, tonka bean resinoid, vanilla bean absolute (vanilla planifolia), vanilla oleoresin bourbon, amerina l (dihydroalphaionylaldehyde), isobutyl lactate, 3,5-cocoapyrazine, coffee distillate, 1,2-cyclohexanedione, diacetyl, ethyl (E)-2-crotonate, fenugreek oleoresin, furfural, 2-furylacetone, geranyl ethyl acetal, 3-mercapto-3-methylbutyl formate, 2-methoxythiazole, 3-methylbutyl 2-furylbutyrate, methyl 2-hydroxy-3-methylpentanoate, methyl nonanedione, (E)-propyl-2-furan acrylate, streptocarnitine, methyl 2-hydroxy-3-methylpentanoate, methyl nonanedione ... 2-hydroxy-3-methylpentanoate, methyl nonanedione, methyl 2-hydroxy-3-methylpentanoate, methyl 2-hydroxy-3-methylpentanoate, methyl nonanedione, methyl 2-hydroxy-3-methylpentanoate, methyl 2-hydroxy-3-methylpentanoate, methyl 2-hydroxy-3-methylpentanoate, methyl 2-hydroxy-3-methylpentanoate, methyl 2-hydroxy-3-methylpentanoate, methyl 2-hydroxy-3-methylpentanoate, methyl 2-hydroxy-3-methylpentanoate, roberberryfuranone methyl ether, 2,3,5,6-tetramethylpyrazine, (E)-tiglic acid, tonka bean absolute, (E,E)-2,4-undecadienal, 2-acetyl-3,6-dimethylpyrazine, 2-acetyl-3,5 (or 6)-dimethylpyrazine, 2-acetylfuran, acetylpropionyl, (R)-ÿ-decalactone, ethyl lactate, 3,4-hexanedione, opoponax resin (commiphora ery thraea var. glabrescens engler), phenethyl octanoate, tetrahydrofurfuryl acetate, tetrahydrofurfuryl alcohol, vanillyl isobutyrate, dextrose, (E)-aconitic acid, benzyl distearate

sulfide, butyl levulinic acid, 2,3-dimethylpyrazine, ethyl 4-pentenoate, ethyl pyruvate, ethyl vanillin isobutyrate, furfuryl alcohol, furfuryl octanoate, ÿ-heptalactone, 5-hydroxymethylfurfural, malt distillate, 2-methylfuran, opoponax oil (commiphora erythraea var. glabrescens engler), peanut oxazole, vanilla oleoresin, aconitic acid, (E)-ethyl tiglate, 2-methylthio-3,5 or 6-methylpyrazine, opoponax absolute (commiphora erythraea var. glabrescens engler), 2-pentylfuran, Contains isoamyl 3-(2-furan)propionate, chocolate pyrazine A, cyclohexyl acetic acid, nutty quinoxaline, 2-acetyl-5-methylfuran, isobutyl 2-butenoate, 4-methyl-2,6-dimethoxyphenol, (E,E)-pomarose and fenugreek seed oil CO2 extract .

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Examples of flavoring agents known to impart or assist in imparting maple flavor include caramelpentadione, cyclotene, 2,5-dimethyl-3,6-diisobutylpyrazine, 3-ethyl-1,2-cyclopentadione, fenugreek absolute, lucuma flavor, maple butter flavor, maple cream flavor, maple distillate, maple flavor, maple nut crunch flavor, maple nut flavor, toasted maple nut flavor, maple pecan cream flavor, maple pecan flavor, maple syrup, maple walnut flavor, butter maple flavor, caramel furanone, cyclotene hydrate, gac fruit distillate, honey maple flavor, maple pumpkin flavor, maple brown sugar flavor, mountain maple (acer spicatum) bark extract, carameldione, red ...pecan cream flavor, maple pecan flavor, maple syrup, maple walnut flavor, maple pecan cream flavor, maple pecan flavor, maple syrup, maple walnut flavor, maple pecan cream flavor, maple pecan flavor, maple syrup, maple pecan cream flavor, maple pecan flavor, maple syrup, maple pecan cream flavor, maple pecan flavor, maple syrup, maple pecan cream flavor, maple pecan flavor, maple pecan flavor, maple pecan flavor, maple pecan flavor, Cinchona bark, cyclohexyl acetate; fenugreek oleoresin, maple furanone, lavage (Leviticum officinale)

Contains rhabdextrin extract; ravij tincture, 5-methylfurfural, and ethylcyclopentenolone.

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Examples of flavoring agents known to impart or help impart a maple aroma include caramelpentadione, 3-ethyl-4-methylcyclotene, fenugreek oleoresin, 2-hydroxy-2-cyclopenten-1-one, s-2-hydroxy-3,4,5-trimethyl-2-cyclopenten-1-one, maple flavoring, mountain maple (acer spicatum) bark extract, caramel furanone, caramel furanone liquor, red cinchona bark, 1,2-cyclohexanedione, cyclotene, cyclotene hydrate, ethyl cyclopentenolone, trans-2-ethylidene-trans-3-hexenal, fenugreek absolute, geranyl crotonate, menthone lactone, 2-methoxy-3,5-dimethyl-2-cyclopenten-1-one, carameldione, fenugreek absolute, geranyl crotonate, menthone lactone, 2-methoxy-3,5-dimethyl-2-cyclopenten-1-one, carameldione, fenugreek absolute, geranyl crotonate, menthone lactone, 2-methoxy-3,5-dimethyl-2-cyclopenten-1-one, geranyl crotonate ... geranyl crotonate, geranyl crotonate, geranyl crotonate, geranyl crotonate, geranyl crotonate, geranyl crotonate, geranyl crotonate, geranyl crotonate, geranyl crotonate, Contains nutraceutical esters, maple furanone, soy sauce furanone, 2-hydroxy-3,4,5-trimethyl-2-cyclopenten-1-one, 5-methylfurfural, 3-propylidenephthalide, blackstrap molasses, strawberry furanone methyl ether, whiskey lactone and cyclohexyl acetic acid.

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Examples of flavoring agents known to impart or assist in imparting cotton candy flavor include cotton candy flavor, maltol, ethyl maltol, strawberry furanone solution, caramel furanone, maltyl isobutyrate, and raspberry ketone.

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Examples of flavoring agents known to impart or assist in imparting a cotton candy flavor include cotton candy flavor, diethyl 2-hydroxyglutarate, strawberry furanone, ethyl maltol, maltol, strawberry furanone liquid, toffee furanone, caramel furanone, heliotropyl acetone, and maltyl isobutyrate.

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Introducing allulose into food or beverage products in amounts below its sweetness threshold can be advantageously combined with the use of natural and/or synthetic high-strength sweeteners in the aforementioned food or beverage products.

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As used herein, the term "high intensity sweetener" refers to a sweetener that has a sweetness intensity at least 10 times or greater than that of sucrose (sugar). For example, the sweetness intensity of a high intensity sweetener by weight can be 10 to 10,000 times (e.g., 20 to 9,000 times, e.g., 50 to 8,000 times) that of sucrose.

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As used herein, the term "synthetic high-intensity sweetener" refers to a high-intensity sweetener produced using one or more synthetic steps, including acesulfame K, alitame, aspartame, glucosylated steviol glycosides, N-[N-[3-(3-hydroxy-4-methoxyphenyl)propyl]-L-[ÿ]-aspartyl]-L-phenylalanine 1-methyl ester, N-[N-[3-(3-hydroxy-4-methoxyphenyl)-3-methylbutyl]-L-[ÿ]-aspartyl]-L-phenylalanine 1-methyl ester, N-[N[3-(3-methoxy-4-hydroxyphenyl)propyl]-L-[ÿ]-aspartyl]-L-phenylalanine 1-methyl ester, neohesperidine dihydrochalcone, neotame, sucralose, and salts and/or solubilizes thereof.

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A specific example of a synthetic high-strength sweetener is sucralose.

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As used herein, the term “natural high-strength sweetener” refers to a high-strength sweetener obtained from a natural source. For example, a natural high-strength sweetener may be in its unprocessed form (e.g., plant

They may be used as (as) or extracted or purified from natural sources. Examples of natural high-strength sweeteners include abulsoside A, bayunoside, blazein, curculin, cyclocarioside I, glycifylline, glycyrrhizic acid, hernandulsin, monk fruit extract, mavinrin, monatin, monelin, muclodioside, osrazine, periandrin, flomisoside, phlorizin, phyllodultin, polypodoside A, pterocarioside A, pterocarioside B, rubusoside, stevia extract (e.g., steviol glycosides, or especially rebaudiosides, e.g., rebaudiosides A-F, M, N and X), thaumatin and trilobatin, as well as salts and/or solvates thereof.

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Specific examples of natural high-strength sweeteners include not only monk fruit extract and stevia extract, but also any sweet compounds isolated from such extracts (including synthetic equivalents of such compounds).

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Monk fruit, also known as Luo Han Guo, is the fruit of the vine Siraitia grosvenorii. The sweetness of monk fruit extract is mainly due to a group of compounds known as "mogrosides," including mogroside V, mogroside IV, mogroside VI, oxomogroside V, mogroside IIIE, neomogroside, and siamenoside I. The food or beverage product used in the method of the present invention may contain not only monk fruit extract but also a sweetener containing any one or more mogrosides. For example, the food or beverage product may contain an extract or sweetener containing mogroside V.

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Stevia, or Stevia rebaudiana, contains sweet compounds in its leaves. These compounds can be extracted to provide stevia extract. The sweetness of stevia extract is mainly due to a group of compounds known as "steviol glycosides," examples of which include rebaudiosides (i.e., rebaudiosides A-F, M, N, and X), rubusoside, stevioside, and dulcoside. Food or beverage used in the method of the present invention

Food products may contain not only stevia extract but also sweeteners containing any one or more steviol glycosides. For example, a food or beverage product may contain an extract or sweetener containing rebaudioside A (Reb A). A food or beverage product may contain a blend or mixture of individual steviol glycosides that have been individually isolated, manufactured and/or purified.

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Stevia extract may contain steviol glycosides in an amount of at least 90% by weight, preferably 95% or more, of the total weight of the stevia extract on a dry solids basis (i.e., at least 90% by weight of the dry solids present in the stevia extract are steviol glycosides). For example, stevia extract may contain steviol glycosides in an amount of at least 90, 91, 92, 93, 94, 95, 96, 97, 98, or 99% by weight of the total weight of the stevia extract on a dry solids basis.

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Food or beverage products manufactured according to the method of the present invention may contain a stevia extract containing rebaudioside A and stevioside in an amount of at least 70% by weight, preferably 75% or more by weight, relative to the total weight of the stevia extract on a dry solids basis. Other stevia extracts may contain rebaudioside B in an amount of about 15% to about 30% by weight, preferably about 19% to about 23% by weight, relative to the total weight of steviol glycosides in the stevia extract on a dry solids basis.

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Further examples of high-strength sweeteners include synthetic high-strength sweeteners that are glycosides, which are synthetic high-strength sweeteners derived from amino acids or protein-based high-strength sweeteners.

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The term "glycoside high-strength sweetener" refers to a high-strength sweetener in which sugar is bonded to an organic part other than sugar itself. Glycoside high-strength sweeteners are abrasives.

Rusoside A, Bayunoside, Cyclocarioside I, Dulcoside A, Dulcoside B, Glycyrrhizin, Glycyrrhizic Acid, Glucosylated Steviol Glycosides, Mogrosides (e.g., Mogroside IV, Mogroside V), Muclodioside, Neomogroside, Osradin, Periandrin, Florisoside, Florizin, Polypodoside A, Pterocarioside A, Pterocarioside B, Rebaudioside (e.g., Rebaudioside A, Rebaudioside B, Rebaudioside C, Rebaudioside D, Rebaudioside E, Rebaudioside F, Rebaudioside M, Rebaudioside N, Rebaudioside X), Rubusoside, Siamenoside, Stevia, S Includes tevioside, trilobatin and neohesperidin dihydrochalcone.

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The term "high-strength sweetener derived from amino acids" refers to a high-strength sweetener that contains at least one amino acid as part of its molecular structure. High-strength sweeteners derived from amino acids include monatin (e.g., monatin, monatin SS, monatin RR, monatin RS, monatin SR), N-[N-[3-(3-hydroxy-4-methoxyphenyl)propyl]-L-[ÿ]-aspartyl]-L-phenylalanine 1-methyl ester, N-[N-[3-(3-hydroxy-4-methoxyphenyl)-3-methylbutyl]-L-[ÿ]-aspartyl]-L-phenylalanine 1-methyl ester, and N-[N[3-(3-methoxy-4-hydroxyphenyl)propyl]-L-[ÿ]-aspartyl]-L-phenylalanine 1-methyl ester, and salts and/or solvates thereof.

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As used herein, the term "protein-based high-strength sweetener" refers to a high-strength sweetener that is a protein. Protein-based high-strength sweeteners include blazein, curculin, mavinrin, monatin, and thaumatin.

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In other aspects, the present invention relates to a method for modifying or enhancing the flavor of a pharmaceutical product (e.g., a pharmaceutical composition), a nutritional supplement, a medicinal food product, a medicinal beverage product, a diet food product, a diet beverage product, a nutritional food product, or a nutritional beverage product, and the above pharmaceutical This includes including allulose in a product, nutritional supplement, medicinal food product, medicinal beverage product, diet food product, diet beverage product, nutritional food product, or nutritional beverage product in an amount below its sweetness threshold.

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The description of embodiments of methods for modifying or enhancing the flavor of food or beverage products may be applied mutatis mutandis to methods for modifying or enhancing the flavor of pharmaceutical products, nutritional supplements, medicinal food products, medicinal beverage products, diet food products, diet beverage products, nutritional food products, or nutritional beverage products.

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In another aspect, the present invention relates to the use of allulose in an amount below its sweetness threshold in order to modify or enhance the flavor of a food or beverage product.

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The description of embodiments of methods for modifying or enhancing the flavor of food or beverage products may be applied mutatis mutandis when allulose is used in an amount below its sweetness threshold to improve or enhance the flavor of food or beverage products.

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In another embodiment, the present invention relates to a method for producing a food or beverage product, the method comprising the step of including a flavoring agent and allulose such that allulose is included in the food or beverage in an amount below its sweetness threshold. In this method, allulose is included to modify or enhance the flavor imparted to the food or beverage product by the flavoring agent. This method may include the step of including one or more flavoring agents.

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As those skilled in the art will understand, this method will also include the usual steps necessary for manufacturing a food or beverage product. For example, this method will also include other steps necessary for manufacturing a food or beverage product.

The method includes mixing the ingredients with allulose and flavoring agents.

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In one embodiment, the flavoring agent is mixed with the allulose prior to mixing with the other ingredients of the food or beverage product.

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The description of embodiments of methods for modifying or enhancing the flavor of food or beverage products applies mutatis mutandis to methods for manufacturing food or beverage products.

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In another embodiment, a flavored food or beverage product is provided that contains allulose in an amount below its sweetness threshold. The presence of allulose in the flavored food or beverage product below its sweetness threshold modifies or enhances the flavor of the food or beverage product.

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The description of embodiments of methods for modifying or enhancing the flavor of food or beverage products applies mutatis mutandis to the above-mentioned flavored food or beverage products containing allulose below its sweetness threshold.

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Flavored food or beverage products may have a sweet flavor. For example, a flavored food or beverage product may have a sweet aromatic flavor, particularly a sweet aromatic flavor perceived primarily or exclusively by nasal odor. (e.g., caramel flavor, maple flavor, sugar flavor, cotton candy flavor, or a mixture thereof (all of these flavors are perceived primarily or exclusively by nasal odor)). In one embodiment, a flavored food or beverage product has a cotton candy or salted caramel flavor. In one embodiment, a flavored food or beverage product is a flavored beverage product having a cotton candy or salted caramel flavor.

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A flavored food or beverage product comprises a flavoring agent. A flavored food or beverage product comprises one or more flavoring agents. Flavoring agents may be included. A flavored food or beverage product may contain one or more flavoring agents described herein. For example, a flavored food or beverage product may contain one or more flavoring agents that impart or help impart a sweet flavor, sugar flavor, caramel flavor, maple flavor, or cotton candy flavor.

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In one embodiment, the flavored food or beverage product is a flavored beverage product. In one embodiment, the flavored beverage product contains cotton candy or salted caramel flavoring and contains allulose in an amount of about 2.695% by weight or less relative to the total weight of the beverage product. For example, a beverage product may contain allulose in amounts of 0.10, 0.20, 0.30, 0.40, 0.50, 0.60, 0.70, 0.80, 0.90, 1.00, 1.10, 1.20, 1.30, 1.40, 1.50, 1.60, 1.70, 1.80, 1.90, 2.00, 2.10, 2.20, 2.30, 2.40, 2.50, 2.60, 2.65, and 2.69% by weight of the total weight of the beverage product, as well as an intermediate amount between all of these values.

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In one embodiment, the beverage product contains allulose in an amount of about 0.10% to about 2.695% by weight relative to the total weight of the beverage product. For example, the beverage product contains allulose in an amount of about 0.10% to about 2.695% by weight relative to the total weight of the beverage product. In contrast, approximately 0.20% to approximately 2.695% by weight, approximately 0.30% to approximately 2.695% by weight, approximately 0.40% to approximately 2.695% by weight, approximately 0.50% to approximately 2.695% by weight, approximately 0.60% to approximately 2.695% by weight, and approximately 0.70% by weight

Approximately 2.695% by weight, approximately 0.80% by weight, and approximately 2.695% by weight; approximately 0.90% by weight, and approximately 2.695% by weight.

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Approximately 1.00% to approximately 2.695% by weight, approximately 1.10% to approximately 2.695% by weight, and approximately 1.20% to approximately 2.695% by weight.

%, from about 1.30% to about 2.695% by weight, or from about 1.40% to about 2.695% by weight, and all intermediate amounts therein.

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Beverage products contain allulose in the following proportions relative to the total weight of the beverage product: approximately 1.40% to 2.60% by weight, approximately 1.40% to 2.50% by weight, approximately 1.40% to 2.40% by weight, approximately 1.40% to 2.30% by weight, approximately 1.40% to 2.20% by weight, approximately 1.40% to 2.10% by weight, approximately 1.40% to 2.00% by weight, approximately 1.40% to 1.90% by weight, approximately 1.40% to 1.80% by weight, approximately 1.40% to 1.70% by weight, approximately 1.40% to 1.60% by weight, and approximately 1.45% to 1.55% by weight. It may be contained in amounts ranging from approximately 1.46% by weight to approximately 1.54% by weight, or approximately 1.47% by weight to approximately 1.53% by weight, approximately 1.48% by weight to approximately 1.52% by weight, or approximately 1.49% by weight to approximately 1.51% by weight, and also in amounts that are the midpoint of all of these ranges.

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Beverage products may contain allulose in amounts of approximately 1.00% to 2.20% by weight, approximately 1.00% to 2.10% by weight, approximately 1.00% to 2.00% by weight, approximately 1.10% to 2.00% by weight, approximately 1.10% to 1.90% by weight, approximately 1.20% to 1.90% by weight, approximately 1.20% to 1.80% by weight, approximately 1.30% to 1.80% by weight, approximately 1.30% to 1.70% by weight, or approximately 1.30% to 1.60% by weight, as well as any intermediate amount between these ranges.

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In one embodiment, the beverage product comprises allulose in an amount of about 1.50% by weight based on the total weight of the beverage product.

[Example]

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Measurement of the sweetness threshold of allulose

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The sweetness threshold of allulose was measured according to the FEMA (Flavor Extracts Manufacturing Association) guidelines. The standard process described in these guidelines requires the use of a two-option forced-choice test (2-AFC test) for the sweetness threshold level. The FEMA guidelines state that the standard for this measurement is a 1.5 wt% sucrose aqueous solution (i.e., sucrose is present in an amount of 1.5 wt% of the total weight of the solution). The AFC test must be performed until the proposed substance exceeds the sweetness level of sucrose at the threshold level. The FEMA guidelines state that 30 observations must be performed to evaluate the difference in sweetness, and the difference must be statistically significant to evaluate the effect.

It further recommends that it should be ensured that

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The number of panelists used throughout the replicates consistently exceeded the minimum of 30 observations recommended by the FEMA Sensory Testing Guidelines. As the replicates were conducted, the ÿ-binomial statistics were required to conform to the published requirements (BI, Jian. 2006. Sensory Discrimination Tests and Measurements. Chapter 6, pp. 106–129, 1st edition. Blackwell Publishing, Ames, IA). In such tests, if the ÿ-binomial ÿ exceeds zero, the ÿ-binomial statistics are required. However, if ÿ is zero or negative, the panel is not overdispersed, and existing binomial statistics can be used.

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Samples were prepared on the morning of the test. A reference solution was prepared as a comparison point for all tests. The reference solution was a simple solution of 1.5% by weight sucrose (commercial Domino brand sugar) in water. Test solutions were prepared from Tate & Lyle's Dolcia Prima® allulose syrup, standardized so that the amount of allulose in the test solution was 1.925%, 2.310%, 2.695%, 2.8875%, or 3.080% of the total weight of the solution.

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A replicated pair of samples at a single test concentration was selected from the above samples and provided on the day in question. Panelists were served the products in coded 2-ounce soufflé cups containing approximately 1.5 ounces (oz) of liquid and asked which sample was sweeter.

The samples were served at room temperature. The serving procedure was randomized based on the complete block design, and the order of the samples was randomized between panelists and replicas.

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As shown in Table 1, the sucrose solution was chosen as a sweeter sample than solutions containing 1.925%, 2.310%, and 2.695% allulose by weight. At these levels, the ÿ-binomial ÿ values are negative, so general binomial statistics apply.

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At concentrations higher than this allulose concentration, i.e., 2.8875% by weight of allulose relative to the total weight of the solution, the solution was considered sweeter than a 1.5% by weight sucrose solution. At 3.0800% allulose solids, the effect was even more pronounced, with a solution containing 3.0800% allulose solids clearly exceeding the sweetness threshold.

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Table 1

アルロース 重量%	計数	可能	両側（２－ｔａｉｌ）個別Ｐ－値	片側（１－ｔａｉｌ）個別Ｐ－値	β二項λ値
1.9250	45	50	0.0001	0.0001	-0.11
2.3100	49	58	0.0001	0.0001	-0.18
2.6950	40	60	0.0067	0.0034	-0.05
2.8875	26	44	0.1456	0.0728	0.06
3.0800	34	60	0.1831	0.0916	0.19

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In Table 1, the number of “possible” is the total number of panelists. The “count” for 1.925% by weight, 2.310% by weight, and 2.695% by weight of allulose is the number of panelists who selected the sucrose solution. The “count” for 2.8875% by weight and 3.0800% by weight of allulose is the number of panelists who selected the allulose solution. The data in Table 1 demonstrates that an allulose solution containing 2.695% by weight or less of allulose relative to the total weight of the solution can be considered to contain allulose in an amount below its sweetness threshold.

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Demonstration of the flavor-modifying or flavor-enhancing effect of allulose

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To demonstrate the flavor-modifying or enhancing properties of allulose when used in subsweet amounts, the following experiment was performed.

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Example 1 - Cotton Candy Flavor

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A cotton candy flavor sample according to Table 2 below was prepared by weighing all ingredients into a container and thoroughly

All samples were non-sweetened (i.e., they did not contain any sweeteners in amounts exceeding the sweetness threshold and therefore had no sweetness).

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Table 2

綿菓子香味サンプル

	対照サンプル		試験サンプル	
成分	重量%	グラム	重量%	グラム
Ｄｏｌｃｉａ　Ｐｒｉｍａ（商標）アルロースシロップ、乾燥固形分７１％	0.00	0.00	2.1127	42.2535
香味、Ｎ＆Ａ綿菓子	0.20	4.00	0.20	4.00
脱イオン水	99.8	1996	97.6873	1953.7465
全体	100	2000	100	2000

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N&A cotton candy flavor was obtained from Givaudan (product code YX-953-327-3). This flavor is sweetener-free (i.e., does not sweeten the sample). Dolcia Prima® was obtained from Tate & Lyle. Dolcia Prima® allulose syrup contains allulose at a concentration of 71% by weight on a dry solids basis. Therefore, in the test sample, allulose was present at a concentration of approximately 1.5% by weight relative to the total weight of the solution. Deionized water was prepared by reverse osmosis.

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The samples in Table 2 were subjected to the 2-AFC test. As previously described herein, the AFC test is an alternative, forced-choice test. Panelists are asked to identify the strongest or weakest sample on a specific attribute among a given number of samples. The 2-AFC test involves a choice between two samples, while the 3-AFC test involves a choice between three samples. The attribute assigned is generally one that panelists may be able to distinguish between. The 2-AFC for sweetness presents panelists with two samples and asks them to select the sweeter of the two. This differs from triangle tests or other types of tests in that an attribute is assigned on which panelists can focus. The AFC test is the standard used when pursuing FEMA GRAS ™ recognition for substances with flavor-modifying or flavor-enhancing properties.

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The samples were prepared the morning of the test. Panelists were asked to rate which taste sample (i.e., control or test sample) had the stronger cotton candy flavor and to choose between the two samples.

Subjects were asked to confirm their preference. Standard ambient fluorescent lighting, typical of a sensory facility, was used in the sensory isolation booth. Products were presented in a blinded and randomized manner in 2-ounce soufflé cups identified by randomized 3-digit product codes.

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The questionnaire was administered using CompuSense Cloud. This study was not replicated; therefore, simple binomial statistics were applied. The results are shown in Table 3.

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Table 3

試験タイプ	計数	可能	両側（２－ｔａｉｌ）個別Ｐ－値	片側（１－ｔａｉｌ）個別Ｐ－値
２－ＡＦＣ香味	27	30	<0.0001	0.0001
選好度	22	30	0.0081	0.0001

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In Table 3, the "possible" number is the total number of panelists. The "count" number is the number of panelists who selected the test sample versus the control sample.

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Of the 30 panelists, 27 ($p < 0.0001$) confirmed that the test sample, cotton candy perfume, had a stronger cotton candy flavor than the control sample, cotton candy perfume. Furthermore, 22 of the 30 panelists ($p < 0.0081$) preferred the test sample over the control sample. Therefore, it was revealed that when used at sub-sweet levels, allolose has a statistically significant effect not only on the intensity of the cotton candy flavor but also on the perception pattern of the allolose-containing test sample.

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In conclusion, the introduction of allulose into a cotton candy-flavored beverage in amounts below the sweetness threshold enhanced the cotton candy flavor and increased the preference for the beverage.

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Example 2 - Salted Caramel Flavor

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Salted caramel flavor samples were prepared according to Table 4 below by weighing all ingredients in a container and blending until completely mixed. All samples were non-sweetened (i.e., they did not contain sweeteners in amounts exceeding the sweetness threshold and therefore were not sweet).

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Table 4

塩漬けキャラメル香味サンプル

	対照サンプル		試験サンプル	
成分	重量%	グラム	重量%	グラム
Ｄｏｌｃｉａ　Ｐｒｉｍａ（商標）アルロースシロップ、乾燥固形分７１％	0.00	0.00	2.1127	42.2535
香味、Ｎ＆Ａ塩漬けキャラメル	0.20	4.00	0.20	4.00
脱イオン水	99.8	1996	97.6873	1953.7465
全体	100	2000	100	2000

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N&A Salted Caramel flavor was obtained from Flavor & Fragrance Specialties, Inc. (product code YX-226E 032). This flavor does not contain sweeteners (i.e., it does not impart sweetness to the sample). Dolcia Prima™ was obtained from Tate & Lyle. Dolcia Prima™ allulose syrup contains allulose in an amount of 71% by weight on a dry solids basis. Therefore, in the test samples, allulose was present in an amount of approximately 1.5% by weight based on the total weight of the solution. Deionized water was prepared by reverse osmosis.

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The 2-AFC test was performed on the samples in Table 3.

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Samples were prepared the morning of the test. Panelists were asked to identify which taste sample (i.e., control or test sample) had a stronger salted caramel flavor and whether there was a preference between the two samples. Standard ambient fluorescent lighting, typical of a sensory facility, was used in the sensory isolation booth. Products were presented in a blinded and randomized manner in 2-ounce soufflé cups identified by randomized 3-digit product codes.

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The questionnaire was administered using CompuSense Cloud. This study was not replicated; therefore, simple binomial statistics were applied. The results are shown in Table 5.

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Table 5

試験タイプ	計数	可能	両側（２－ｔａｉｌ）個別Ｐ－値	片側（１－ｔａｉｌ）個別Ｐ－値
２－ＡＦＣ香味	28	30	<0.0001	0.0034
選好度	25	30	0.0002	0.0728

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In Table 5, the "possible" number is the total number of panelists. The "count" number is the number of panelists who selected the test sample versus the control sample.

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Of the 30 panelists, 28 ($p<0.0001$) perceived the test sample, salted caramel fragrance, to have a stronger salted caramel flavor than the control sample, salted caramel fragrance. Furthermore, 25 ($p<0.0002$) of the 30 panelists preferred the test sample to the control sample. Thus, when used at subsweet levels, allulose was found to have a highly statistically significant effect on both the intensity of the salted caramel flavor as well as its apparent impact on the acceptance pattern of the test sample containing allulose.

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In conclusion, the introduction of allulose into a salted caramel flavored beverage in an amount below its sweetness threshold enhanced the salted caramel flavor and increased the liking for the beverage.

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Hoffman Estates, Prairie Stone Parkway, 5450 C/O Tate & Lyle Ingredients Americas, LLC

(72) Inventor John Smythe
Tate & Lyle Ingredients Americas, LLC, 5450 C/O Prairie Stone Parkway, Hoffman Estates, Illinois 60192, USA

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Examiner: Hiroki Muramatsu

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