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(54) Title: BAKED FOOD PRODUCT HAVING AN AIRY, SOFT, TENDER, AND MOIST TEXTURE

(57) Abstract: A baked food product having an airy, soft, tender, and moist texture, having a water activity of less than about 0.7, and prepared from a dough comprising: three or more humectants, and a baking powder composition; where the baked food product has a moisture content of greater than about 10 wt% of the baked food product.



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TITLE

BAKED FOOD PRODUCT HAVING AN AIRY, SOFT, TENDER, AND MOIST TEXTURE

BACKGROUND

[0001] The present application related generally to a baked food product having an airy, soft, tender, and moist texture and a method of making the same.

SUMMARY OF THE INVENTION

[0002] According to some embodiments of the present invention, a baked food product having an airy, soft, tender, and moist texture, and having a water activity of less than about 0.7, is prepared from a dough including (a) three or more humectants; and (b) a baking powder composition. In some embodiments, the baked food product has a moisture content of greater than about 10 wt% of the baked food product. In some embodiments, the baking powder composition includes sodium bicarbonate, sodium acid pyrophosphate, and monocalcium phosphate.

[0003] In some embodiments, the dough includes four humectants. The humectants may include glycerin, sorbitol, high fructose syrup, solid fructose, and combinations thereof. In certain embodiments, the humectants include a combination of glycerin, sorbitol, high fructose syrup, and solid fructose. The dough may include glycerin in an amount of up to about 0.5 wt% of the baked food product; sorbitol in an amount of about 1 wt% to about 5 wt% of the dough; high fructose syrup in an amount of about 0.5 wt% to about 10 wt% of the dough; and/or solid fructose in an amount of about 1 wt% to about 25 wt% of the dough.

[0004] In certain embodiments, the dough may include modified starch. The modified starch may be present in an amount of about 0.1 wt% to about 5 wt% of the dough, and may include hydroxypropyl starch.

[0005] In some embodiments, the baked food product has a moisture content of about 13 wt% to about 15 wt% of the baked food product, and may have a water activity of about 0.65 to about 0.67. In some embodiments, the baked food product has a shelf life of up to about 6 months; or up to about 9 months. In some embodiments, the baked food product has a tender and moist texture.

[0006] According to some embodiments of the present invention, a baked food product has an airy, soft, tender, and moist texture, a water activity of less than about 0.7, and is prepared from a dough

including (a) humectants including glycerin, sorbitol, and fructose; and (b) a baking powder composition including sodium bicarbonate, sodium acid pyrophosphate, and monocalcium phosphate. In some embodiments, the baked food product has a moisture content of greater than about 10 wt% of the baked food product.

[0007] According to some embodiments of the present invention, a method of preparing a baked food product includes preparing a dough comprising three or more humectants and a baking powder composition; shaping the dough to prepare a pre-formed dough product; and baking the pre-formed dough product to form a baked dough product. In some embodiments, the baked dough product has a moisture content of greater than about 10 wt% of the baked food product and a water activity of less than about 0.7. In some embodiments, shaping the dough includes wirecutting.

[0008] According to some embodiments, a method of preparing a baked food product includes preparing a dough comprising (a) humectants including glycerin, sorbitol, and fructose; and (b) a baking powder composition including sodium bicarbonate, sodium acid pyrophosphate, and monocalcium phosphate; shaping the dough to prepare a pre-formed dough product; and baking the pre-formed dough product to form a baked dough product. In some embodiments, the baked dough product has a moisture content of greater than about 10 wt% of the baked food product and a water activity of less than about 0.7.

[0009] According to some embodiments of the present invention, a baked food product having an airy, soft, tender, and moist texture, having a water activity of less than about 0.7 and a shelf life of at least 6 months, includes: (a) a humectant sugar; (b) a baking powder product composition; (c) a moisture content of greater than about 10 wt% of the baked food product; and (d) a thickness/diameter ratio more than 0.2. In some embodiments, the humectant sugar is derived from a glycerin, sorbitol, high fructose syrup, solid fructose, and combinations thereof. In some embodiments, the baked food product includes about 10 wt% to about 15 wt% of humectant sugar.

[0010] According to some embodiments of the present invention, a dough for preparing a baked food product with an airy, soft, tender, and moist texture, and a water activity of less than about 0.7, the dough includes: (a) three or more humectants; and (b) a baking powder composition.

DETAILED DESCRIPTION OF EXEMPLARY EMBODIMENTS

[0011] Compositions and methods of the present invention related to a baked food product having an airy, soft, tender and/or moist texture, a moisture content of greater than about 10 wt% of the baked food product, a water activity of less than 0.7 and a desirable shelf life.

[0012] I. COMPOSITION

[0013] In some embodiments, said baked food product is prepared from a dough including three or more humectants, a baking powder composition, and modified starch. The baking powder composition may include sodium bicarbonate, sodium acid pyrophosphate, and monocalcium phosphate. The amount of components as described herein may be expressed as a weight percentage of the dough used to prepare the baked food product.

[0014] Humectants

[0015] Baked food products of embodiments of the present invention may be prepared from dough which includes three or more humectants. In some embodiments, the dough includes four humectants. In some embodiments, the selection, combination, and/or amount of humectants may contribute to the soft and airy texture of the baked food product. Generally, the humectants that can be used in the present invention can be comprised of any edible material that is able to absorb and retain water, or bind water, such as, for example, alcohols, certain saccharides, salts and mixtures thereof. In some embodiments, humectant sugars, such as high fructose syrup, maltose, sorbose, galactose, corn syrup, glucose syrup, invert syrup, honey, molasses, solid fructose, lactose, dextrose, and mixtures thereof, may be employed. In addition to the humectant sugars, other humectants, or aqueous solutions of humectants which are not sugars or possess a low degree of sweetness relative to sucrose, may also be employed in the dough or batter. For example, glycerol, sugar alcohols such as maltitol, xylitol and sorbitol, and other polyols, may be used as humectants. Additional examples of humectant polyols (i.e. polyhydric alcohols) include glycols, for example propylene glycol, and hydrogenated glucose syrups. Other humectants include sugar esters, dextrans, hydrogenated starch hydrolysates, and other starch hydrolysis products.

[0016] In one embodiment, suitable humectants in combination include glycerin, sorbitol, high fructose syrup, solid fructose, and combinations thereof. In one embodiment, a baked food product includes a combination of glycerin, sorbitol, high fructose syrup, and solid fructose.

[0017] Generally, the dough may contain any suitable amount of humectant. Although the amount will vary with the precise humectant or humectants employed, in some embodiments the dough of the invention contains humectant in an amount of: about 2.5 wt% to about 45 wt% of the dough; about 5 wt% to about 40 wt% of the dough; about 10 wt% to about 35 wt% of the dough; about 15 wt% to about 30 wt% of the dough; about 5 wt% of the dough to about 10 wt% of the dough; about 10 wt% to about 20 wt% of the dough; about 12 wt% to about 18 wt% of the dough; 14 wt% to about 18 wt% of the dough; 15 wt% to about 17 wt% of the dough.

[0018] In some embodiments, the humectant includes glycerin in an amount of from about 0.01 wt% to about 5 wt% of the dough; about 0.05 wt% to about 4 wt% of the dough; or about 0.1 wt% to 3 wt% of the dough. In one embodiment, the dough includes glycerin in an amount of up to about 0.5 wt% of the dough.

[0019] In another embodiment, the dough includes glycerin in an amount of: about 0.01 wt% of the dough; about 0.02 wt% of the dough; about 0.05 wt% of the dough; about 0.1 wt% of the dough; about 0.2 wt% of the dough; about 0.3 wt% of the dough; about 0.4 wt% of the dough; about 0.5 wt% of the dough; about 0.6 wt% of the dough; about 0.7 wt% of the dough; about 0.8 wt% of the dough; about 0.9 wt% of the dough; about 1 wt% of the dough; 1.2 wt% of the dough; about 1.4 wt% of the dough; about 1.6 wt% of the dough; about 1.8 wt% of the dough; about 2 wt% of the dough; about 2.2 wt% of the dough; about 2.4 wt% of the dough; about 2.6 wt% of the dough; about 2.8 wt% of the dough; about 3 wt% of the dough; about 3.2 wt% of the dough; about 3.4 wt% of the dough; about 3.6 wt% of the dough; about 3.8 wt% of the dough; about 4 wt% of the dough; about 4.2 wt% of the dough; about 4.4 wt% of the dough; about 4.6 wt% of the dough; about 4.8 wt% of the dough; or about 5 wt% of the dough.

[0020] In some embodiments, the humectant includes sorbitol in an amount of about 0.01 wt% to about 5 wt% of the dough; about 0.1 wt% to about 5 wt% of the dough; about 0.5 wt% to about 5 wt% of the dough; about 1 wt% to about 5 wt% of the dough; about 2 wt% to about 4 wt% of the dough; or about 3 wt% to about 5 wt% of the dough. In an embodiment, the dough of the invention contains sorbitol in an amount of: about 0.01 wt% of the dough; about 0.1 wt% of the dough; about 0.5 wt% of the dough; about 1 wt% of the dough, about 1.2 wt% of the dough, about 1.4 wt% of the dough, about 1.6 wt% of the dough, about 1.8 wt% of the dough, about 2 wt% of the dough, about 2.2 wt% of the dough, about 2.4 wt% of the dough, about 2.6 wt% of the dough, about 2.8 wt% of the dough, about 3 wt% of the dough, about 3.2 wt% of the dough, about 3.4 wt% of the dough, about 3.6 wt%

of the dough, about 3.8 wt% of the dough, about 4 wt% of the dough, about 4.2 wt% of the dough, about 4.4 wt% of the dough, about 4.6 wt% of the dough, about 4.8 wt% of the dough, and about 5 wt% of the dough.

[0021] In some embodiments, the humectant includes high fructose syrup in an amount of about 0.5 wt% to about 10 wt% of the dough; about 0.8 wt% to about 8 wt% of the dough; about 1 wt% to about 8 wt% of the dough; about 1 wt% to about 5 wt% of the dough; or about 5 wt% to about 10 wt% of the dough; about 5 wt% of the dough to about 9 wt% of the dough; about 5 wt% of the dough to about 8 wt% of the dough; about 5 wt% of the dough to about 7 wt% of the dough; or about 6 wt% to about 7 wt% of the dough. In some embodiments, the humectant includes high fructose syrup in an amount of about 0.5 wt% of the dough; about 0.8 wt% of the dough; about 1 wt% of the dough; about 2 wt% of the dough; about 3 wt% of the dough; about 4 wt% of the dough; about 5 wt% of the dough; about 6 wt% of the dough; about 7 wt% of the dough; about 8 wt% of the dough; about 9 wt% of the dough; or about 10 wt% of the dough.

[0022] In some embodiments, the humectant includes solid fructose in an amount of about 1 wt% to about 25 wt% of the dough; about 1.5 wt% to about 25 wt% of the dough; about 2 wt% to about 20 wt% of the dough; about 3 wt% to about 15 wt% of the dough; about 5 wt% to about 10 wt% of the dough; about 5 wt% to about 9 wt% of the dough; about 5 wt% to about 8 wt% of the dough; about 5 wt% to about 7 wt% of the dough; or about 6 wt% to about 7 wt% of the dough. In some embodiments, the humectant includes solid fructose in an amount of about 1 wt% of the dough; about 3 wt% of the dough; about 5 wt% of the dough; about 7 wt% of the dough; about 10 wt% of the dough; about 13 wt% of the dough; about 15 wt% of the dough; about 17 wt% of the dough; about 20 wt% of the dough; about 23 wt% of the dough; or about 25 wt% of the dough.

[0023] An advantage of using a combination of glycerin, sorbitol, high fructose syrup, and solid fructose is used as the humectant system is that it also may act as a flavoring agent in the baked food product.

[0024] Baking Powder Composition

[0025] Baked food products of the present invention may be prepared from dough including a baking powder composition. In some embodiments, the selection, combination, and/or amount of the components in the baking powder composition may contribute to the soft and airy texture of the baked food product. In some embodiments, the baking powder composition includes baking soda

alone. In some embodiments, the baking powder composition may include sodium bicarbonate, sodium acid pyrophosphate, monocalcium phosphate, ammonium hydrogen carbonate, or combinations thereof.

[0026] Although the amount will vary with the precise baking powder composition employed, generally the dough contains a baking powder composition in an amount of about 0.05 wt% to about 5 wt% of the dough; about 0.1 wt% to about 4 wt% of the dough; or about 0.5 wt% to 3 wt% of the dough. In an embodiment, the dough contains a baking powder composition in an amount of about 0.05 wt% of the dough; about 0.08 wt% of the dough; about 0.1 wt% of the dough; about 0.5 wt% of the dough; about 0.7 wt% of the dough; about 0.9 wt% of the dough; about 1 wt% of the dough; about 1.2 wt% of the dough; about 1.4 wt% of the dough; about 1.6 wt% of the dough; about 1.8 wt% of the dough; about 2 wt% of the dough; about 2.2 wt% of the dough; about 2.4 wt% of the dough; about 2.6 wt% of the dough; about 2.8 wt% of the dough; about 3 wt% of the dough; about 3.2 wt% of the dough; about 3.4 wt% of the dough; about 3.6 wt% of the dough; about 3.8 wt% of the dough; about 4 wt% of the dough; about 4.2 wt% of the dough; about 4.4 wt% of the dough; about 4.6 wt% of the dough; about 4.8 wt% of the dough; or about 5 wt% of the dough.

[0027] In another embodiment, the dough contains baking powder composition in an amount from about 0.5 wt% of the dough to about 3 wt% of the dough; about 1 wt% of to about 3 wt% of the dough; about 1.5 wt% to about 3 wt% of the dough; and about 2 wt% to about 3 wt% of the dough.

[0028] In some embodiments, during baking, the baking powder composition undergoes a reaction. During such reaction, the properties of the baking powder composition are altered. The baking powder composition as found in the baked food product is referred to herein as the baking powder product composition.

[0029] Flour

[0030] In some embodiments, a baked food product is prepared from a dough including flour. Suitable flour may include refined flour and/or whole grain flour. Wholegrain flour is understood to mean flour produced directly or indirectly from cereal whole grains comprising endosperm, bran and germ. Wholegrain flour may also be reconstituted from separate flours made from endosperm, bran and germ respectively in ratios that give the reconstituted wholegrain flour the same composition as wholegrain flour directly produced from grains that still retain bran and germ. Refined flour is understood to mean flour produced from cereal endosperm only. In an embodiment, dough includes

flour in an amount of from about 20 wt% to about 21 wt% of the dough, from about 21 wt% to about 22 wt% of the dough, from about 22 wt% to about 23 wt% of the dough, from about 23 wt% to about 24 wt% of the dough, from about 24 wt% to about 25 wt% of the dough, from about 25 wt% to about 26 wt% of the dough, from about 26 wt% to about 27 wt% of the dough, from about 27 wt% to about 28 wt% of the dough, from about 28 wt% to about 29 wt% of the dough, from about 29 wt% to about 30 wt% of the dough, from about 30 wt% to about 31 wt% of the dough, from about 31 wt% to about 32 wt% of the dough, from about 32 wt% to about 33 wt% of the dough, from about 33 wt% to about 34 wt% of the dough, from about 34 wt% to about 35 wt% of the dough, from about 35 wt% to about 36 wt% of the dough, from about 36 wt% to about 37 wt% of the dough, from about 37 wt% to about 38 wt% of the dough, from about 38 wt% to about 39 wt% of the dough, from about 39 wt% to about 40 wt% of the dough,

[0031] In some embodiments, a dough may include any suitable whole grain and/or refined flour such as wheat flour, graham flour, oat flour, corn flour, rye flour, barley flour, spelt flour, soft wheat flour, hard wheat flour, durum wheat flour, kamut flour, tapioca flour, sago flour, and legume flours such as garbanzo bean flour. Soft wheat flour may include soft red flour and/or soft white flour. Terms “soft” and “hard” are understood to refer to the hardness of the grains of *Triticum aestivum* used to make the flour, rather than the species of wheat. Hardness of the grains may be due to density of the endosperm cells. Soft wheat endosperm has a lower density, which corresponds to weaker starch and protein bonds. Consequently, soft wheat grains may be crushed into fine particles, damaging less starch than in hard wheat grains.

[0032] Modified Starch

[0033] In some embodiments, the baked food product is prepared from a dough including modified starch. The modified starch may be derived from any suitable source such as dent corn starch, waxy corn starch, potato starch, wheat starch, rice starch, sago starch, tapioca starch, sorghum starch, sweet potato starch, and mixtures thereof. The modified starch can be a starch that has been modified by a chemical, physical, or enzymatic modification. In some embodiments, the modified starch may include raw starch and/or gelatinized starch. In some embodiments, the modified starch may include hydroxypropyl distarch phosphate. In some embodiments, the dough includes a weight ratio of raw starch to gelatinized starch of about 0.1:1 to about 15:1; about 3:1 to about 10:1; about 5:1 to about 10:1; about 6:1 to about 10:1; about 3:1; about 4:1; about 5:1; about 6:1; about 7:1; about 8:1; about 9:1; or about 10:1.

[0034] In some embodiments, the dough may include a modified starch in an amount from about 1 wt% to about 3 wt% of the dough. In an embodiment, the dough contains modified starch in an amount of from about 1 wt% to about 1.3 wt% of the dough, from about 1 wt% to about 1.4 wt% of the dough, from about 1 wt% to about 1.5 wt% of the dough, from about 1 wt% to about 1.6 wt% of the dough, from about 1 wt% to about 1.7 wt% of the dough, from about 1 wt% to about 1.8 wt% of the dough, from about 1 wt% to about 1.9 wt% of the dough, from about 1 wt% to about 2 wt% of the dough; or from about 1 wt% to about 3 wt% of the dough.

[0035] Chemical modification includes any treatment of a starch with a chemical that results in a modified starch. Within chemical modification are included, but not limited to, depolymerization of a starch, oxidation of a starch, reduction of a starch, etherification of a starch, esterification of a starch, nitrification of a starch, defatting of a starch, hydrophobization of a starch, and the like. Chemically modified starches may also be prepared by using a combination of any of the chemical treatments. Examples of chemically modified starches include the reaction of alkenyl succinic anhydride, particularly octenyl succinic anhydride, with starch to produce a hydrophobic esterified starch; the reaction of 2,3-epoxypropyltrimethylammonium chloride with starch to produce a cationic starch; the reaction of ethylene oxide with starch to produce hydroxyethyl starch; the reaction of hypochlorite with starch to produce an oxidized starch; the reaction of an acid with starch to produce an acid depolymerized starch; defatting of a starch with a solvent such as methanol, ethanol, propanol, methylene chloride, chloroform, carbon tetrachloride, and the like, to produce a defatted starch.

[0036] Physically modified starches are any starches that are physically treated in any manner to provide physically modified starches. Within physical modification are included, but not limited to, thermal treatment of the starch in the presence of water, thermal treatment of the starch in the absence of water, fracturing the starch granule by any mechanical means, pressure treatment of starch to melt the starch granules, and the like. Physically modified starches may also be prepared by using a combination of any of the physical treatments. Examples of physically modified starches include the thermal treatment of starch in an aqueous environment to cause the starch granules to swell without granule rupture; the thermal treatment of anhydrous starch granules to cause polymer rearrangement; fragmentation of the starch granules by mechanical disintegration; and pressure treatment of starch granules by means of an extruder to cause melting of the starch granules.

[0037] Enzymatically modified starches are any starches that are enzymatically treated in any manner to provide enzymatically modified starches. Within enzymatic modification are included, but not limited to, the reaction of an alpha amylase with starch, the reaction of a protease with starch, the reaction of a lipase with starch, the reaction of a phosphorylase with starch, the reaction of an oxidase with starch, and the like. Enzymatically modified starches may be prepared by using a combination of any of the enzymatic treatments. Examples of enzymatic modification of starch include the reaction of alpha-amylase enzyme with starch to produce a depolymerized starch; the reaction of alpha amylase debranching enzyme with starch to produce a debranched starch; the reaction of a protease enzyme with starch to produce a starch with reduced protein content; the reaction of a lipase enzyme with starch to produce a starch with reduced lipid content; the reaction of a phosphorylase enzyme with starch to produce an enzyme modified phosphated starch; and the reaction of an oxidase enzyme with starch to produce an enzyme oxidized starch.

[0038] Specific examples of the modified starch include acetylated starch, hydroxypropylated starch, starch octenylsuccinate, acetylated crosslinked starch adipate, acetylated crosslinked starch phosphate, starch acetate, oxidized starch, crosslinked starch monophosphate, starch phosphate, crosslinked starch phosphate, hydroxypropylated crosslinked starch phosphate and the like. In one embodiment, the baked food product of the present invention includes hydroxypropyl starch.

[0039] Additional Ingredients

[0040] Baked food products of some embodiments may be prepared from dough that also includes ingredients such as emulsifiers, buffering agents, seasoning, preservatives and sweeteners.

[0041] Suitable emulsifiers may include but are not limited to lecithin, diacetyl tartaric ester of monoglyceride ("DATEM"), mono or diglycerides, phospholipids, caseinate, egg whites, sodium stearoyl lactylate and combinations thereof.

[0042] A dough of the present invention may include added water as well as water from any other ingredients.

[0043] Additional ingredients may include vitamins or minerals such as vitamin B1, B2, B3, B6, B12, iron, magnesium, calcium or mixtures thereof. Baked food products may also include salt, flavoring agents such as vanilla, cocoa powder, milk and dairy derivatives, honey.

[0044] II. METHODS

[0045] In order that the baked food product of one or more of the desirable characteristics described herein, it need to be appropriately prepared. In an exemplary method of preparing the baked food product, comprises (a) preparing a dough comprising one or more humectants and a baking powder composition including sodium bicarbonate, sodium acid pyrophosphate, and monocalcium phosphate; (b) shaping the dough to prepare a pre-formed dough product; and (c) baking the pre-formed dough product to form a baked dough product, wherein the baked dough product has a moisture content of greater than about 10 wt% of the baked food product and a water activity of less than about 0.7.

[0046] In some embodiments, preparing the dough comprises combining the one or more humectants and the baking powder composition in a mixer. The dough may then be shaped into the desired form by any suitable method, such as cutting, wirecutting, depositing or extruding. The formed dough may then be baked to produce the baked food product. In some embodiments, the formed dough is baked at about 150°C to about 250°C for about 5 to about 15 minutes.

[0047] III. BAKED FOOD PRODUCT

[0048] Baked food products of the present invention may be formulated and/or prepared to include desirable characteristics. In some embodiments, the baked food products are formulated and/or prepared to include desirable sensory attributes. In some embodiments, sensory attributes are quantified by measuring lightness, dryness, softness, stickiness, and/or melting perceptions of the baked food product, using a sensory test according to the guidelines ISO 13299:2003 "Sensory analysis -- Methodology -- General guidance for establishing a sensory profile". Such sensory evaluations and have been shown to be reproducible and discriminating. Such quantifications may be defined according to guidelines ISO 11036:1994 "Sensory analysis - Methodology - Texture profile", evaluated by sensory experts using the technique described in the same guidelines. For example, the intensity of softness may be measured using a unstructured continuous scale from 0 to 60; 0 being labeled 'weak' and 60 being labeled 'intense.' Reference products used for such scale in the softness evaluation may include: Croissant de Lune, Balsem as a product with an intense softness level; Veritable Petit Beurre, LU as a product with intermediate hardness in bite; and Bastogne, LU as a product with a weak softness level. In embodiments of the present invention, a baked food product may have a texture described as airy, soft, tender, and/or moist.

[0049] In some embodiments, the baked food product has a water activity of less than about 0.7, less than about 0.6, or less than about 0.5. In some embodiments, the baked food product has a water activity of about 0.5, about 0.6, or about 0.7.

[0050] Generally, the baked food product of the present invention can have any suitable moisture content. However, in one preferred embodiment, the baked food product has a moisture content of about 13 wt% to about 15 wt% of the baked food product. In another preferred embodiment, the baked food product has a moisture content selected from the group consisting of about 13 wt% to about 14 wt% of the baked food product, about 13 wt% to about 15 wt% of the baked food product, and about 14 wt% to about 15 wt% of the baked food product.

[0051] The baked food product of the present invention may have a shelf life of up to about 6 months; up to about 9 months; up to about 12 months; or longer than one year. In another embodiment, the baked food product has a shelf life of about 1 month, about 2 months, about 3 months, about 4 months, about 5 months, about 6 months, about 7 months, about 8 months, and about 9 months. In some embodiments, shelf stability may be evaluated under accelerated aging conditions by measuring moisture, relative humidity, and hexanal content at a temperature above storage temperatures.

[0052] In some embodiments, the baked food product of the present invention is prepared in any suitable form, such as biscuits, miniature biscuits, cookies, sandwich cookies, or iced cookies. In some embodiments, the baked food product has a ratio of product thickness to diameter of about 0.1 to about 0.3; about 0.15 to about 0.25; about 0.2 to about 0.3; about 0.2; about 0.21; about 0.22; about 0.23; about 0.24; about 0.25; about 0.26; about 0.27; about 0.28; about 0.29; or about 0.3.

[0053] EXAMPLES:

[0054] Dough compositions for the baked food product were prepared according to the following formulations, including ingredients in Part I and the Part II formulation included in each specific example.

Part I (general ingredients):

Ingredients	Wt. based on 200 grams flour
Fat	60-120
Emulsifier	0-3

Egg powder	3-15
Cocoa Powder	20-40
Sugar	70-120
Milk Powder	2-10
Flavor	0.1-1
Salt	1-5
Baking powder composition	0.5-20
Water	10-250
Wheat Flour	200.00

Part II (other ingredients):

Ingredients	Wt. based on 200 grams flour
Solid Fructose	10-150
Hydroxypropyl distarch phosphate, not gelatinized	0-30
Hydroxypropyl distarch phosphate, Pregelatinized	0-20
High Fructose Syrup	5-50
Sorbitol	0-30
Glycerin	0.1-20

Example 1

[0055] Part II

Ingredients	Wt. based on 200 grams flour	
High Fructose Syrup	80-115	115-150
Sorbitol	2-5	6-15
Hydroxypropyl distarch phosphate, not gelatinized	5-15	16-25

[0056] The baked food product, having a thickness of about 71-78 mm/10ps (mm/10ps is defined herein as the height, in mm, of a stack of 10 baked food product pieces) and diameter of 43-45 mm, exhibited a texture described as hard, sticky, tight, dry, and loose, having a moisture level of about 10-14%, a water activity of 0.65-0.72 and a shelf life of 1-3 months.

[0057] Example 2

[0058] Part II

Ingredients	Wt. based on 200 grams flour	
Solid Fructose	10-20	40-80
High Fructose Syrup	15-25	30-40
Sorbitol	5-10	15-30
Hydroxypropyl distarch phosphate, not gelatinized	16-30	1-10

[0059] The baked food product, having a thickness of about 83-92 mm/10ps and diameter of 44-47 mm/10ps, exhibited a texture described as hard, dry, and tight, having a moisture level of 11-14%, a water activity of 0.60-0.65 and a shelf life of 3 months.

[0060] When solid fructose was removed out from the above ingredients, the resulting baked food product was harder and drier; a mould spot appeared on the product over shelf life of 1 month.

[0061] Example 3

[0062] Part II:

Ingredients	Wt. based on 200 grams flour		
Solid Fructose	15-50	15-50	60-120
Hydroxypropyl distarch phosphate, not gelatinized	15-25	15-25	/
Hydroxypropyl distarch phosphate, Pregelatinized	/	/	15-25
High Fructose Syrup	15-25	15-25	25-40
Sorbitol	5-10	11-20	5-15

[0063] The baked food products, having a thickness of about 105-125 mm/10ps and diameter of 45-47 mm/10ps, exhibited a texture described as airy, soft, and a little dry after 6 months, having a moisture level of 11.5-13.5%, a water activity of 0.63-0.67 and a shelf life of 6-7 months.

[0064] When high fructose syrup was removed from the above ingredients, the resulting baked food product was harder.

[0065] Example 4

[0066] Part II:

Ingredients	Wt. based on 200 grams flour
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Solid Fructose	20-40	50-70
Hydroxypropyl distarch phosphate, not gelatinized	10-15	16-20
High Fructose Syrup	5-15	16-30
Sorbitol	5-15	16-30

[0067] The baked food products, having a thickness of about 105-122 mm/10ps and diameter of 47-49 mm/10ps, exhibited a texture described as airy, soft, and a little dry after 6 months, having a moisture level of 10.5-14%, a water activity of 0.59-0.67 and a shelf life of 6-7 months.

[0068] When sorbitol was removed from the above ingredients, the resulting baked food product was harder.

[0069] Example 5

[0070] Part II:

Ingredients	Wt. based on 200 grams flour						
Solid Fructose	60-80	60-80	60-80	60-80	60-80	60-80	60-80
Hydroxypropyl distarch phosphate, not gelatinized	5-20	5-20	5-20	5-20	5-20	5-20	5-20
Hydroxypropyl distarch phosphate, Pregelatinized	0	0.5	1	2	3	4	5
High Fructose Syrup	15-25	15-25	15-25	15-25	15-25	15-25	15-25
Sorbitol	5-10	5-10	5-10	11-20	11-20	11-20	11-20

[0071] The baked food products, having a thickness of about 111-116 mm/10ps and diameter of 42-45 mm/10ps, exhibited a texture described as less airy, soft, and a little dry after 6 months, having a moisture level of 11-13.5%, a water activity of 0.65-0.68 and a shelf life of 6 months.

[0072] Example 6

[0073] Part II:

Ingredients	Wt. based on 200 grams flour				
Solid Fructose	15-30	15-30	15-30	15-30	15-30
Hydroxypropyl distarch phosphate, not gelatinized	1-10	0-10	0-10	0-10	0-10
Hydroxypropyl distarch phosphate, Pregelatinized	5	15	20	25	30
High Fructose Syrup	10-30	10-30	10-30	10-30	10-30
Sorbitol	8-16	8-16	8-16	10-16	10-16

[0074] The baked food products, having a thickness of about 115-121 mm/10ps and diameter of 44-49 mm/10ps, exhibited a texture described as airy, soft, and a little dry after 6 months, having a moisture level of 11-14%, a water activity of 0.62-0.68 and a shelf life of 6-7 months.

[0075] Example 87

[0076] Part II:

Ingredients	Wt. based on 200 grams flour		
Solid Fructose	10-20	10-20	10-20
Hydroxypropyl distarch phosphate, not gelatinized	1-5	1-5	1-5
Hydroxypropyl distarch phosphate, Pregelatinized	5-20	5-20	5-20
High Fructose Syrup	16-30	16-30	16-30
Sorbitol Liquid	15-20	20-25	25-30
Glycerin	0.1-1	2--5	6-10

[0077] The baked food products, having a thickness of about 90-120 mm/10ps and diameter of 44-49mm/10ps, exhibited a texture described as airy, soft, and a little dry to moist after 6 months, having a moisture level of 11.5-16%, a water activity of 0.56-0.68 and a shelf life of 6-9 months.

[0078] When glycerin was removed from the above ingredients, the resulting baked food product was harder and drier.

[0079] All of the references specifically identified in the detailed description section of the present application are expressly incorporated herein in their entirety by reference thereto. The term "about," as used herein, should generally be understood to refer to both the corresponding number and a range of numbers. Moreover, all numerical ranges herein should be understood to include each whole integer within the range, and other embodiments can have other dimensions. Accordingly, the specific embodiments described herein should be understood as examples and not limiting the scope thereof.

[0080] While illustrative embodiments of the disclosure are disclosed herein, it will be appreciated that numerous modifications and other embodiments may be devised by those skilled in the art. For example, the features for the various embodiments can be used in other embodiments. Therefore, it will be understood that the appended claims are intended to cover all such modifications and embodiments that come within the spirit and scope of the present disclosure.

CLAIMS

1. A baked food product having an airy, soft, tender, and moist texture, having a water activity of less than about 0.7, and prepared from a dough comprising:
 - (a) three or more humectants; and
 - (b) a baking powder composition;wherein the baked food product has a moisture content of greater than about 10 wt% of the baked food product.
2. The baked food product of claim 1, wherein the dough includes four humectants.
3. The baked food product of claim 1, wherein the three or more humectants are selected from the group consisting of glycerin, sorbitol, high fructose syrup, solid fructose, and combinations thereof.
4. The baked food product according to any of claims 1-3, wherein the three or more humectants include glycerin, sorbitol, high fructose syrup, and solid fructose.
5. The baked food product according to any of claims 1-4, wherein the three or more humectants include glycerin in an amount of up to about 0.5 wt% of the dough.
6. The baked food product according to any of claims 1-5, wherein the three or more humectants include sorbitol in an amount of about 1 wt% to about 5 wt% of the dough.
7. The baked food product according to any of claims 1-6, wherein the three or more humectants include high fructose syrup in an amount of about 0.5 wt% to about 10 wt% of the dough.
8. The baked food product according to any of claims 1-7, wherein the three or more humectants include solid fructose in an amount of about 1 wt% to about 25 wt% of the dough.
9. The baked food product according to any of claims 1-8, the dough further comprising modified starch.
10. The baked food product of claim 9, wherein the modified starch includes hydroxypropyl starch.

11. The baked food product of claim 9, wherein the modified starch is present in an amount of about 0.1 wt% to about 5 wt% of the dough.
12. The baked food product according to any of claims 1-11, wherein the baking powder composition includes sodium bicarbonate, sodium acid pyrophosphate, and monocalcium phosphate.
13. The baked food product according to any of claims 1-12, having a moisture content of about 13 wt% to about 15 wt% of the baked food product.
14. The baked food product according to any of claims 1-13, having a water activity of about 0.65 to about 0.67.
15. The baked food product according to any of claims 1-14, having a shelf life of up to about 6 months.
16. The baked food product according to any of claims 1-14, having a shelf life of up to about 9 months.
17. The baked food product according to any of claims 1-16, having a tender and moist texture.
18. A baked food product having an airy, soft, tender, and moist texture, having a water activity of less than about 0.7, and prepared from a dough comprising:
 - (a) humectants including glycerin, sorbitol, and fructose; and
 - (b) a baking powder composition including sodium bicarbonate, sodium acid pyrophosphate, and monocalcium phosphate;wherein the baked food product has a moisture content of greater than about 10 wt% of the baked food product.
19. The baked food product according to claim 18, wherein the fructose comprises solid fructose, high fructose syrup, or combinations thereof.
20. The baked food product according to any of claims 18-19, wherein the dough includes glycerin in an amount of up to about 0.5 wt% of the dough.

21. The baked food product according to any of claims 18-20, wherein the dough includes sorbitol in an amount of about 1 wt% to about 5 wt% of the dough.
22. The baked food product according to any of claims 18-21, wherein the dough includes high fructose syrup in an amount of about 0.5 wt% to about 10 wt% of the dough.
23. The baked food product according to any of claims 18-22, wherein the dough includes solid fructose in an amount of about 1 wt% to about 25 wt% of the dough.
24. *The baked food product according to any of claims 18-23, the dough further comprising modified starch.*
25. The baked food product of claim 24, wherein the modified starch includes hydroxypropyl starch.
26. The baked food product of claim 24, wherein the modified starch is present in an amount of about 0.1 wt% to about 5 wt% of the dough.
27. The baked food product according to any of claims 18-26, having a moisture content of about 13 wt% to about 15 wt% of the baked food product.
28. The baked food product according to any of claims 18-27, having a water activity of about 0.65 to about 0.67.
29. The baked food product according to any of claims 18-28, having a shelf life of up to about 6 months.
30. The baked food product according to any of claims 18-28, having a shelf life of up to about 9 months.
31. The baked food product according to any of claims 18-30, having a tender and moist texture.
32. A method of preparing a baked food product, comprising:

preparing a dough comprising three or more humectants and a baking powder composition;

shaping the dough to prepare a pre-formed dough product; and

baking the pre-formed dough product to form a baked dough product, wherein the baked dough product has a moisture content of greater than about 10 wt% of the baked food product and a water activity of less than about 0.7.

33. The method of claim 32, wherein shaping the dough includes wirecutting.
34. The method according to any of claims 32-33, wherein the dough includes four humectants.
35. The method according to any of claims 32-34, wherein the three or more humectants are selected from the group consisting of glycerin, sorbitol, high fructose syrup, solid fructose, and combinations thereof.
36. The method according to any of claims 32-35, wherein the three or more humectants include glycerin, sorbitol, and fructose.
37. The method according to claim 36, wherein the fructose comprises solid fructose, high fructose syrup, or combinations thereof.
38. The method according to any of claims 32-37, wherein the three or more humectants include glycerin in an amount of up to about 0.5 wt% of the dough.
39. The method according to any of claims 32-38, wherein the three or more humectants include sorbitol in an amount of about 1 wt% to about 5 wt% of the dough.
40. The method according to any of claims 32-39, wherein the three or more humectants include high fructose syrup in an amount of about 0.5 wt% to about 10 wt% of the dough.
41. The method according to any of claims 32-39, wherein the three or more humectants include solid fructose in an amount of about 1 wt% to about 25 wt% of the dough.
42. The method according to any of claims 32-41, wherein the dough further comprises modified starch.
43. The method of claim 42, wherein the modified starch includes hydroxypropyl starch.
44. The method of claim 43, wherein the modified starch is present in an amount of about 0.1 wt% to about 5 wt% of the dough.

45. The method according to any of claims 32-44, wherein the baking powder composition includes sodium bicarbonate, sodium acid pyrophosphate, and monocalcium phosphate.
46. The method according to any of claims 32-45, the baked food product having a moisture content of about 13 wt% to about 15 wt% of the baked food product.
47. The method according to any of claims 32-46, the baked food product having a water activity of about 0.65 to about 0.67.
48. The method according to any of claims 32-47, the baked food product having a shelf life of up to about 6 months.
49. The method according to any of claims 32-47, the baked food product having a shelf life of up to about 9 months.
50. The method according to any of claims 32-49, the baked food product having a tender and moist texture.
51. A method of preparing a baked food product, comprising:
- preparing a dough comprising (a) humectants including glycerin, sorbitol, and fructose; and (b) a baking powder composition including sodium bicarbonate, sodium acid pyrophosphate, and monocalcium phosphate;
- shaping the dough to prepare a pre-formed dough product; and
- baking the pre-formed dough product to form a baked dough product, wherein the baked dough product has a moisture content of greater than about 10 wt% of the baked food product and a water activity of less than about 0.7.
52. The method of claim 51, wherein shaping the dough includes wirecutting.
53. The method according to any of claims 51-52, wherein the dough includes glycerin in an amount of up to about 0.5 wt% of the dough.
54. The method according to any of claims 51-53, wherein the dough includes sorbitol in an amount of about 1 wt% to about 5 wt% of the dough.

55. The method according to any of claim 51-53, wherein the fructose comprises solid fructose, high fructose syrup, or combinations thereof.
56. The method according to any of claims 51-55, wherein the dough includes high fructose syrup in an amount of about 0.5 wt% to about 10 wt% of the dough.
57. The method according to any of claims 51-56, wherein the dough includes solid fructose in an amount of about 1 wt% to about 25 wt% of the dough.
58. *The method according to any of claims 51-57, the dough further comprising modified starch.*
59. The method of claim 58, wherein the modified starch includes hydroxypropyl starch.
60. The method of claim 58, wherein the modified starch is present in an amount of about 0.1 wt% to about 5 wt% of the dough.
61. The method according to any of claims 51-60, the baked food product having a moisture content of about 13 wt% to about 15 wt% of the baked food product.
62. *The method according to any of claims 51-61, the baked food product having a water activity of about 0.65 to about 0.67.*
63. The method according to any of claims 51-62, the baked food product having a shelf life of up to about 6 months.
64. The method according to any of claims 51-62, the baked food product having a shelf life of up to about 9 months.
65. The method according to any of claims 51-64, the baked food product having a tender and moist texture.
66. A baked food product having an airy, soft, tender, and moist texture, having a water activity of less than about 0.7 and a shelf life of at least 6 months, said baked food product comprising:
- (a) a humectant sugar;
 - (b) a baking powder product composition;
 - (c) a moisture content of greater than about 10 wt% of the baked food product; and

(d) a thickness/diameter ratio more than 0.2.

67. The baked food product of claim 66, wherein the humectant sugar is derived from a glycerin, sorbitol, high fructose syrup, solid fructose, and combinations thereof.

68. The baked food product according to claims 66 and 67, containing about 10 wt% to about 15 wt% of humectant sugar.

69. A dough for preparing a baked food product with an airy, soft, tender, and moist texture, and a water activity of less than about 0.7, the dough comprising:

(a) three or more humectants; and

(b) a baking powder composition.

70. The dough according to claim 69, wherein the dough includes four humectants.

71. The dough according to claim 69, wherein the three or more humectants are selected from the group consisting of glycerin, sorbitol, high fructose syrup, solid fructose, and combinations thereof.

72. The dough according to any of claims 69-71, wherein the three or more humectants include glycerin, sorbitol, high fructose syrup, and solid fructose.

73. The dough according to any of claims 69-72, wherein the three or more humectants include glycerin in an amount of up to about 0.5 wt% of the dough.

74. The dough according to any of claims 69-73, wherein the three or more humectants include sorbitol in an amount of about 1 wt% to about 5 wt% of the dough.

75. The dough according to any of claims 69-74, wherein the three or more humectants include high fructose syrup in an amount of about 0.5 wt% to about 10 wt% of the dough.

76. The dough according to any of claims 69-75, wherein the three or more humectants include solid fructose in an amount of about 1 wt% to about 25 wt% of the dough.

77. The dough according to any of claims 69-76, the dough further comprising modified starch.

78. The dough of claim 77, wherein the modified starch includes hydroxypropyl starch.

79. The dough of claims 77 or 78, wherein the modified starch is present in an amount of about 0.1 wt% to about 5 wt% of the dough.

80. The dough according to any of claims 69-79, wherein the baking powder composition includes sodium bicarbonate, sodium acid pyrophosphate, and monocalcium phosphate.

INTERNATIONAL SEARCH REPORT

International application No.

PCT/CN2012/000917

A. CLASSIFICATION OF SUBJECT MATTER

A23L 1/00(2006.01)i

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC: A23L

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

CNABS,CPRSABS,CNTXT,CJFD,DWPI: bake, baked, baking, dough, glycerin, sorbitol, fructose, sodium bicarbonate, sodium acid pyrophosphate, monocalcium phosphate, starch

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO2012054489A1(KRAFT FOODS GLOBAL BRANDS LLC)26 Apr. 2012(26.04.2012) Claims 1-41, description page 18 line 21 to page 22 line 22	1-80

☐ Further documents are listed in the continuation of Box C.☒ See patent family annex.

* Special categories of cited documents:	“T” later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
“A” document defining the general state of the art which is not considered to be of particular relevance	“X” document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
“E” earlier application or patent but published on or after the international filing date	“Y” document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
“L” document which may throw doubts on priority claim (S) or which is cited to establish the publication date of another citation or other special reason (as specified)	“&”document member of the same patent family
“O” document referring to an oral disclosure, use, exhibition or other means	
“P” document published prior to the international filing date but later than the priority date claimed	

Date of the actual completion of the international search 25 Mar. 2013(25.03.2013)	Date of mailing of the international search report 04 Apr. 2013 (04.04.2013)
Name and mailing address of the ISA/CN The State Intellectual Property Office, the P.R.China 6 Xitucheng Rd., Jimen Bridge, Haidian District, Beijing, China 100088 Facsimile No. 86-10-62019451	Authorized officer ZHAO,Shihua Telephone No. (86-10)62411183

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/CN2012/000917

Patent Documents referred in the Report	Publication Date	Patent Family	Publication Date
WO2012054489A1	26.04.2012	NONE	