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PARA HACER LA MISMA Y DULCES DE CONFECCION HACIENDO USO DEL MISMO

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MARS INCORPORATED

DOMICILIO

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74. APODERADO

RAMIRO CASTRO DUQUE

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2 SOLICITANTE (71)	Nombre: MARS INCORPORATED Dirección: 6885 Elm Street, McLean, VA 22101-3883, Estados Unidos de América Nacionalidad o Domicilio: Estados Unidos de América Lugar de Constitución: Estados Unidos de América Teléfono: Fax: E-mail:		IDENTIFICACION C.C. ☐ NIT ☐ C.E. ☐ Otro ☐ Cual _____ Número _____
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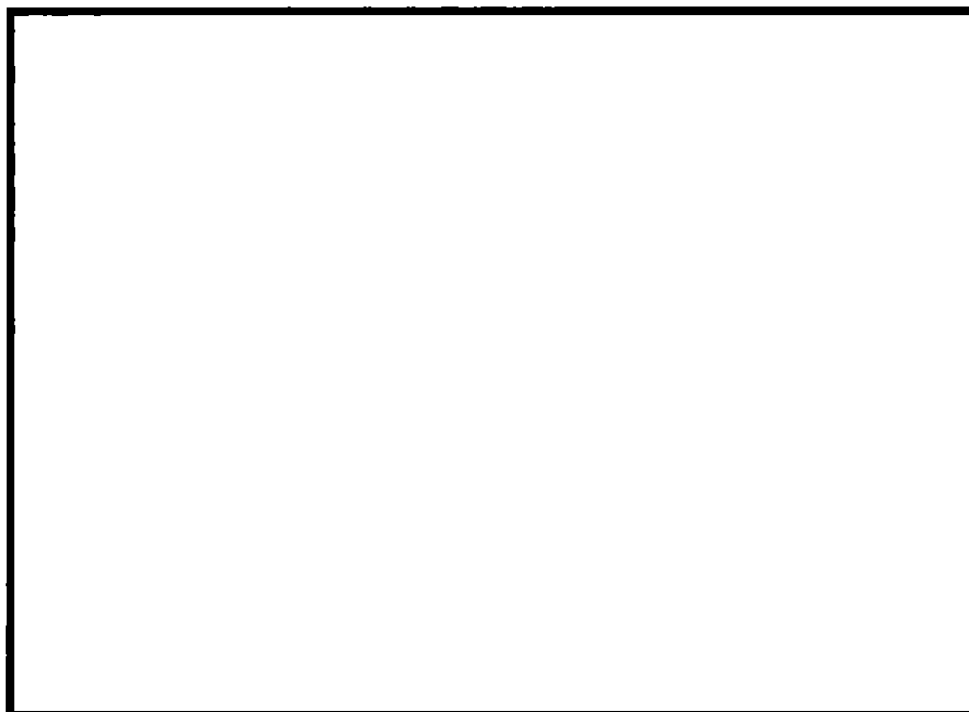
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ANEXOS

- ☒ Comprobante de pago de la tasa de presentación de la solicitud. \$422.000
- ☐ Documento que acredite la existencia y representación legal cuando el solicitante sea persona jurídica.
- ☒ Poderes, si fuere el caso. Protocolo No. 13958 y Fotocopia del documento de poder.
- ☐ Documento de cesión del inventor al solicitante o a su causante.
- ☐ Declaraciones
- ☒ Copia de la solicitud internacional. (Resumen, descripción, reivindicaciones, dibujos)
- ☒ Traducción de la solicitud internacional al castellano. (Resumen, descripción, reivindicaciones, dibujos)
- ☒ Copia del examen preliminar efectuado por la IPEA.
- ☐ Traducción del examen preliminar efectuado por la IPEA.
- ☐ De ser el caso, copia del contrato de acceso.
- ☐ De ser el caso, documento que acredite la licencia o autorización de uso de conocimientos tradicionales de las comunidades indígenas.
- ☐ De ser el caso, certificado de depósito del material biológico.
- ☐ Arte final 12x12.
- ☐ De ser el caso, información sobre otras solicitudes de patente o títulos obtenidos en el extranjero por el mismo titular o su causante, relacionadas parcial o totalmente con la invención de esta solicitud.
- ☒ Otros Tarjeta de propietarios.

11 FIGURA CARACTERÍSTICA:



12 Solicito la concesión de la patente

NOMBRE: RAMIRO CASTRO DUQUE

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(54) Title: DULCE DE LECHE-FLAVORED FAT-BASED CONFECTION, METHOD FOR MAKING THE SAME AND CONFECTIONERY CANDIES MAKING USE OF THE SAME

(57) Abstract: A dulce-flavored fat-based confection possessing a smooth and creamy mouthfeel and a thermally generated flavor and suitable for use in candy-shelling is provided. A method of making such a dulce-flavored fat-based confection is also disclosed.

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TITLE

**DULCE DE LECHE-FLAVORED FAT-BASED CONFECTION,
METHOD FOR MAKING THE SAME AND
CONFECTIONERY CANDIES MAKING USE OF THE SAME**

BACKGROUND OF THE INVENTION**Field of the Invention**

The present invention relates to a novel fat based confection having a smooth and creamy mouthfeel and a thermally generated dulce de leche flavor. This invention further relates to a method of making such a dulce de leche-flavored fat based confection, as well as to confectionery candies incorporating such a dulce de leche-flavored fat-based confection, in particular candy-shelled confectionery candies.

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Description of Related Art

Dulce de leche (hereinafter "dulce de leche" or "dulce") translated from Spanish as "sweet of milk" is a popular treat in South and Central American countries. Dulce de leche is typically made by boiling sweetened condensed milk for hours to produce a sweet, caramelized pudding like treat, which can be eaten alone or in combination with a biscuit or wafer. Dulce de leche is a water-based composition characterized by a smooth and creamy texture and a distinct rich dairy flavor with lower caramelized sugar notes. The flavor of dulce de leche is thermally generated. Dulce de leche is also known as carjeta (Mexico), arequipe (Colombia), fanqulla (Cuba) and manjar blanco (Peru).

It is known to incorporate water-based dulce de leche or dulce de leche-like compositions into certain products. For example, Häagen-Daas Dulce De Leche ice cream and Alfajore cookies do just that. In addition, dulce de leche spreads such as La Salamandra and Smucker's spreads are known. All known dulce de leche products contain water-based dulce de leche compositions. Typically dulce de leche compositions contain high moisture contents, i.e. about 26% moisture by weight, and exhibit a water activity of about 0.85.

Both the high moisture content and water activity of dulce de leche impose limits on the types and quality of products which can be made using it. For example, the incorporation of water-based dulce de leche into certain applications such as candy-shelled confections is problematic. In short, dulce de leche is typically too soft to candy shell or at the very least is very difficult to process. In this same regard, water-based dulce de leche can be difficult to form in a bite-size format. Special process conditions are required, which drive up manufacturing costs and complexity. Temperature and humidity must be carefully controlled to process on traditional depositing or Open Extrusion center forming equipment. Traditional water-based dulce de leche loses its shape during processing.

Additionally, the high moisture content of water-based dulce de leche creates a moisture gradient when mixed with low moisture components such as crisp rice, biscuits, cookies etc. Controlling this gradient can be difficult, often requiring a more complex product design that relies on the application of moisture barriers and humectants to slow the movement of water into the lower moisture components. Shortened product shelf life, poor texture and quality are often the result.

It should also be noted that traditional water-based caramels suffer from the same inadequacies as water-based dulce de leche in certain applications. This, again, is due to a relatively high moisture content, i.e. about 5.0%-12.0% moisture by weight and a water activity ranging from about 0.40 to 0.50. Softer traditional water-based caramels have the same problems as dulce de leche, often being too soft to form in bite-size pieces or to candy shell. Further, traditional water-based caramels give a hard, chewy unpleasant eating experience when candy-shelled and are too slow to clear the mouth upon consumption, in other words, bits of caramel and candy shell stick to the consumer's teeth, resulting in an unfavorable overall eating experience. Water-based caramels also create problematic moisture gradients as described above. In the end, however, the inadequacies of water-based caramel are irrelevant; water based caramel could never be a substitute for dulce de leche because caramels have a very different flavor characterized by caramelized sugar, vanilla and buttery notes.

Clearly, there is a need to develop a dulce de leche composition which does not suffer from the above-noted inadequacies of water-based dulce de leche. Such a dulce de leche product should offer the same rich dairy flavor as water-based dulce de leche, but offer a much greater degree of product design freedom, improved shelf life, better texture and simple processing.

Caramac® (Nestle®) is a fat based "caramel flavour covering" which is used to enrobe a biscuit in Nestle®'s BreakAway which is sold in the United Kingdom. Caramac® is also marketed as a simple solid bar in Nestle®'s Caramac®. As set

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forth in the ingredient declaration, Caramac® comprises vegetable fat, sugar lactose, sweetened condensed skimmed milk, skimmed milk powder butter, emulsifier (lecithin), treacle, salt, flavoring, and possibly nut traces. Caramac® has a flavor intensity much lower than that of conventional dulce de leche. More importantly the flavor of Caramac® is more similar to a traditional caramel flavor than to a dulce de leche flavor. It is believed that the caramel like flavor of the fat based Caramac® can be solely attributed to the inclusion of treacle, a.k.a, molasses, in the composition. In other words, Caramac® does not appear to have a thermally generated flavor. What is more, Caramac® can be described as having a waxy mouthfeel.

Hence, there is clearly a need to develop a composition having a distinct thermally generated dulce de leche flavor a smooth, creamy texture and a very low moisture content. The applications for such a composition would be manifold.

SUMMARY OF THE INVENTION

The present invention is directed to a dulce de leche-flavored fat based confection comprising a sweetener a dairy protein and a fat continuous phase, made according to a process comprising the steps of dispersing the sweetener and the dairy protein in a fat to form a raw confection having the fat continuous phase; heating the raw confection within a temperature range and for a time sufficient to thermally generate dulce de leche flavor thereby forming the dulce de leche-flavored fat based confection, and cooling the dulce de leche-flavored fat based confection to a temperature sufficient to halt the thermal generation of dulce de leche flavor.

The present invention is also directed to a method of making a dulce de leche-flavored fat-based confection comprising the steps of dispersing a sweetener and a dairy protein in a fat to form a raw confection having a fat continuous phase, heating the raw confection within a temperature range and for a time sufficient to thermally generate a dulce de leche flavor thereby forming the dulce de leche-

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flavored fat-based confection, and cooling the dulce de leche-flavored fat-based confection to a temperature sufficient to halt the thermal generation of dulce de leche flavor

In certain preferred embodiments of the method, there is an additional particle size reduction step either before or after the heating step. The average particle size is reduced to 10 to 1000 microns. In certain preferred embodiments of the method the raw confection is heated within a temperature range between 70 °C and 180°C. In certain preferred embodiments, the time sufficient to develop a dulce de leche flavor is between 1 minute and 1440 minutes. In certain preferred embodiments, the temperature sufficient to halt the development of dulce de leche flavor is below 70 °C.

In certain preferred embodiments of the invention, the confection produced has a water activity ranging from 0.09 to 0.38. In certain preferred embodiments of the invention, moisture is present in an amount ranging from 0.10% to 5.0% by weight of the confection. In additional preferred embodiments of the present invention, the confection comprises a fat in an amount ranging from 10.0% to 98.0% by weight or a sweetener in an amount ranging from 1.0% to 80.0% by weight or a dairy protein in an amount ranging from 0.5% to 40.0% by weight of the confection.

The present invention is broadly directed to a dulce de leche-flavored fat based confection.

The present invention is further directed to a dulce de leche-flavored fat-based confection comprising a sweetener, a dairy protein and a fat continuous phase. In preferred embodiments, the sweetener is selected from fructose, sucrose, lactose, dextrose, polyols, other natural and artificial sweeteners and combinations thereof. In certain preferred embodiments, the dairy protein is selected from non-fat dry milk, demineralized whey powder, whole milk powder and combinations thereof.

In certain preferred embodiments, the fat continuous phase is selected from fractionated palm kernel oil, cocoa butter anhydrous milk fat, hydrogenated vegetable oil, and combinations thereof.

The present invention is additionally directed to a confection, preferably a candy-shelled confection, or a chocolate composition comprising a dulce de leche-flavored fat-based confection.

The present invention is also directed to a fat-based confection comprising 2-hydroxy-3-methyl 2-cyclopenten-1-one as a flavor component. In preferred embodiments of the present invention, the fat based confection contains an additional flavor component or additional flavor components. These flavor components are 2-acetyl furan, 2-acetyl 3-hydroxyfuran, methyl furanoate, 2,5 dimethyl-4-hydroxy-3-(2H) furanone, 3 hydroxy-2-methyl-pyran-4-one, 2-furfural, 2-(5H)furanone, 2-furfuryl alcohol, dihydro hydroxy maltol and 5 hydroxymethyl furfural.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

The present invention relates to a novel dulce de leche-flavored fat based confection. This confection is preferably thermally processed to create special textural and flavor attributes. The inventive dulce de leche-flavored confection has a fat based continuous phase that imparts a distinctive mouthfeel and eating experience. The creaminess of the fat-based confection enhances consumer perception of quality and overall acceptance of a finished candy using such a confection. The dulce de leche-flavored fat-based confection of the present invention solves the problems associated with traditional water based dulce de leche, while maintaining a true thermally generated dulce de leche flavor. In sum, by virtue of an ultra low moisture content, a low water activity and a fat continuous phase, the dulce de leche-flavored fat-based confection of the present invention offers a great degree of product design freedom, improved shelf life, better texture and simple processing.

As used herein, the term "dulce de leche flavor" refers to a flavor characterized by a dairy-main flavor with lower caramelized sugar flavor typically formed through thermal generation. As used herein, the term "dulce de leche-flavored" refers to a material having a dulce de leche flavor. As used herein, "fat-based" refers to a material having a fat/lipid continuous phase in which material components such as milk proteins and sugars are dispersed. As used herein, "water-based" refers to a material having a water continuous phase in which material components such as milk proteins and sugars are dispersed, typically water-based materials have a water activity from about 0.4 to about 0.5 and a moisture content of about 5% to about 12%. As used herein, "candy-shelled" refers to a composition having a sugar shell made by panning as known to those skilled in the art. As used herein, "dairy protein" refers to any protein derived from a dairy source, the dairy protein may be purified and/or processed and may be in the whey or casein class of milk proteins. As used herein, "sweetener" refers to any composition which provides sweetness and/or serves as a browning or reducing sugar. As used herein, "Maillard reaction" refers to a well-known food reaction which occurs between an amino source such as a dairy protein and a reducing sugar.

In a first aspect, the present invention is directed to a method of making a dulce de leche-flavored fat based confection. In the first step, a sweetener and a dairy protein are dispersed in a fat to form a raw confection having a fat continuous phase. Dispersion is accomplished in any manner suitable to form a homogeneous dispersion, such as, for example, a Littleford Day M 5 Mixer (Littleford Day Florence, KY) or a Hobart A 200FT Mixer (Hobart Corp., Troy OH). Typically dispersion is accomplished under low heat, i.e. 35-50°C, and with agitation, as it is necessary to keep the fat(s) liquid during the dispersion step. However any method or equipment which keeps the fat(s) liquid can be employed herein.

It is important to note that since many ingredients will inherently contain water at 5% or greater, ingredients must be carefully selected to keep the overall moisture content less than about 5%, and preferably less than about 1.5%, i.e. low moisture ingredients (less than about 5% moisture) are preferably employed. For example,

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if dextrose is used as a sweetener it would need to be anhydrous dextrose, not dextrose monohydrate. Typically commercially purchased dextrose is dextrose monohydrate, which has a substantially higher moisture content than anhydrous dextrose.

Generally any sweetener is suitable for use in this invention as long as it has a low moisture content. Exemplary sweeteners include, without limitation and in their low moisture form if applicable, sucrose, lactose, dextrose, polyols, other natural and artificial sweeteners and combinations thereof. In a preferred embodiment of the present invention, the sweetener is a sugar such as fructose, sucrose, lactose or dextrose. One of ordinary skill in this art will readily appreciate that the above-described sweetener may not only provide sweetness to the dulce de leche-flavored fat-based confection, but in some instances may also serve as the browning or reducing sugar necessary to develop dulce de leche flavor. In certain preferred embodiments of this invention, the dulce de leche-flavored fat-based confection comprises a sweetener in an amount ranging from 1 0% to 80 0%, preferably 5 0% to 70 0%, more preferably 10 0% to 60 0%, still more preferably 15 0% to 55 0% and most preferably 25 0% to 50 0%, by weight of the dulce de leche-flavored fat-based confection.

Likewise, any dairy protein is suitable for use in the present invention as long as it has a low moisture. Exemplary dairy proteins include, without limitation and in their low moisture form if applicable, non-fat dry milk, demineralized whey powder, whole milk powder and combinations thereof. It is also believed that soy protein could be used in place of dairy protein if so desired. One of ordinary skill in this art will readily appreciate that certain sugars may be present in the above-described dairy protein, these sugars may provide some degree of sweetness to the dulce de leche-flavored fat-based confection, as well as serve as the browning or reducing sugar necessary to develop dulce de leche flavor. In certain preferred embodiments of this invention, the dulce de leche-flavored fat based confection comprises a dairy protein in an amount ranging from 0 5% to 40 0%, preferably 1 0% to 30 0%, more preferably 2 0% to 20 0%, still more preferably 3 0% to

15 0%, and most preferably 4 0% to 10 0%, by weight of the dulce de leche-flavored fat based confection.

Similarly any fat is suitable for use in the present invention as long as it has a low moisture content. Exemplary fats include, without limitation and in their low moisture form if applicable, fractionated palm kernel oil, cocoa butter, anhydrous milk fat (AMF) hydrogenated vegetable oil such as soy fat or cottonseed oil, and combinations thereof. Fractionated palm kernel oil such as that available from Fuji under the name Palkena-SAC, is preferably used in the dulce de leche-flavored fat-based confection. In certain preferred embodiments of this invention, the dulce de leche-flavored fat-based confection comprises a fat in an amount ranging from 10 0% to 98 0% preferably 16 0% to 85 0%, more preferably 22 0% to 75 0%, still more preferably 25 0% to 60 0%, and most preferably 28 0% to 45 0%, by weight of the dulce de leche-flavored fat based confection.

The particular fat(s) chosen for use in the present invention is primarily responsible for the smooth, creamy mouthfeel of the present inventive dulce de leche-flavored fat based confection. The fat(s) chosen comprises a continuous matrix which disperses the sweetener and dairy protein. The particular texture of the dulce de leche-flavored fat-based confection obtained can be manipulated by the selection of particular fat(s). Fats with relatively high melting points give a greater degree of heat stability conversely fats with relatively low melting points give a softer texture. According to the present invention, fat(s) with a melting point in the range of about 30°C to about 34 °C is preferably used, especially when the dulce de leche-flavored fat-based confection will be used in any type of panining process. Likewise, one of ordinary skill in the art would readily appreciate that the use of fat(s) having a higher melting point would give a harder texture.

The texture of the present dulce de leche-flavored fat based confection can be further controlled by fat type, fat content, dairy protein type, dairy protein content, sweetener type, sweetener content and particle size. In that regard, in an optional step of the present inventive method, the raw confection can be ground (refined) to

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obtain a desired average particle size. The desired average particle size ranges from 10 to 1000 microns, preferably 50 to 750 more preferably, 100 to 500 still more preferably 150 to 400 and most preferably 200 to 350 microns. Grinding can be accomplished using any conventional means such as a roller refiner or a ball mill or any other means known in the art. The average particle size of the raw confection prior to size reduction will depend upon the particular sweetener and dairy protein employed, typically this will range anywhere from about 80 microns and up. One of ordinary skill in this art will readily appreciate that such a size reduction step could alternatively be conducted prior to the above-described dispersion step i.e., size reduction of ingredients or even after the thermal processing step described below

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One of ordinary skill in this art will also readily understand that other ingredients may and will be present in a given dulce de leche-flavored fat-based confection, in addition to the sweetener dairy protein and fat described above. Other such ingredients include, without limitation, emulsifiers such as mono and diglycerides, salt and stabilizers such as disodium phosphate.

In a second step of the process of making the dulce de leche-flavored fat-based confection of the present invention, the raw confection is heated within a temperature range and for a time sufficient to thermally generate a dulce de leche flavor, thereby forming the dulce de leche-flavored fat-based confection. This heating step can be conducted in any scraped surface heat exchanger such as, for example, a Contherm scraped-surface heat exchanger (Alfa Laval Thermal Inc., Newburyport, MA). The temperature must be raised to a temperature sufficient to initiate flavor development reactions such as the Maillard reaction, likewise, the temperature must be maintained at a temperature and for a time sufficient to conduct such reactions, yet without developing undesirable flavors

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Typically the raw confection is heated within a temperature range from 70°C to 180 °C, preferably 75°C to 165°C, more preferably 80°C to 150°C, still more preferably 90 °C to 135 °C, and most preferably 100°C to 125 °C. Temperatures

higher than these will impart scorch notes to the dulce de leche-flavored fat-based confection, temperatures lower than these are insufficient to initiate the requisite flavor development reactions such as the Maillard reaction. Typically the time sufficient to develop a dulce de leche flavor ranges from 1 to 1440 minutes, preferably 2 to 720 minutes, more preferably 3 to 600 minutes, still more preferably 5 to 480 minutes, and most preferably 10 to 120 minutes. Times longer than these will impart scorch notes to the dulce de leche-flavored fat based confection, times shorter than these will be inadequate to allow dulce de leche flavor to develop. For purposes of the present invention, one of ordinary skill in this art will readily appreciate that the higher the temperature, the lower the time and vice versa. Confirmation of the formation of the desired dulce-de-leche-flavored fat based confection is typically made by sensory evaluation, analytical evaluation or combination thereof.

In a final step of the present inventive process, the dulce de leche-flavored fat based confection is cooled to a temperature sufficient to halt the development of dulce de leche flavor. It is also understood that further cooling may be undertaken in order to develop an appropriate fat crystal structure for a given end use. Typically a temperature below 70°C is suitable for halting flavor development.

The dulce de leche-flavored fat-based confection made according to the above-described method has an ultra-low moisture content and low water activity. In certain preferred embodiments of this invention, moisture is present in an amount ranging from 0.1% to 5.0%, preferably 0.15% to 3.50%, more preferably 0.20% to 2.50%, still more preferably 0.25% to 1.50%, further preferably 0.30% to 1.25% and most preferably 0.5% to 0.9%, by weight of the dulce de leche-flavored fat based confection. In certain preferred embodiments of this invention, the dulce de leche-flavored fat-based confection has a water activity (Aw) ranging from 0.09 to 0.38, preferably 0.10 to 0.36, more preferably 0.11 to 0.34, still more preferably 0.12 to 0.30 and most preferably 0.13 to 0.25.

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If the dulce de leche-flavored fat-based confection contains a higher amount of moisture than that noted above, the sweetener and dairy protein will come out of the fat continuous phase upon heating the raw confection, in fact, the characteristics of the dulce de leche-flavored fat-based confection will change dramatically becoming unstable and quite brittle. The texture is no longer smooth and creamy but quite the opposite. A discontinuous, severely grained texture forms that is composed of many hard inclusions with large quantities of fat oiling off the mass. A gentle heating process as described above, in combination with low moisture ingredients, maintains the creaminess of the present dulce de leche-flavored fat-based confection. During processing, heating and agitation are carefully controlled to prevent localized hot spots from occurring in the dulce de leche-flavored fat-based confection.

The present invention also contemplates a process wherein dulce de leche flavor is thermally generated via a sweetener and/or a dairy protein before their dispersion in a fat continuous phase. Any process by which dulce de leche flavor is thermally generated using the above-noted ingredients is within the scope of the present invention.

In a second aspect, the present invention is directed to a dulce de leche-flavored fat-based confection comprising a sweetener, a dairy protein and a fat continuous phase made according to the above-described process.

In a third aspect, the present invention is directed to a dulce de leche-flavored fat-based confection. In other words, the present invention is broadly directed to any fat-based confection which has a dulce de leche flavor as defined above. In certain preferred embodiments, the dulce de leche-flavored fat-based confection includes a sweetener in an amount and/or type noted above, includes a dairy protein in an amount and/or type noted above, and/or includes a fat in an amount and/or type noted above. Further in certain preferred embodiments, the dulce de leche-flavored fat-based confection of the present invention has a water activity as noted above and/or a moisture content as noted above.

Given the extremely low moisture content of the above-described inventive dulce de leche-flavored fat-based confection, it is particularly suited for application to products in which an unacceptable moisture gradient would typically be present if one were using a water-based composition such as a traditional caramel or dulce de leche. When using the present dulce de leche-flavored fat-based confection in conjunction with cookies, crisp rice, crackers, etc., no moisture gradient is created, thus allowing for a platform of products comprising dry components combined with the dulce de leche-flavored fat-based confection which will not become soggy during shelf-life. The dulce de leche-flavored fat-based confection of the present invention can even be used as a barrier coating. What is more, the present dulce de leche-flavored fat-based confection is particularly suited for use in a candy-shelled confection. The dulce de leche-flavored fat-based confection allows for the formation of a bite-size piece, and the surface of the dulce de leche-flavored fat-based confection is stable to sugar-shelling, i.e., sugar shell will adhere.

Hence, another aspect of the present invention is directed to confections comprising the dulce de leche-flavored fat-based confection of the present invention, and, in particular, to a candy-shelled confection comprising the dulce de leche-flavored fat-based confection. It is important to note that the dulce de leche-flavored fat-based confection of the present invention can also be used as a stand alone product, e.g., in tablet form, as an inclusion, as an enrobing material, etc.

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Further, the inventive dulce de leche-flavored fat-based confection can also be used as an intermediate in the manufacture of chocolate. Both SOI (standard of identity) and non-SOI chocolate is included for purposes of the present invention. In fact, using the dulce de leche-flavored fat-based confection of the present invention as an intermediate to generate developed milk notes in chocolate allows for bypass of the complicated, expensive and cumbersome crumb oven process. The crumb process generates desirable developed milk flavors for chocolate through, for example, the Maillard reaction between milk proteins and sugar to impart a flavor. Generally, fluid milk is condensed and mixed with sugar and cocoa liquor; the mixture is dried in large ovens at 75°C to 105°C for 4 to 8 hours until the moisture

content is under 1%. Details of the crumb oven process can be found in *Chocolate, Cocoa, and Confectionery* by Bernard Minifie.

The cooking process used in the present dulce de leche-flavored fat-based confection creates, inter alia, an array of developed milk flavors associated with chocolate processed using the crumb oven. In short, the sugar and protein sources of the present invention can be modified to produce an array of developed milk and dairy like flavors for chocolate. Accordingly an additional aspect of the present invention is directed to a chocolate composition which contains the dulce de leche-flavored fat-based confection of the present invention, one of ordinary skill in this art would readily appreciate that other ingredients typically present in chocolate compositions would also be present in the chocolate composition of the present invention.

Yet another aspect of the present invention is directed to a dulce de leche-flavored fat-based confection comprising a sweetener a dairy protein and a fat continuous phase. All of the details given above with respect to sweetener identity and amount, dairy protein and amount, fat continuous phase identity and amount, water activity moisture content and flavor are the same for this aspect.

Yet another aspect of the present invention is directed to a fat-based confection comprising 2-hydroxy 3-methyl 2-cyclopenten-1-one as a flavor component. As used herein, "flavor component" refers to a flavor compound or a compound which provides flavor to a confection. According to the present invention, the overall flavor profile is preferably a result of thermally generated flavor components.

4. In preferred embodiments of the present invention, the fat-based confection contains an additional flavor component or additional flavor-components. These flavor components are 2-acetyl furan, 2-acetyl-3-hydroxyfuran, methyl furanoate, 2,5-dimethyl-4-hydroxy 3-(2H) furanone, 3 hydroxy 2-methyl pyran-4-one, 2-furfural, 2-(5H)furanone, 2-furfuryl alcohol, dihydro hydroxy maltol and 5-hydroxymethyl furfural. Analysis of the fat-based confection of the present

invention has shown these flavor compounds to be key in producing a dulce de leche flavor hence, "dulce de leche flavor" can be more specifically defined as flavor created by some combination of these flavor components. All of the details given above for the first aspect of this invention with respect to sweetener identity and amount, dairy protein and amount, fat continuous phase identity and amount, water activity and moisture content are the same for this aspect.

In certain embodiments of the present invention, 2-hydroxy-3-methyl 2-cyclopentan-1-one is present in an amount greater than or equal to 0.001 ppm, preferably greater than or equal to 0.004 ppm, more preferably greater than or equal to 0.007 ppm, still more preferably greater than or equal to 0.010 ppm, further preferably greater than or equal to 0.013 ppm, and most preferably greater than or equal to 0.016 ppm. In certain embodiments of the present invention, 2-hydroxy-3-methyl 2-cyclopentan-1-one is present in an amount ranging from 0.001 ppm to 30.0 ppm, preferably 0.004 ppm to 25.0 ppm, more preferably 0.007 ppm to 20.0 ppm, still more preferably 0.010 ppm to 15.0 ppm, further preferably 0.013 ppm to 10.0 ppm, and most preferably 0.016 ppm to 5.0 ppm.

In certain embodiments of the present invention, 2-acetyl furan is present in an amount greater than or equal to 0.001 ppm, preferably greater than or equal to 0.020 ppm, more preferably greater than or equal to 0.040 ppm, still more preferably greater than or equal to 0.060 ppm, further preferably greater than or equal to 0.080 ppm, and most preferably greater than or equal to 0.10 ppm. In certain embodiments of the present invention, 2-acetyl furan is present in an amount ranging from 0.001 ppm to 30.0 ppm, preferably 0.020 ppm to 25.0 ppm, more preferably 0.040 ppm to 20.0 ppm, still more preferably 0.060 ppm to 15.0 ppm, further preferably 0.080 ppm to 10.0 ppm, and most preferably 0.10 ppm to 5.0 ppm.

In certain embodiments of the present invention, 2-acetyl 3-hydroxyfuran (isomalt) is present in an amount greater than or equal to 0.001 ppm, preferably greater than or equal to 0.020 ppm, more preferably greater than or equal to 0.040 ppm, still

more preferably greater than or equal to 0.060 ppm, further preferably greater than or equal to 0.080 ppm, and most preferably greater than or equal to 0.10 ppm. In certain embodiments of the present invention, 2-acetyl-3-hydroxyfuran is present in an amount ranging from 0.001 ppm to 250.0 ppm, preferably 0.020 ppm to 200.0 ppm, more preferably 0.040 ppm to 150.0 ppm, still more preferably 0.060 ppm to 100.0 ppm, further preferably 0.080 ppm to 75.0 ppm, and most preferably 0.10 ppm to 50.0 ppm.

In certain embodiments of the present invention, methyl furanoate is present in an amount greater than or equal to 0.001 ppm, preferably greater than or equal to 0.020 ppm, more preferably greater than or equal to 0.040 ppm, still more preferably greater than or equal to 0.060 ppm, further preferably greater than or equal to 0.080 ppm, and most preferably greater than or equal to 0.10 ppm. In certain embodiments of the present invention, methyl furanoate is present in an amount ranging from 0.001 ppm to 60.0 ppm, preferably 0.020 ppm to 50.0 ppm, more preferably 0.040 ppm to 40.0 ppm, still more preferably 0.060 ppm to 30.0 ppm, further preferably 0.080 ppm to 20.0 ppm, and most preferably 0.10 ppm to 10.0 ppm.

In certain embodiments of the present invention, 2,5-dimethyl-4-hydroxy-3-(2H) furanone (furanol) is present in an amount greater than or equal to 0.15 ppm, preferably greater than or equal to 0.18 ppm, more preferably greater than or equal to 0.21 ppm, still more preferably greater than or equal to 0.24 ppm, further preferably greater than or equal to 0.27 ppm, and most preferably greater than or equal to 0.30 ppm. In certain embodiments of the present invention, 2,5-dimethyl-4-hydroxy-3-(2H) furanone is present in an amount ranging from 0.15 ppm to 120.0 ppm, preferably 0.18 ppm to 100.0 ppm, more preferably 0.21 ppm to 80.0 ppm, still more preferably 0.24 ppm to 60.0 ppm, further preferably 0.27 ppm to 40.0 ppm, and most preferably 0.30 ppm to 20.0 ppm.

In certain embodiments of the present invention, 3-hydroxy-2-methyl-pyran-4-one (maltol) is present in an amount greater than or equal to 5.0 ppm, preferably greater

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than or equal to 6.0 ppm, more preferably greater than or equal to 7.0 ppm, still more preferably greater than or equal to 8.0 ppm, further preferably greater than or equal to 9.0 ppm, and most preferably greater than or equal to 10.0 ppm. In certain embodiments of the present invention, 3-hydroxy-2-methyl-pyran-4-one is present in an amount ranging from 5.0 ppm to 300.0 ppm, preferably 6.0 ppm to 250.0 ppm, more preferably 7.0 ppm to 200.0 ppm, still more preferably 8.0 ppm to 150.0 ppm, further preferably 9.0 ppm to 100.0 ppm, and most preferably 10.0 ppm to 50.0 ppm.

In certain embodiments of the present invention, 2-furfural is present in an amount greater than or equal to 0.10 ppm, preferably greater than or equal to 0.15 ppm, more preferably greater than or equal to 0.20 ppm, still more preferably greater than or equal to 0.25 ppm, further preferably greater than or equal to 0.30 ppm, and most preferably greater than or equal to 0.35 ppm. In certain embodiments of the present invention, 2-furfural is present in an amount ranging from 0.10 ppm to 60.0 ppm, preferably 0.15 ppm to 50.0 ppm, more preferably 0.20 ppm to 40.0 ppm, still more preferably 0.25 ppm to 30.0 ppm, further preferably 0.30 ppm to 20.0 ppm, and most preferably 0.35 ppm to 10.0 ppm.

In certain embodiments of the present invention, 2-(5H)furanone is present in an amount greater than or equal to 0.05 ppm, preferably greater than or equal to 0.06 ppm, more preferably greater than or equal to 0.07 ppm, still more preferably greater than or equal to 0.08 ppm, further preferably greater than or equal to 0.09 ppm, and most preferably greater than or equal to 0.10 ppm. In certain embodiments of the present invention, 2-(5H)furanone is present in an amount ranging from 0.05 ppm to 120.0 ppm, preferably 0.06 ppm to 100.0 ppm, more preferably 0.07 ppm to 80.0 ppm, still more preferably 0.08 ppm to 60.0 ppm, further preferably 0.09 ppm to 40.0 ppm, and most preferably 0.10 ppm to 20.0 ppm.

In certain embodiments of the present invention, 2-furfuryl alcohol is present in an amount greater than or equal to 2.5 ppm, preferably greater than or equal to 3.0

ppm, more preferably greater than or equal to 3.5 ppm, still more preferably greater than or equal to 4.0 ppm, further preferably greater than or equal to 4.5 ppm, and most preferably greater than or equal to 5.0 ppm. In certain embodiments of the present invention, 2-furfuryl alcohol is present in an amount ranging from 2.5 ppm to 100.0 ppm, preferably 3.0 ppm to 90.0 ppm, more preferably 3.5 ppm to 80.0 ppm, still more preferably 4.0 ppm to 75.0 ppm, further preferably 4.5 ppm to 50.0 ppm, and most preferably 5.0 ppm to 25.0 ppm.

In certain embodiments of the present invention, dihydro hydroxy maltol is present in an amount greater than or equal to 0.50 ppm, preferably greater than or equal to 0.55 ppm, more preferably greater than or equal to 0.60 ppm, still more preferably greater than or equal to 0.65 ppm, further preferably greater than or equal to 0.70 ppm, and most preferably greater than or equal to 0.75 ppm. In certain embodiments of the present invention, dihydro hydroxy maltol is present in an amount ranging from 0.50 ppm to 10000.0 ppm, preferably 0.55 ppm to 1000.0 ppm, more preferably 0.60 ppm to 500.0 ppm, still more preferably 0.65 ppm to 250.0 ppm, further preferably 0.70 ppm to 100.0 ppm, and most preferably 0.75 ppm to 50.0 ppm.

In certain embodiments of the present invention, 5-hydroxymethyl furfural is present in an amount greater than or equal to 0.05 ppm, preferably greater than or equal to 0.06 ppm, more preferably greater than or equal to 0.07 ppm, still more preferably greater than or equal to 0.08 ppm, further preferably greater than or equal to 0.09 ppm, and most preferably greater than or equal to 0.10 ppm. In certain embodiments of the present invention, 5-hydroxymethyl furfural is present in an amount ranging from 0.05 ppm to 10000.0 ppm, preferably 0.06 ppm to 1000.0 ppm, more preferably 0.07 ppm to 500.0 ppm, still more preferably 0.08 ppm to 250.0 ppm, further preferably 0.09 ppm to 100.0 ppm, and most preferably 0.10 ppm to 50.0 ppm.

Another related aspect of the present invention is directed to a fat-based confection comprising one or more flavor components selected from the group consisting of

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2-hydroxy 3 methyl 2-cyclopenten-1-one, 2-acetyl furan, 2-acetyl 3-hydroxyfuran and methyl furanoate. In a preferred embodiment, the fat-based confection further comprises one or more flavor components selected from the group consisting of 2,5-dimethyl-4-hydroxy 3-(2H) furanone, 3-hydroxy 2-methyl-pyran-4-one, 2-furfural, 2-(5H)furanone and 2-furfuryl alcohol. In a more preferred embodiment, the fat based confection further comprises one or more flavor components selected from the group consisting of dihydro hydroxy maltol and 5-hydroxymethyl furfural, as well as one or more flavor components selected from the group consisting of 2,5-dimethyl-4-hydroxy 3-(2H) furanone, 3-hydroxy 2-methyl pyran-4-one, 2-furfural, 2-(5H)furanone and 2-furfuryl alcohol.

It is within the skill of one of ordinary skill in this art to vary the amounts of all of the above-described thermally generated flavor components to achieve a variety of dulce de leche flavors. Some flavor components may contribute to the dairy flavor of dulce de leche compositions. Varying amounts of the above-noted flavor components will result in dulce de leche flavors having different flavor notes brought to the forefront of the taste profile.

The examples which follow are intended as an illustration of certain preferred embodiments of the invention, and no limitation of the invention is implied.

EXAMPLE 1

Preparation of Dulce De Leche-Flavored Fat Based Confection

A raw confection was obtained by first combining the ingredients listed in Table 1 in an agitated kettle under low heat, i.e. a 53°C water-jacketed Hobart A 200FT mixer (Hobart Corp. Troy OH), and then reducing the average particle size of the raw confection to about 25 microns via a Buhler SDX 600 three-roll refiner (Buhler Industries, Uzwil, Switzerland)

Table 1

sucrose	44.50 w/w%
fractionated palm kernel oil	35 w/w%
non fat dry milk	20 w/w%
lecithin	0.475 w/w%
ethyl vanillin	0.025 w/w%

The raw confection was heated to 115°C and held for 20 minutes using a 120°C steam jacketed Contherm 6x6 scraped surface heat exchanger (Alfa Laval Thermal, Inc., Newburyport, MA). The finished dulce de leche-flavored fat-based confection was cooled to cease the browning reaction and solidify the dulce de leche-flavored fat-based confection. The dulce de leche-flavored fat based confection had a moisture content of less than 0.70% and a water activity of 0.15.

EXAMPLE 2

Preparation of Candy-Shelled Dulce De Leche-Flavored Fat Based Confection

A candy-shelled dulce de leche-flavored fat based confection is acquired by forming the dulce de leche-flavored fat based confection as obtained in Example 1 into a bite-sized piece. The dulce de leche-flavored fat-based confection can be used alone or in conjunction with other components such as chocolate. The bite-size piece is then candy-shelled such that 25.0% of the finished product constitutes a hard-panned candy shell.

COMPARATIVE EXAMPLE 1

Preparation of Water-Based Dulce De Leche

A traditional water-based dulce de leche was made by placing sealed cans of Nestle's Carnation Sweetened Condensed Whole Milk (SCWM) in boiling water for two hours. Then, the heat is turned off, and the SCWM is allowed to slowly cool in the water. After one hour of cooling, the cans of SCWM are removed and

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air cooled on a wire rack at room temperature. The resulting dulce de leche has a smooth pudding like texture, a water activity of 0.85 and a moisture content of 26%.

COMPARATIVE EXAMPLE 2

Preparation of Water-Based Caramel

A water-based caramel was obtained by first combining the ingredients listed in Table 2 to form a raw caramel.

Table 2.

sucrose	15-40 w/w%
corn syrup	15-60 w/w%
heavy cream	10-20 w/w%
butter	3-5 w/w%
sweetened condensed milk	20-40 w/w%
salt	0-10 w/w%
ethyl vanillin	0-03 w/w%

The raw caramel was heated in a scraped surface heat exchange apparatus. In an evaporation step, water was flashed off and then browning or caramelization was accomplished in a jacketed vessel under high heat. The finished water-based caramel had a moisture content of between 5-12.0% and a typical water activity of 0.4-0.65.

Sensory Testing

Descriptive sensory analysis of the dulce de leche-flavored fat based confection of Example 1, the water-based dulce de leche of Comparative Example 1, Hershey Classic Caramels, Kraft Caramels and Caramac® has been conducted. All samples were evaluated by trained taste testers using the Spectrum Method, this method uses the Universal Aromatic Scale to capture intensities of flavors in a given

sample. The flavor profiles of the dulce de leche-flavored fat based confection of the present invention and water-based dulce de leche were the same, both samples were described as having a main dairy character with a lower caramelized sugar flavor. On the other hand, both Hershey Classic Caramels and Kraft Caramels were described as having a main character of caramelized sugar and vanilla with a lower dairy flavor and underlying buttery flavor. Caramac® was described as having a dairy character with low vanilla and caramelized sugar flavors, a flavor that was much more similar to a traditional caramel flavor than to a dulce de leche flavor.

Further candy-shelled samples of the dulce de leche-flavored fat-based confection of the present invention obtained superior consumer scores and a strong preference, as compared with candy-shelled samples of traditional water-based caramel. Additional descriptive sensory analysis of candy-shelled samples of the dulce de leche-flavored fat-based confection of the present invention, as compared with candy-shelled samples of traditional water-based caramel, has also been conducted.

Analytical Testing

Analysis of the dulce de leche-flavored fat based confection of Example 1, water-based caramels from Snickers and Milky Way, and the water-based dulce de leche of Comparative Example 1 has determined water activities and moisture contents as set forth in Table 3 below. The water activities were determined using a Rotronic Hygroskop DT at 25°C using 0.10-0.95 RH standards. The moisture contents were determined using an Orion Turbo 2 using the blending Karl Fisher technique.

Table 3 Water activity and moisture content.

	water activity	% water
Snickers	0.50	11.5
Milky Way	0.50	11.5
Comparative Example 1	0.85	26
Example 1	0.15	0.70

As can be seen from Table 3 the dulce de leche-flavored fat based confection of the present invention has a much lower moisture content and water activity than any of the other tested materials. The ultra-low moisture and ultra low water activity of the dulce de leche-flavored fat based confection of the present invention render it particularly suitable for applications in which moisture has been problematic, e.g. in combination with other low moisture ingredients, candy shelling, etc.

Analysis of the dulce de leche-flavored fat based confection of Example 1 and Caramac[®] by gas chromatograph/mass spectrometry has identified flavor compounds as set forth in Table 4 below. This analysis involved two basic steps: extraction and identification.

The extraction conditions and technique was identical for both the dulce de leche-flavored fat based confection and Caramac[®]. Each sample (72.90 g) was frozen with liquid nitrogen and subsequently ground. The sample was then mixed with 100 ml saturated NaCl solution at 50°C and shaken for 20 minutes with an autoshaker. The resulting solution was then spiked with an internal standard of 2-isobutylthiazole (113.6 ppm) and 75 ml re-distilled ether was added. The resulting solution was then shaken for another 20 minutes (autoshaker) and centrifuged at 3500 rpm for 10 minutes. Then the ether layer extract was decanted via Solvent Assisted Flavor Evaporation (SAFE) technique (Baeng Corp. Manching, Germany). SAFE conditions were high vacuum (3.2×10^{-5} mbar) for 2 hours. The

extract was concentrated using a Vigreux column in a 50°C water bath until a final volume of 250 ml was achieved.

Identification of the flavor compounds was accomplished using an Agilent 6890 gas chromatograph coupled to a Quadrupole Agilent 5973 mass spectrometer. Analysis of the volatile extract concentrates was accomplished using the following parameters: Carrier Gas: helium 36 cm/sec, 6.73 psi (35°C), 1.0 ml/minute constant flow. Separation Column: HP-FFAP 30 m x 0.25 mm x 0.25 µm, Injection: split (10:1), 1 µl of the sample distillate, Gerstel MPS2, inlet temperature of 250°C. Oven Profile: 35°C, 1 minute hold, 35°C - 60°C at 60°C/minute, 60°C - 230°C at 6°C/minute, 230°C hold 10 minutes, Detector: Agilent 5973 MSD 70eV 35-350 amu scan on negative ion mode.

Table 4 Flavor compounds.

flavor compound	amount (ppm) in Example 1	amount (ppm) in Caramac®
2-furfural	0.62	0.07
2-acetyl furan	0.20	ND
2-acetyl-3 hydroxyfuran	0.20	ND
2-furfuryl alcohol	6.16	2.15
2-(5H)furanone	0.12	0.04
2-hydroxy-3-methyl 2-cyclopenten 1-one	0.02	ND
3-hydroxy-2-methyl pyran-4-one	12.18	4.83
methyl furanoate	0.63	ND
2,5-dimethyl-4-hydroxy-3-(2H)furanone	0.38	0.12
dihydro hydroxy maltol	1.02	0.48
5 hydroxymethyl furfural	0.15	0.04
vanillin	ND	19.57

*ND = not detected

As can be seen from Table 4 the dulce de leche-flavored fat based confection of the present invention has a set of flavor compounds distinct from those of Caramac®. These findings are consistent with the sensory testing described above.

From a flavor chemistry perspective, the absence of 2-acetyl furan, 2-acetyl-3-hydroxyfuran, 2-hydroxy 3-methyl-2-cyclopenten-1-one and methyl furanoate from Caramac® has a significant impact on the overall taste of Caramac® as compared with the overall taste of the inventive dulce de leche-flavored fat based confection. These compounds would appear to be responsible, at least in part, for the distinct rich dairy flavor (as discussed above) of the inventive confection. Similarly the absence of vanillin flavor compound from the dulce de leche-flavored fat-based confection of the present invention is significant, those flavor compounds may in part, be responsible for the vanilla flavor (as discussed above), which render Caramac® more similar in flavor to a traditional caramel than to a dulce de leche composition.

Further, the significantly higher amounts of 2-furfural, 2-furfuryl alcohol, 3-hydroxy 2-methyl pyran-4-one and 2,5-dimethyl-4-hydroxy 3-(2H)furanone in the dulce de leche-flavored fat-based confection of the present invention would appear to also be responsible, at least in part, for the distinct rich dairy flavor (as discussed above) of the inventive confection.

Other variations and modifications of this invention will be obvious to those skilled in this art. This invention is not to be limited except as set forth in the following claims.

WHAT IS CLAIMED IS

- 1 A method of making a dulce de leche-flavored fat-based confection comprising the steps of
dispersing a sweetener and a dairy protein in a fat to form a raw confection having a fat continuous phase;
heating the raw confection within a temperature range and for a time sufficient to thermally generate a dulce de leche flavor thereby forming the dulce de leche-flavored fat based confection, and
cooling the dulce de leche-flavored fat based confection to a temperature sufficient to halt the thermal generation of dulce de leche flavor
2. The method according to claim 1 further comprising the step of reducing an average particle size of the raw confection.
- 3 The method according to claim 2, wherein the average particle size is reduced to 1 to 100 microns
- 4 The method according to claim 1 further comprising the step of reducing an average particle size of the dulce de leche-flavored fat-based confection.
- 5 The method according to claim 4 wherein the average particle size is reduced to 1 to 100 microns.
- 6 The method according to claim 1, wherein the raw confection is heated within the temperature range between 70°C and 180 C
- 7 The method according to claim 1 wherein the time sufficient to develop a dulce de leche flavor is between 1 minute and 1440 minutes

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8 The method according to claim 1, wherein the temperature sufficient to halt the development of dulce de leche flavor is below 70°C.

9 A dulce de leche-flavored fat-based confection comprising a sweetener, a dairy protein, and a fat continuous phase, made according to a process comprising the steps of:

dispersing the sweetener and the dairy protein in a fat to form a raw confection having the fat continuous phase,

heating the raw confection within a temperature range and for a time sufficient to thermally generate dulce de leche flavor thereby forming the dulce de leche-flavored fat based confection, and

cooling the dulce de leche-flavored fat based confection to a temperature sufficient to halt the thermal generation of dulce de leche flavor

10 A dulce de leche-flavored fat-based confection.

11 The dulce de leche-flavored fat based confection according to claim 10 wherein the dulce de leche-flavored fat based confection has a water activity ranging from 0.09 to 0.38

12. The dulce de leche-flavored fat-based confection according to claim 10 wherein moisture is present in an amount ranging from 0.10% to 5.0% by weight of the dulce de leche-flavored fat based confection.

13 The dulce de leche-flavored fat-based confection according to claim 10 wherein the dulce de leche-flavored fat based confection comprises a fat in an amount ranging from 10.0% to 98.0% by weight of the dulce de leche-flavored fat-based confection.

14 The dulce de leche-flavored fat-based confection according to claim 10 wherein the dulce de leche-flavored fat based confection comprises a

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sweetener in an amount ranging from 1 0% to 80 0% by weight of the dulce de leche-flavored fat-based confection.

15 The dulce de leche-flavored fat-based confection according to claim 10, wherein the dulce de leche-flavored fat-based confection comprises a dairy protein in an amount ranging from 0 5% to 40 0% by weight of the dulce de leche-flavored fat-based confection,

16 A dulce de leche-flavored fat-based confection comprising
a sweetener
a dairy protein, and
a fat continuous phase.

17 The dulce de leche-flavored fat-based confection according to claim 16 wherein the sweetener is a material selected from the group consisting of fructose, sucrose, lactose, dextrose, polyols, other natural and artificial sweeteners and combinations thereof.

18 The dulce de leche-flavored fat-based confection according to claim 16 wherein the sweetener is present in an amount ranging from 1 0% to 80 0% by weight of the dulce de leche-flavored fat-based confection.

19 The dulce de leche-flavored fat-based confection according to claim 16, wherein the dairy protein is selected from the group consisting of non-fat dry milk, demineralized whey powder whole milk powder and combinations thereof.

20 The dulce de leche-flavored fat-based confection according to claim 16, wherein the dairy protein is present in an amount ranging from 0 5% to 40 0% by weight of the dulce de leche-flavored fat-based confection.

21 The dulce de leche-flavored fat based confection according to claim 16 wherein the fat continuous phase is a material selected from the group consisting of fractionated palm kernel oil, cocoa butter anhydrous milk fat, hydrogenated vegetable oil, and combinations thereof.

22 The dulce de leche-flavored fat-based confection according to claim 16 wherein the fat continuous phase is present in an amount ranging from 10 0% to 98 0% by weight of the dulce de leche-flavored fat based confection.

23 The dulce de leche-flavored fat-based confection according to claim 16, wherein moisture is present in an amount ranging from 0 10% to 5 0%.

24 The dulce de leche-flavored fat based confection according to claim 16 wherein the dulce de leche-flavored fat based confection has a water activity ranging from 0 09 to 0.38

25 A confection comprising a dulce de leche-flavored fat based confection.

26 The confection according to claim 25, wherein the confection is a candy-shelled confection.

27 A chocolate composition comprising a dulce de leche-flavored fat-based confection.

28 A fat based confection comprising 2-hydroxy 3-methyl-2-cyclopenten-1-one as a flavor component.

29 The fat-based confection according to claim 28 further comprising 2-acetyl furan as a flavor component.

30 The fat based confection according to claim 29 further comprising 2-acetyl 3-hydroxyfuran as a flavor component.

31 The fat-based confection according to claim 30 further comprising methyl furanoate as a flavor component.

32 The fat-based confection according to claim 31 further comprising 2,5-dimethyl-4-hydroxy-3-(2H) furanone as a flavor component.

33 The fat-based confection according to claim 32 further comprising 3-hydroxy-2-methyl-pyran-4-one as a flavor component.

34 The fat-based confection according to claim 33 further comprising 2-furfural as a flavor component.

35 The fat based confection according to claim 34 further comprising 2-(5H)furanone as a flavor component.

36 The fat-based confection according to claim 35 further comprising 2-furfuryl alcohol as a flavor component.

37 The fat based confection according to claim 36 further comprising dihydro hydroxy maltol as a flavor component.

38 The fat-based confection according to claim 37 further comprising 5-hydroxymethyl furfural as a flavor component.

39 The fat-based confection according to claim 28, wherein the 2-hydroxy 3 methyl 2-cyclopenten-1-one is present in an amount greater than 0.001 ppm.

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40 The fat based confection according to claim 29 wherein the 2-acetyl furan is present in an amount greater than 0 001 ppm.

41 The fat based confection according to claim 30 wherein the 2-acetyl-3 hydroxyfuran is present in an amount greater than 0 001 ppm.

42 The fat based confection according to claim 31 wherein the methyl furanoate is present in an amount greater than 0 001 ppm.

43 The fat based confection according to claim 32, wherein the 2,5-dimethyl-4-hydroxy 3-(2H) furanone is present in an amount greater than 0 15 ppm.

44 The fat based confection according to claim 33 wherein the 3-hydroxy 2-methyl-pyran-4-one is present in an amount greater than 5 0 ppm.

45 The fat based confection according to claim 34 wherein the 2-furfural is present in an amount greater than 0 10 ppm.

46 The fat based confection according to claim 35 wherein the 2-(5H)furanone is present in an amount greater than 0 05 ppm.

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47 The fat-based confection according to claim 36, wherein the 2-furfuryl alcohol is present in an amount greater than 2.5 ppm.

48 The fat based confection according to claim 37 wherein the dihydro hydroxy maltol is present in an amount greater than 0 50 ppm.

49 The fat based confection according to claim 38 wherein the 5-hydroxymethyl furfural is present in an amount greater than 0 05 ppm.

50 The fat-based confection according to claim 28 wherein the fat based confection has a water activity ranging from 0.09 to 0.38

51 The fat-based confection according to claim 28 wherein moisture is present in an amount ranging from 0.10% to 5.0% by weight of the fat based confection.

52 The fat-based confection according to claim 28 wherein the fat-based confection comprises a fat in an amount ranging from 10.0% to 98.0% by weight of the fat-based confection.

53 The fat-based confection according to claim 28, wherein the fat based confection comprises a sweetener in an amount ranging from 1.0% to 80.0% by weight of the fat based confection.

54 The fat based confection according to claim 28, wherein the fat-based confection comprises a dairy protein in an amount ranging from 0.5% to 40.0% by weight of the fat-based confection.

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RESUMEN DE LA INVENCION

Una confección a base de grasa con sabor a dulce que posee una sensación bucal suave y cremosa y un sabor térmicamente generado y apropiado para uso en cubrimiento de dulce También se describe un método para hacer dicha confección a base de grasa con sabor a dulce

CONFECCIÓN A BASE DE GRASA CON SABOR A DULCE DE LECHE, MÉTODO PARA HACER LA MISMA Y DULCES DE CONFECCIÓN HACIENDO USO DEL MISMO.

ANTECEDENTES DE LA INVENCION

5 Campo de la Invención

La presente invención se relaciona con una confección novedosa a base de grasa que tiene una sensación bucal suave y cremosa y un sabor a dulce de leche térmicamente generado. Esta invención se relaciona además
10 con un método para hacer dicha confección a base de grasa con sabor a dulce de leche, así como con dulces de confección que incorporan dicha confección a base de grasa con sabor a dulce de leche, en particular dulces confitados de cubierta de dulce.

15 Descripción del Ramo Relacionado

Dulce de leche (a continuación "dulce de leche" o "dulce"), traducido del inglés como "sweet of milk", es una costumbre popular en países de Centro y Sudamérica. El dulce de leche se hace típicamente hirviendo leche condensada endulzada durante horas para producir un convite dulce,
20 semejante a pudín con caramelo, que se puede comer solo o en combinación con una galleta u oblea. El dulce de leche es una composición a base de agua caracterizada por una textura suave y cremosa y un sabor distintivo dicho en leche con
25 notas menores de azúcar en caramelo. El sabor de dulce de

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leche se genera térmicamente. El dulce de leche también se conoce como cajeta (México), arequipa (Colombia), fanquilla (Cuba) y manjar blanco (Perú).

5. Se sabe como incorporar dulce de leche a base de agua o composiciones semejantes a dulce de leche en ciertos productos. Por ejemplo, el helado de Haagen Das Dulce De Leche y galletas Alfajores hacen exactamente eso. Además las dispersiones de dulce de leche tales como La Salamandra y dispersiones de Smucker son conocidas. Todos los productos de dulce de leche conocidos contienen composiciones de dulce de leche a base de agua. De manera típica, las composiciones de dulce de leche contienen contenidos elevados de humedad, es decir, alrededor de 26% de humedad en peso, y exhiben una actividad de agua de aproximadamente 0.85.

15 Tanto el elevado contenido de humedad como la actividad de agua de dulce de leche impone límites en los tipos y calidad de productos que se pueden hacer utilizándolo. Por ejemplo, la incorporación de dulce de leche a base de agua en ciertas aplicaciones tales como confecciones de capa de caramelo es problemática. Brevemente, el dulce de leche es de manera típica demasiado suave para la cubierta de caramelo o cuando menos es muy difícil de procesar. En este mismo aspecto, el dulce de leche a base de agua puede ser difícil de formar en formato de tamaño de mordisco. Se requieren condiciones de proceso

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especiales, que han elevado los costos y complejidad de fabricación. La temperatura y humedad deben controlarse cuidadosamente para procesar en equipo de depósito tradicional o de formación de centro de Extrusión Abierta.

5 El dulce de leche a base de agua tradicional pierde su configuración durante el procesamiento.

Adicionalmente, el elevado contenido de humedad de dulce de leche a base de agua crea un gradiente de humedad cuando se mezcla con componentes de baja humedad, tales como
10 arroz tostado, bizcochos, galletas, etc. Controlar este gradiente puede ser difícil, requiriendo frecuentemente un diseño de producto más complejo que se basa en la aplicación de barreras de humedad y humectantes para hacer lento el movimiento de oblea hacia los componentes de humedad
15 inferior. Vida de anaquel de producto acortada, baja textura y calidad son frecuentemente el resultado.

Se debe observar también que los caramelos a base de agua tradicionales adolecen de las mismas insuficiencias que el dulce de leche a base de agua en ciertas aplicaciones.
20 Esta, nuevamente, se debe al contenido de humedad relativamente elevado, es decir, aproximadamente 5.0%-12.0% de humedad en peso y una actividad de agua que varía de alrededor de 0.40 a 0.50. Los caramelos a base de agua tradicionales más suaves tienen los mismos problemas que el
25 dulce de leche, frecuentemente siendo demasiado suaves para

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formarse en piezas de tamaño de mordisco o la cubierta de caramelo. Además, los caramelos a base de agua tradicionales proporcionan una experiencia de comida dura, masticable, desagradable cuando se cubren con caramelo y son demasiado lentos para dejar la boca durante el consumo; en otras palabras, pedazos de caramelo y cubierta de caramelo se adhieren a los dientes del consumidor, resultando en una experiencia de comida total desfavorable. Los caramelos a base de agua también crean gradientes de humedad problemáticos, como se describe arriba. Al final, sin embargo, las indeficiencias del caramelo a base de agua son irrelevantes; el caramelo a base de agua nunca podría ser un sustituto de dulce de leche debido a que los caramelos tienen un sabor muy diferente caracterizado por notas de azúcar en caramelo, vainilla y mantequilla.

Claramente, existe la necesidad de desarrollar una composición de dulce de leche que no adolezca de las faltas de propiedad arriba anotadas de dulce de leche a base de agua. Dicho producto de dulce de leche debe ofrecer el mismo sabor rico de leche que el dulce de leche a base de agua, pero ofrecer un grado mucho mayor de libertad de diseño de producto, vida de anaquel mejorada, mejor textura y procesamiento sencillo.

El Caramac^(R) (Nestle^(R)) es una "cubierta de sabor de caramelo" a base de grasa que se utiliza para cubrir una

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galleta en BreakAway de Nestle^(R), que se vende en el Reino Unido. El Caramac^(R) también se vende como una barra sólida simple en Caramac^(R) de Nestle^(R). Como se expone en la declaración de ingredientes, Caramac^(R) comprende grasa vegetal, azúcar, lactosa, leche descremada condensada endulzada, polvo de leche descremada, mantequilla, emulsionante (lecitina), melaza, sal, saborizante, y posiblemente vestigios de nuez. Caramac^(R) tiene una intensidad de sabor muy inferior a aquella del dulce de leche convencional. De manera más importante, el sabor de Caramac^(R) es más similar a un sabor de caramelo tradicional que a un sabor de dulce de leche. Se cree que el sabor semejante a caramelo del Caramac^(R) basado en grasa solamente se puede atribuir a la inclusión de melaza, en la composición. En otras palabras, el Caramac^(R) no parece tener un sabor térmicamente generado. Lo que es más, Caramac^(R) se puede describir como teniendo una sensación bucal cerosa.

Por lo tanto, existe claramente la necesidad de desarrollar una composición que tenga un sabor de dulce de leche térmicamente generado, distintivo, una textura suave, cremosa y un contenido de humedad muy bajo. Las aplicaciones para dicha composición serían múltiples.

COMPENDIO DE LA INVENCION

La presente invención está dirigida a una confección a base de grasa con sabor de dulce de leche que

comprende un edulcorante, una proteína de leche y una fase continua de grasa, hecha de conformidad con un proceso que comprende los pasos de dispersar el edulcorante y la proteína de leche en una grasa para formar una confección cruda que tiene la fase continua de grasa; calentar la confección cruda dentro de una escala de temperatura y durante un tiempo suficiente para generar térmicamente sabor de dulce de leche, formando de esta manera la confección a base de grasa con sabor de dulce de leche; y enfriar la confección a base de grasa con sabor de dulce de leche a una temperatura suficiente para detener la generación térmica de sabor de dulce de leche.

La presente invención también está dirigida a un método para hacer una confección a base de grasa con sabor de dulce de leche que comprende los pasos de dispersar un edulcorante y una proteína de leche en una grasa para formar una confección cruda que tiene una fase continua de grasa; calentar la confección cruda dentro de una escala de temperatura y durante un tiempo suficiente para generar térmicamente un sabor de dulce de leche, formando de esta manera la confección a base de grasa con sabor de dulce de leche; y enfriar la confección a base de grasa con sabor a dulce de leche a una temperatura suficiente para detener la generación térmica de sabor de dulce de leche.

En ciertas modalidades preferidas del método,

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existe un paso de reducción de tamaño de partícula adicional ya sea antes o después del paso de calentamiento. El tamaño de partícula promedio se reduce a 1.0 a 100.0 micrones. En ciertas modalidades preferidas del método, la confección cruda se calienta dentro de una escala de temperatura entre 70°C y 180°C. En ciertas modalidades preferidas, el tiempo suficiente para desarrollar un sabor de dulce de leche es entre 1 minuto y 1440 minutos. En ciertas modalidades preferidas, la temperatura suficiente para detener el desarrollo de sabor de dulce de leche es inferior a 70°C.

En ciertas modalidades preferidas de la invención, la confección producida tiene una actividad de agua que varía de 0.09 a 0.38. En ciertas modalidades preferidas de la invención, la humedad está presente en una cantidad que varía de 0.10% a 5.0% en peso de la confección. En modalidades preferidas adicionales de la presente invención, la confección comprende una grasa en una cantidad que varía de 10.0% a 98.0% en peso o un edulcorante en una cantidad que varía de 1.0% a 80.0% en peso o una proteína de leche en una cantidad que varía de 0.5% a 40% en peso de la confección.

La presente invención está ampliamente dirigida a una confección a base de grasa con sabor de dulce de leche.

La presente invención está dirigida además a una confección a base de grasa de sabor de dulce de leche que comprende un edulcorante, una proteína de leche y una fase

continua de grasa. En modalidades preferidas, el edulcorante se selecciona a partir de fructosa, sucrosa, lectosa, dextrosa, polioles, otros edulcorantes naturales y artificiales y combinaciones de los mismos. En ciertas modalidades preferidas, la proteína de leche se selecciona a partir de leche seca no grasa, polvo de suero desmineralizado, polvo de leche entera y combinaciones de los mismos.

En ciertas modalidades preferidas, la fase continua de grasa se selecciona a partir de aceite de semilla de palma fraccionada, mantequilla de cocoa, grasa de leche anhidra, aceite vegetal hidrogenado, y combinaciones de los mismos.

La presente invención está dirigida adicionalmente a una confección, de preferencia una confección de cubierta de dulce, o una composición de chocolate que comprende una confección a base de grasa con sabor a dulce de leche.

La presente invención también está dirigida a una confección a base de grasa que comprende 2-hidroxí-3-metil-2-ciclopenten-1-ona como un componente de sabor. En modalidades preferidas de la presente invención, la confección a base de grasa contiene un componente de sabor adicional o componentes de sabor adicionales. Estos componentes de sabor son 2-acetil furano, 2-acetil-3-hidroxifurano, furanoato de metilo, 2,5-dimetil-4-hidroxi-3-(2H) furanona, 3-hidroxi-2-metil-piran-4-ona, 2-furfural,

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2-(5H)furanona, alcohol de 2-furfurilo, dihidro hidroxí maltol y 5-hidroximetil furfural.

DESCRIPCIÓN DETALLADA DE LAS MODALIDADES PREFERIDAS

La presente invención se relaciona con una
5 confección a base de grasa de sabor de dulce de leche. Esta
confección es de preferencia térmicamente procesada para
crear atributos especiales de textura y sabor. La confección
de sabor de dulce de leche de la invención tiene una fase
continua a base de grasa que imparte una experiencia distinta
10 de sensación de boca y de comer. La cremosidad de la
confección a base de grasa mejora la percepción del
consumidor de calidad y aceptación total de un dulce
terminado utilizando dicha confección. La confección a base
de grasa de sabor de dulce de leche de la presente invención
15 resuelve los problemas asociados con el dulce de leche a base
de agua tradicional, mientras que mantiene un sabor de dulce
de leche verdadero térmicamente generado. En suma, en vista
del contenido de humedad ultra bajo, una baja actividad de
agua y una fase continua de grasa, la confección a base de
20 grasa de sabor de dulce de leche de la presente invención
ofrece un grado elevado de libertad de diseño de producto,
vida de anaquel mejorada, mejor textura y procesamiento
sencillo.

Como se utiliza en la presente, el término "sabor
25 de dulce de leche" se refiere a un sabor caracterizado por

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un sabor principal de lecha con sabor de azúcar de caramelo inferior formado típicamente a través de generación térmica.

Como se utiliza en la presente, el término "sabor de dulce de leche" se refiere a un material que tiene un sabor de dulce

5 de leche. Como se utiliza en la presente "a base de grasa"

se refiere a un material que tiene una fase continua de grasa/lípido en la que los componentes de material tales como

proteínas de leche y azúcares se dispersan. Como se utiliza

en la presente, "a base de agua" se refiere a un material que

10 tiene una fase continua de agua en la que los componentes de

material tales como proteínas de leche y azúcares se

dispersan; de manera típica, los materiales a base de agua

tienen una actividad de agua de alrededor de 0.4 a

aproximadamente 0.5 y un contenido de humedad de alrededor de

15 5% a aproximadamente 12%. Como se utiliza en la presente

"cubierta de dulce" se refiere a una composición que tiene

una cubierta de azúcar hecha mediante uso de perol como es

sabido por aquellos experimentados en el ramo. Como se

utiliza en la presente, "proteína de leche" se refiere a

20 cualquier proteína derivada de una fuente de leche; la

proteína de leche puede purificarse y/o procesarse y puede

estar en la clase de suero o caseína de proteínas de leche.

Como se utiliza en la presente "edulcorante" se refiere a

cualquier composición que proporcione dulzura y/o sirva como

25 un tostado o azúcar de reducción. Como se utiliza en la

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presente, "reacción de Maillard" se refiere a una reacción de alimento bien conocida que ocurre entre una fuente de amino tal como una proteína de leche y un azúcar de reducción.

5 En un primer aspecto, la presente invención está dirigida a un método para hacer una confección a base de grasa de sabor de dulce de leche. En el primer paso, un edulcorante y una proteína de leche se dispersan en una grasa para formar una confección cruda que tiene una fase continua de grasa. La dispersión se logra de cualquier manera
10 apropiada para formar una dispersión homogénea, tal como por ejemplo, una Mezcladora Littleford Day M-5 (Littleford Day, Florencia, KY) o una Mezcladora Hobart A-200FT (Hobart Corp., Troy, OH). De manera típica, la dispersión se logra bajo calor bajo, es decir, 35-50°C, y con agitación, ya que es
15 necesario mantener la grasa líquida durante el paso de dispersión. Sin embargo, cualquier método o equipo que mantenga a la o las grasas líquidas se puede emplear en la presente.

Es importante observar que puesto que muchos
20 ingredientes contendrán inherentemente agua a .5% o más, los ingredientes se deben seleccionar cuidadosamente para mantener el contenido total de humedad menor de alrededor de 5%, y de preferencia menor de aproximadamente 1.5%, es decir, ingredientes de baja humedad (menos de aproximadamente 5% de
25 humedad) se emplean de preferencia. Por ejemplo, si se

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utiliza dextrosa como edulcorante, necesitaría ser dextrosa anhidra, no monohidrato de dextrosa. De manera típica, la dextrosa comercialmente adquirida es monohidrato de dextrosa, que tiene un contenido de humedad substancialmente superior
5 que la dextrosa anhidra.

Por lo general, cualquier edulcorante es apropiado para utilizarse en esta invención, en tanto tenga un bajo contenido de humedad. Los edulcorantes de ejemplo incluyen, sin límite y en su forma de baja humedad si es aplicable,
10 sucrosa, lactosa, dextrosa, polioles, otros edulcorantes naturales y artificiales y combinaciones de los mismos. En una modalidad preferida de la presente invención, el edulcorante es una azúcar tal como fructosa, sucrosa, lactosa o dextrosa. Uno de experiencia ordinaria en este ramo
15 apreciará fácilmente que el edulcorante arriba descrito puede no solamente proporcionar dulzura a la confección a base de grasa de sabor de dulce de leche, sino que en algunos casos también puede servir como el azúcar de tostado o reducción necesaria para desarrollar el sabor de dulce de leche. En
20 ciertas modalidades preferidas de esta invención, la confección a base de grasa con sabor a dulce de leche comprende un edulcorante en una cantidad que varía de 1.0% a 80.0%, de preferencia de 5.0% a 760.0%, más preferentemente 10.0% a 60.0%, de manera todavía más preferible, 15.0% a
25 55.0%, y más preferentemente 25.0% a 50.0%, en peso de la

confección a base de grasa de sabor de dulce de leche.

Asimismo, cualquier proteína de leche es apropiada para utilizarse en la presente invención, en tanto tenga una baja humedad. Las proteínas de lecha de ejemplo incluyen, sin límite y en su forma de baja humedad, si es aplicable, lecha seca no grasa, polvo de suero desmineralizado, polvo de leche entera y combinaciones de los mismos. También se cree que la proteína de soya podría utilizarse en lugar de proteína de leche, si así se desea. Uno de experiencia ordinaria en este ramo apreciará fácilmente que ciertos azúcares pueden estar presentes en la proteína de lecha arriba descrita; estos azúcares pueden proporcionar algún grado de dulzura a la confección a base de grasa de sabor de dulce de lecha, así como servir como el azúcar de tostado o reducción necesaria para desarrollar el sabor de dulce de leche. En ciertas modalidades preferidas de esta invención, la confección a base de grasa de sabor de dulce de leche comprende una proteína de leche en una cantidad que varía de 0.5% a 40.0%, de preferencia 1.0% a 30.0%, más preferentemente 2.0% a 20.0%, todavía más preferentemente 3.0% a 15.0%, y de manera más preferible 4.0% a 10.0%, en peso de la confección a base de grasa de sabor de dulce de leche.

De manera similar, cualquier grasa es apropiada para utilizarse en la presente invención, en tanto tenga un

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bajo contenido de humedad. Las grasas de ejemplo incluyen, sin límite y en su forma de humedad baja si es aplicable, aceite de semilla de palma fraccionado, mantequilla de cocoa, grasa de lecha anhidra (AMF), aceite vegetal hidrogenado tal como grasa de soya o aceite de semilla de algodón, y combinaciones de los mismos. El aceite de semilla de palma fraccionado tal como aquel disponible de Fuji bajo el nombre Palkena-SAC, se utiliza de preferencia en la confección a base de grasa de sabor de dulce de leche. En ciertas modalidades preferidas de esta invención, la confección a base de grasa de sabor de dulce de leche comprende una grasa en una cantidad que varía de 10.0% a 98.0%, de preferencia 16.0% a 85.0%, más preferentemente 22.0% a 75.0%, todavía más preferentemente 25.0% a 60%, y de manera más preferible 28.0% a 45.0%, en peso de la confección a base de grasa con sabor de dulce de leche.

Las grasas particulares seleccionadas para uso en la presente invención son principalmente responsables de la sensación bucal tersa, cremosa de la confección a base de grasa con sabor de dulce de leche de la presente invención. La grasa seleccionada comprende una matriz continua que dispersa el edulcorante y la proteína de leche. La textura particular de la confección a base de grasa con sabor de dulce de leche obtenida se puede manipular mediante la selección de la grasa particular. Las grasas con puntos de



fusión relativamente elevados proporcionan un mayor grado de estabilidad térmica; inversamente, las grasas con puntos de fusión relativamente bajos proporcionan una textura más suave. De conformidad con la presente invención, las grasas con un punto de fusión en la escala de alrededor de 30°C a aproximadamente 34°C se utilizan de preferencia, especialmente cuando la configura a base de grasa con sabor de dulce de leche se utilizará en cualquier tipo de proceso de tratado en batea. Asimismo, uno de experiencia ordinaria en el ramo apreciará fácilmente que el uso de grasas que tienen un punto de fusión superior proporcionarían una textura más dura.

La textura de la presente confitura a base de grasa con sabor de dulce de leche se puede controlar adicionalmente por el tipo de grasa, contenido de grasa, tipo de proteína de leche, contenido de proteína de leche, tipo de edulcorante, contenido de edulcorante y tamaño de partícula. A ese respecto, en un paso opcional del método de la presente invención, la configura cruda se puede moler (refinar) para obtener un tamaño de partícula promedio deseado. El tamaño de partícula promedio deseado varía de 1.0 a 100.0 micrones, de preferencia 5.0 a 75.0, más preferentemente 10.0 a 50.0, y de manera todavía más preferencia 15.0 a 40.0, y más preferentemente 20.0 a 35.0 micrones. La molienda se puede lograr utilizando cualquier medio convencional tal como un

refinador de rodillos un molino de bolas o cualquier otro medio conocido en el ramo. El tamaño de partícula promedio de la configura cruda antes de la reducción de tamaño dependerá del edulcorante y proteína de leche particulares empleados; típicamente esto variará en cualquier punto desde aproximadamente 80 micrones y hacia arriba. Uno de experiencia ordinaria en este ramo apreciará fácilmente que dicho paso de reducción de tamaño se podría conducir, alternativamente antes del paso de dispersión arriba descrito, es decir, reducción de tamaño de ingredientes, o aún después del paso de procesamiento térmico abajo descrito.

Uno de experiencia ordinaria en el ramo también entenderá fácilmente que otros ingredientes pueden y estarán presentes en una configura a base de grasa con sabor de dulce de leche determinada, además del edulcorante, proteína de leche y grasa arriba descritos. Estos otros ingredientes incluyen, sin límite, emulsionantes tales como mono y diglicéridos, sal y estabilizadores tales como fosfato de disodio.

En un segundo paso del proceso para hacer la configura a base de grasa con sabor a dulce de leche de la presente invención, la confección o configura cruda se calienta dentro de una escala de temperatura y durante un tiempo suficiente para generar térmicamente un sabor de dulce de leche, formando de esta manera la configura a base de

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grasa sabor de dulce de leche. Este paso de calentamiento se puede conducir en cualquier intercambiador térmico de superficie raspada, tal como por ejemplo, un intercambiador térmico de superficie raspada Coutherm (Alfa Laval Thermal Inc., Newburyport, MA). La temperatura se debe elevar a una temperatura suficiente para iniciar las reacciones de desarrollo de sabor tal como la reacción de Maillard; asimismo, la temperatura se debe mantener a una temperatura y durante un tiempo suficiente para conducir estas reacciones, sin embargo, sin desarrollar sabores no deseables.

De manera típica, la configura o confección cruda se calienta dentro de una escala de temperatura de 70°C a 180°C, de preferencia 75°C a 165°C, más preferentemente 80°C a 150°C, todavía más preferentemente 90°C a 135°C, y de manera más preferible 100°C-125°C. Las temperaturas superiores a éstas impartirán notas de chamuscado a la configura a base de grasa con sabor de dulce de leche; las temperaturas inferiores a éstas son insuficientes para iniciar las reacciones de desarrollo de sabor requeridas tales como la reacción de Maillard. De manera típica, el tiempo suficiente para desarrollar un sabor de dulce de leche varía de 1 a 1440 minutos, de preferencia 2 a 720 minutos, más preferentemente 3 a 600 minutos, todavía más preferentemente 5 a 480 minutos, y de manera más preferible 10 a 120 minutos. Los tiempos más largos que estos

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impartirán notas de chamuscado a la configura a base de grasa de sabor de dulce de leche; los tiempos más cortos que estos serán inadecuados para permitir que se desarrolle el sabor de dulce de leche. Para propósitos de la presente invención, uno de experiencia ordinaria en este ramo apreciarán fácilmente que entre más elevada es la temperatura, es inferior el tiempo y vice versa. La confirmación de la formación de la configura a base de grasa con sabor de dulce de leche deseada se hace de manera típica mediante evaluación sensorial, evaluación analítica o combinación de las mismas.

En un paso final del proceso de la presente invención, la configura a base de grasa con sabor a dulce de leche se enfría a una temperatura suficiente para detener el desarrollo de sabor de dulce de leche. También se entiende que el enfriamiento adicional se puede hacer a fin de desarrollar una estructura de cristal de grasa apropiada para un uso final determinado. De manera típica, una temperatura inferior a 70°C es apropiada para detener el desarrollo de sabor.

La confitura a base de grasa con sabor de dulce de leche hecha de conformidad con el método arriba descrito tiene un contenido de humedad ultra bajo y actividad de agua baja. En ciertas modalidades preferidas de esta invención, la humedad está presente en una cantidad que varía de 0.15 a 5.0%, de preferencia 0.15% a 3.5%, más preferentemente 0.20%

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a 2.50%, todavía más preferentemente 0.25% a 1.50%, de preferencia además 0.30% a 1.25%, y de manera más preferible 0.5% a 0.9%, en peso de la confitura a base de grasa con sabor de dulce de leche. En ciertas modalidades de esta invención, la configura a base de grasa con sabor a dulce de lecha tiene una actividad de agua (Aw) que varía de 0.09 a 0.38, de preferencia 0.10 a 0.36, más preferentemente 0.11 a 0.34, todavía más preferentemente 0.12 a 0.30, y de manera más preferible 0.13 a 0.25.

Si la confitura a base de grasa con sabor a dulce de leche contiene una cantidad superior de humedad que la arriba anotada, el edulcorante y la proteína de leche saldrán de la fase continua de grasa durante el calentamiento de la configura cruda; de hecho, las características de la configura a base de grasa con sabor a dulce de leche cambiará dramáticamente, haciéndose inestable y muy frágil. La textura ya no es tersa y cremosa, sino totalmente lo opuesto. Una textura discontinua, severamente de granos se forma que está compuesta de muchas inclusiones duras con cantidades grandes de grasa que sale de la masa. Un proceso de calentamiento suave como se describe arriba, en combinación con ingredientes de baja humedad, mantiene la cremosidad de la presente confitura a base de grasa con sabor de dulce de leche. Durante el procesamiento, el calentamiento y agitación se controlan cuidadosamente para impedir los

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puntos calientes l calizados que ocurran en la confitura a base de grasa con sabor de dulce de leche.

La presente invención también contempla un proceso en donde el sabor de dulce de leche se genera térmicamente a través de un edulcorante y/o una proteína de leche antes de su dispersión en una fase continua de grasa. Cualquier proceso mediante el que el sabor de dulce de leche se genera térmicamente utilizando los ingredientes arriba anotados está dentro del alcance de la presente invención.

En un segundo aspecto, la presente invención está dirigida a una confitura a base de grasa con sabor a dulce de leche que comprende un edulcorante, una proteína de leche y una fase continua de grasa hecha de conformidad con el proceso arriba descrito.

En un tercer aspecto, la presente invención está dirigida a una confección o confitura a base de grasa de sabor de dulce de leche. En otras palabras, la presente invención está ampliamente dirigida a cualquier confitura a base de grasa que tiene un sabor de dulce de leche como se define arriba. En ciertas modalidades preferidas, la confitura a base de grasa con sabor de dulce de leche incluye un edulcorante en una cantidad y/o tipo arriba anotados, incluye una proteína de leche en una cantidad y/o tipo arriba anotada, y/o incluye una grasa en una cantidad y/o tipo anotado arriba. Adicionalmente, en ciertas modalidades

preferidas, la confitura a base de grasa con sabor de dulce de leche de la presente invención tiene una actividad de agua como se anota arriba y/o un contenido de humedad como se anota arriba.

5 Dado el contenido de humedad extremadamente bajo de la confitura a base de grasa de sabor de dulce de leche de la invención arriba descrita, es particularmente apropiada para aplicación a productos en los que un gradiente de humedad inaceptable típicamente estaría presente si se utilizara una
10 composición a base de agua tal como un caramelo tradicional o dulce de leche. Cuando se utiliza la presente confitura a base de grasa con sabor a dulce de leche en conjunción con galletas, arroz tostado, bizcochos, etc., no se crea gradiente de humedad; esto permite una plataforma de
15 productos que comprenden componentes secos combinados con la confitura a base de grasa con sabor de dulce de leche que no quedará empapado durante la vida de anaquel. La confección o confitura a base de grasa de sabor de dulce de leche de la presente invención se puede utilizar aún como un
20 revestimiento de barrera. Lo que es más, la presente confitura a base de grasa con sabor a dulce de leche es particularmente apropiada para utilizarse en una confitura de coraza de caramelo. La confitura a base de grasa con sabor de dulce de leche permite la formación de una pieza de tamaño
25 de mordida, y la superficie de la confitura a base de grasa

con sabor a dulce de leche es estable al cubrimiento de azúcar, es decir, la cubierta de azúcar se adherirá.

Por lo tanto, otro aspecto de la presente invención está dirigido a confecciones o confituras que comprenden la confitura a base de grasa con sabor de dulce de leche de la presente invención y, en particular, con una confitura de cubierta de dulce que comprende la confitura a base de grasa con sabor de dulce de leche. Es importante observar que la confitura a base de gasa con sabor de dulce de leche de la presente invención también se puede utilizar como un producto solo, v.gr., en forma de tableta, como una inclusión, como un material de cubrimiento, etc.

Además, la confitura a base de grasa con sabor de dulce de leche de la invención también se puede utilizar como un intermediario en la fabricación de chocolate. Tanto chocolate SOI (norma de identidad) como no-SOI se incluye para propósitos de la presente invención. De hecho, utilizando la confitura a base de grasa con sabor a dulce de leche de la presente invención como un intermediario para generar notas de leche desarrolladas en chocolate permite la desviación del proceso complicado, costoso y molesto de horno de desmenuzado. El proceso de desmenuzado genera sabores deseables de leche desarrollados para chocolate a través de, por ejemplo, la reacción de Maillard entre proteínas de leche y azúcar para impartir un sabor. Por lo general, la leche

fluida se condensa y mezcla con azúcar y licor de cocoa; la mezcla se seca en hornos grandes a de 75°C a 105°C durante 4 a 8 horas hasta que el contenido de humedad está bajo 1%. Los detalles del proceso de horno de desmenuzado se pueden encontrar en Chocolate, Cocoa, and Confectionery por Bernard Minifie.

El proceso de cocción utilizado en la presente confitura a base de grasa con sabor de dulce de leche crea, entre otros, una disposición de sabores de leche desarrollados asociados con chocolate procesado utilizando el horno de desmenuzado. Brevemente, el azúcar y fuentes de proteína de la presente invención se pueden modificar para producir una disposición de sabores desarrollados de leche y semejante a leche para el chocolate. Consecuentemente, un aspecto adicional de la presente invención está dirigido a una composición de chocolate que contiene la confitura a base de grasa con sabor a dulce de leche de la presente invención; uno de experiencia ordinaria en este ramo apreciará fácilmente que otros ingredientes típicamente presentes en composiciones de chocolate también estarían presentes en la composición de chocolate de la presente invención.

Todavía otro aspecto de la presente invención está dirigido a una confitura a base de grasa con sabor a dulce de leche que comprende un edulcorante, una proteína de leche y una fase continua de grasa. Todos los detalles

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proporcionados arriba con respecto a identidad y cantidad de edulcorante, proteína de leche y cantidad, identidad y cantidad de fase continua de grasa, actividad de agua, contenido de humedad y sabor son los mismos para este aspecto.

Todavía otro aspecto de la presente invención está dirigido a una confitura a base de grasa que comprende 2-hidroxi-3-metil-2-ciclopenten-1-ona como un componente de sabor. Como se utiliza en la presente, "componente de sabor" se refiere a un compuesto de sabor o un compuesto que proporciona sabor a una confitura. De conformidad con la presente invención, el perfil de sabor total es de preferencia un resultado de componentes de sabor térmicamente generados.

En modalidades preferidas de la presente invención, la confitura a base de grasa contiene un componente de sabor adicional o componentes de sabor adicionales. Estos componentes de sabor son 2-acetil furano, 2-acetil-3-hidroxifurano, furonato de metilo, 2,5-dimetil-4-hidroxi-3-(2H)furanona, 3-hidroxi-2-metilpiran-4-ona, 2-furfural, 2-(5H)furanona, alcohol de 2-furfurilo, dihidrohidroxi maltol y furfural de 5-hidroximetilo. El análisis de la confitura a base de grasa de la presente invención ha mostrado que estos compuestos de sabor son la clave al producir un sabor de dulce de leche;

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por lo tanto, "sabor de dulce de leche" se puede definir más específicamente como sabor creado por alguna combinación de estos componentes de sabor. Todos los detalles arriba proporcionados para el primer aspecto de esta invención con respecto a identidad y cantidad de edulcorante, proteína de leche y cantidad, identidad y cantidad de fase continua de grasa, actividad de agua y contenido de humedad son los mismos para este aspecto.

En ciertas modalidades de la presente invención, 2-hidroxi-3-metil-2-ciclopenten-1-ona está presente en una cantidad mayor que o igual a 0.001 ppm, de preferencia mayor que o igual a 0.004 ppm, más preferentemente mayor que o igual a 0.007 ppm, todavía más preferentemente mayor que o igual a 0.010 ppm, de preferencia adicional mayor que o igual a 0.013 ppm, y de manera más preferible mayor que o igual a 0.016 ppm. En ciertas modalidades de la presente invención, 2-hidroxi-3-metil-2-ciclopenten-1-ona está presente en una cantidad que varía de 0.001 ppm a 30.0 ppm, de preferencia 0.004 ppm a 25.0 ppm, más preferentemente 0.007 ppm a 20.0 ppm, todavía más preferentemente 0.010 ppm a 15.0 ppm, de preferencia adicional 0.013 ppm a 10.0 ppm, y de manera más preferible 0.016 ppm a 5.0 ppm.

En ciertas modalidades de la presente invención, 2-acetil furano está presente en una cantidad mayor que o igual a 0.001 ppm, de preferencia mayor que o igual a 0.020

ppm, de preferencia mayor que o igual a 0.040 ppm, todavía más preferentemente mayor que o igual a 0.060 ppm, de preferencia adicional mayor que o igual a 0.080 ppm, y de manera más preferible mayor que o igual a 0.10 ppm. En
5 ciertas modalidades de la presente invención, 2-acetil furano está presente en una cantidad que varía de 0.001 ppm a 30.0 ppm, de preferencia 0.020 ppm a 25.0 ppm, más preferentemente 0.040 ppm a 20.0 ppm, todavía más preferentemente 0.060 ppm a 15.0 ppm, todavía de preferencia 0.080 ppm a 10.0 ppm, y de
10 manera más preferible 0.10 ppm a 5.0 ppm.

En ciertas modalidades de la presente invención 2-acetil-3-hidroxifurano (isomalta) está presente en una cantidad mayor que o igual a 0.001 ppm, de preferencia mayor que o igual a 0.020 ppm, más preferentemente mayor que o
15 igual a 0.040 ppm, todavía más preferentemente mayor que o igual a 0.060 ppm, además de preferencia mayor que o igual a 0.080 ppm, y de manera más preferible mayor que o igual a 0.10 ppm. En ciertas modalidades de la presente invención, 2-acetil-3-hidroxifurano está presente en una cantidad que
20 varía de 0.001 ppm a 250.0 ppm, de preferencia 0.020 ppm a 200.0 ppm, más preferentemente 0.040 ppm a 150.0 ppm, todavía más preferentemente 0.060 ppm a 100.0 ppm, además de preferencia 0.080 ppm a 75.0 ppm, y de manera más preferencia 0.10 ppm a 50.0 ppm.

25 En ciertas modalidades de la presente invención,

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furanoato de metil está presente en una cantidad mayor que o igual a 0.001 ppm, de preferencia mayor que o igual a 0.020 ppm, más preferentemente mayor que o igual a 0.040 ppm, todavía más preferentemente mayor que o igual a 0.060 ppm, además de preferencia mayor que o igual a 0.080 ppm, y de manera más preferible mayor que o igual a 0.10 ppm. En ciertas modalidades de la presente invención, el furanoato de metilo está presente en una cantidad que varía de 0.001 ppm a 60.0 ppm, de preferencia 0.020 ppm a 50.0 ppm, más preferentemente 0.040 ppm a 40.0 ppm, todavía más preferentemente 0.060 ppm a 30.0 ppm, además de preferencia 0.080 ppm a 20.0 ppm, y más preferentemente 0.10 ppm a 10.0 ppm.

En ciertas modalidades de la presente invención, 2,5-dimetil-4-hidroxil-3-(2H)furanona (furaneol) está presente en una cantidad mayor que o igual a 0.15 ppm, de preferencia mayor que o igual a 0.18 ppm, más preferentemente mayor que o igual a 0.21 ppm, todavía más preferentemente mayor que o igual a 0.24 ppm, además de preferencia mayor que o igual a 0.27 ppm, y de manera más preferible mayor que o igual a 0.30 ppm. En ciertas modalidades de la presente invención, 2,5-dimetil-4-hidroxil-3-(2H)furanona está presente en una cantidad que varía de 0.15 ppm a 120.0 ppm, de preferencia 0.18 ppm a 100.0 ppm, más preferentemente 0.21 ppm a 80.0 ppm, todavía más preferentemente 0.24 ppm a 60.0 ppm, además

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de preferencia 0.27 ppm a 40.0 ppm, y de manera más preferible 0.30 ppm a 20.0 ppm.

En ciertas modalidades de la presente invención, 3-hidroxi-2-metil-piran-4-ona (maltol) está presente en una
5 cantidad mayor que o igual a 5.0 ppm, de preferencia mayor que o igual a 6.0 ppm, más preferentemente mayor que o igual a 7.0 ppm, todavía más preferentemente mayor que o igual a 8.0 ppm, además de preferencia mayor que o igual a 9.0 ppm, y de manera más preferible mayor que o igual a 10.0 ppm. En

10 ciertas modalidades de la presente invención, 3-hidroxi-2-metil-piran-4-ona está presente en una cantidad que varía de 5.0 ppm a 300.0 ppm, de preferencia 6.0 ppm a 250.0 ppm, más preferentemente 7.0 ppm a 200.0 ppm, todavía más preferentemente 8.0 ppm a 150.0 ppm, además de
15 preferencia 9.0 ppm a 100.0 ppm, y de manera más preferible 10.0 ppm a 50.0 ppm.

En ciertas modalidades de la presente invención, 2-furfural está presente en una cantidad mayor que o igual a 0.10 ppm, de preferencia mayor que o igual a 0.15 ppm, más
20 preferentemente mayor que o igual a 0.20 ppm, todavía más preferentemente mayor que o igual a 0.25 ppm, además de preferencia mayor que o igual a 0.30 ppm, y de manera más preferente mayor que o igual a 0.35 ppm. En ciertas modalidades de la presente invención, 2-furfural está
25 presente en una cantidad que varía de 0.10 ppm a 60.0 ppm,

de preferencia 0.15 ppm a 50.0 ppm, más preferentemente 0.20 ppm a 40.0 ppm, todavía más preferentemente 0.25 ppm a 30.0 ppm, además de preferencia 0.30 ppm a 20.0 ppm, y de manera más preferible 0.35 ppm a 10.0 ppm.

5 En ciertas modalidades de la presente invención, 2-(5H)furanona está presente en una cantidad mayor que o igual a 0.05 ppm, de preferencia mayor que o igual a 0.06 ppm, más preferentemente mayor que o igual a 0.07 ppm, todavía más preferentemente mayor que o igual a 0.08 ppm, 10 además de preferencia mayor que o igual a 0.09 ppm, y de manera más preferible mayor que o igual a 0.10 ppm. En ciertas modalidades de la presente invención, 2-(5H)furanona está presente en una cantidad que varía de 0.05 ppm a 120.0 ppm, de preferencia 0.06 ppm a 100.0 ppm, más preferentemente 15 0.07 ppm a 80 ppm, todavía más preferentemente 0.08 ppm a 60.0 ppm, además de preferencia 0.09 ppm a 40.0 ppm, y de manera más preferente 0.10 ppm a 20.0 ppm.

En ciertas modalidades de la presente invención, alcohol de 2-fur4furilo está presente en una cantidad mayor que o igual a 2.5 ppm, de preferencia mayor que o igual a 3.0 ppm, más preferentemente mayor que o igual a 3.5 ppm, todavía 20 más preferentemente mayor que o igual a 4.0 ppm, además de preferencia mayor que o igual a 4.5 ppm, y más preferentemente mayor que o igual a 5.0 ppm. En ciertas 25 modalidades de la presente invención, el alcohol de

2-furfurilo está presente en una cantidad que varía de 2.5 ppm a 100.0 ppm, de preferencia 3.0 ppm a 90.0 ppm, más preferentemente 3.5 ppm a 80.0 ppm, todavía más preferentemente 4.0 ppm a 75.0 ppm, además de preferencia 4.5 ppm a 50.0 ppm, y más preferentemente 5.0 ppm a 25.0 ppm.

En ciertas modalidades de la presente invención dihidrohidroxi maltol está presente en una cantidad mayor que o igual a 0.50 ppm, de preferencia mayor que o igual a 0.55 ppm, más preferentemente mayor que o igual a 0.60 ppm, todavía más preferentemente mayor que o igual a 0.65 ppm, además de preferencia mayor que o igual a 0.70 ppm, y de manera más preferible mayor que o igual a 0.75 ppm. En ciertas modalidades de la presente invención dihidrohidroxi maltol está presente en una cantidad que varía de 0.50 ppm a 10000.0 ppm, de preferencia 0.55 ppm a 1000.0 ppm, más preferentemente 0.60 ppm a 500.0 ppm, todavía más preferentemente 0.65 ppm a 250.0 ppm, además de preferencia 0.70 ppm a 100.0 ppm, y de manera más preferible 0.75 ppm a 50.0 ppm.

En ciertas modalidades de la presente invención 5-hidroximetil furfural está presente en una cantidad mayor que o igual a 0.05 ppm, de preferencia mayor que o igual a 0.06 ppm, más preferentemente mayor que o igual a 0.07 ppm, todavía más preferentemente mayor que o igual a 0.08 ppm, además de preferencia mayor que o igual a 0.09 ppm, y de

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manera más preferible mayor que o igual a 0.10 ppm. En ciertas modalidades de la presente invención 5-hidroximetil furfural está presente en una cantidad que varía de 0.05 ppm a 10000.0 ppm, de preferencia 0.06 ppm a 1000.0 ppm, más preferentemente 0.07 ppm a 500.0 ppm, todavía más preferentemente 0.08 ppm a 250.0 ppm, además de preferencia 0.09 ppm a 100.0 ppm, y de manera más preferible 0.10 ppm a 50.0 ppm.

Otro aspecto relacionado de la presente invención está dirigido a una confitura a base de grasa que comprende uno o más componentes de sabor seleccionados a partir del grupo que consiste de 2-hidroxi-3-metil-2-ciclopenten-1-ona, 2-acetilfurano, 2-acetil-3-hidroxufrano y furanoato de metilo. En una modalidad preferida, la confitura a base de grasa comprende además uno o más componentes de sabor seleccionados a partir del grupo que consiste en 2,5-dimetil-4-hidroxi-3-(2H)furanona, 3-hidroxi-2-metil-piran-4-ona, 2-furfural, 2-(5H)furanona, y alcohol de 2-furfurilo. En una modalidad más preferida, la confitura a base de grasa comprende además uno o más componentes de sabor seleccionados a partir del grupo que consiste en dihidrohidroxi maltol y 5-hidroximetil furfural, así como uno o más componentes de sabor seleccionados del grupo que consiste en 2,5-dimetil-4-hidroxi-3-(2H)furanona, 3-hidroxi-2-metil-piran-4-ona, 2-furfural, 2-(5H)furanona y alcohol de

2-furfurilo.

Queda dentro de la experiencia de uno de conocimiento ordinario en este ramo variar las cantidades de todos los componentes de sabor térmicamente generados arriba descritos para lograr una variedad de sabores de dulce de leche. Algunos componentes de sabor pueden contribuir al sabor de leche de las composiciones de dulce de leche. Cantidades variables de los componentes de sabor arriba anotados resultarán en sabores de dulce de leche que tienen notas de sabor diferentes llevadas al frente del perfil de sabor.

Los ejemplos que siguen se pretenden como una ilustración de ciertas modalidades preferidas de la invención, y no se implica limitación de la invención.

EJEMPLO 1

Preparación de Confitura a Base de Grasa de Sabor de Dulce de Leche

Se obtuvo una confitura cruda combinando primero los ingredientes enumerados en el Cuadro 1 en un perol agitado bajo calor bajo, es decir, una mezcladora Hobart A-200FT de camisa de agua de 53°C (Hobart Corp., Troy, OH), y luego reduciendo el tamaño de partícula promedio de la confitura cruda a aproximadamente 25 micrones a través de un refinador de tres rodillos Buhler SDX 600 (Buhler Industries, Uzwil, Suiza).

Cuadro 1

Sucroşa	44.50 peso/% en peso
Aceite de semilla de palma fraccionado	35 peso/% en peso
5 Leche seca no grasa	20 peso/% en peso
Lecitina	0.475 peso/% en peso
Vanilina de etilo	0.025 peso/% en peso

La confitura cruda se calentó a 115°C y se mantuvo durante 20 minutos utilizando un intercambiador térmico de superficie raspada Contherm 6x6 de camisa de vapor (Alfa Laval Thermal Inc., Newburtyport, MA). La confitura a base de grasa con sabor a dulce de leche terminada se enfrió para cesar la reacción de tostado y solidificar la confitura a base de grasa con sabor a dulce de leche. La confitura a base de grasa con sabor a dulce de leche tuvo un contenido de humedad de menos de 0.70% y una actividad de agua de 0.15.

EJEMPLO 2

Preparación de Confitura a Base de Grasa con Sabor a Dulce de Lecha de Cubierta de Dulce

Una confitura a base de grasa con sabor a dulce de leche de cubierta de dulce se adquiere formando la confitura a base de grasa con sabor de dulce de leche como se obtuvo en el Ejemplo 1 en una pieza de tamaño de bocado. La confitura a base de grasa con sabor a dulce de leche se puede utilizar sola o en conjunción con otros componentes tales como

chocolate. La pieza de tamaño de bocado luego se cubre con dulce de manera que 25.0% del producto terminado constituya una cubierta de dulce tratada en pero dura.

EJEMPLO 1 DE COMPARACIÓN

5 Preparación de Dulce de Leche a Base de Agua

Se hizo un dulce de leche a base de agua tradicional colocando botes sellados de Leche Entera Condensada Endulzada (SCWN) Carnation de Nestle^(R) en agua en ebullición durante dos horas. Luego, el calor se apagó y la

10 SCWM se dejó enfriar lentamente en el agua. Después de una hora de enfriamiento, los botes de SCWM se separaron y enfriaron al aire en una cremallera de alambre a temperatura ambiente. El dulce de leche resultante tiene una textura semejante a pudín tersa, una actividad de agua de 0.85 y un

15 contenido de humedad de 26%.

EJEMPLO 2 DE COMPARACIÓN

Preparación de Caramelo a Base de Agua

Un caramelo a base de agua se obtuvo combinando primero los ingredientes enumerados en el Cuadro 2 para

20 formar un caramelo crudo

Cuadro 2

25	Sucrosa	15-40 peso/% en peso
	Jarabe de maíz	15-60 peso/% en peso
	Crema espesa	10-20 peso/% en peso
	Mantequilla	3-5 peso/% en peso

Leche condensada endulzada	20-40 peso/% en peso
Sal	0.10 peso/% en peso
Vanillina de etilo	0.03 peso/% en peso

5 El caramelo crudo se calentó en un aparato de intercambio térmico de superficie raspada. En un paso de evaporación, el agua se evaporó y luego se logró el tostado o caramelización en un recipiente con camisa bajo calor elevado. El caramelo a base de agua terminado tuvo un contenido de humedad de entre 5.0-12.0% y una actividad de
10 agua típica de 0.4-0.65.

Prueba Sensorial

Se condujo análisis sensorial descriptivo de la confitura a base de grasa de sabor de dulce de leche del ejemplo 1, el dulce de leche a base de agua del Ejemplo 1 de
15 Comparación, Hershey Classic Caramels, Kraft Caramels y Caramac^(R). Todas las muestras se evaluaron mediante probadores de sabor entrenados utilizando el Método de Espectro; este método utiliza una Escala Aromática Universal para atrapar las intensidades de sabores en una muestra
20 determinada. Los perfiles de sabor de la confitura a base de grasa de sabor de dulce de leche de la presente invención y el dulce de leche a base de agua fueron los mismos; ambas muestras se describieron como teniendo un carácter de leche principal con un sabor de azúcar en caramelo inferior. Por
25 otra parte, tanto los Caramelos Hershey Classic como los

caramelos Kraft se describieron como teniendo un carácter principal de azúcar en caramelo y vainilla con un sabor de leche inferior y sabor de mantequilla subyacente. Caramac^(R) se describió como teniendo un carácter de leche con sabores
5 bajos de vainilla y azúcar en caramelo, un sabor que fue mucho más similar a un sabor de caramelo tradicional que a un sabor de dulce de leche.

Además, las muestras con cubierta de dulce de la confitura a base de grasa con sabor a dulce de leche de la
10 presente invención obtuvieron marcas de consumidor superiores y una fuerte preferencia, en comparación con las muestras cubiertas con caramelo de caramelo a base de agua tradicional. El análisis sensorial descriptivo adicional de muestras con cubierta de caramelo de la confitura a base de
15 grasa con sabor a dulce de leche de la presente invención, en comparación con las muestras con cubierta de caramelo de caramelo a base de agua tradicional, también se condujo.

Prueba Analítica

El análisis de la confitura a base de grasa con
20 sabor de dulce de leche del Ejemplo 1, los caramelos a base de agua de Snickers y Milky Way, y el dulce de leche a base de agua del Ejemplo 1 de Comparación se determinó con actividades de agua y contenidos de humedad como se exponen en el Cuadro 3 a continuación. Las actividades de agua se
25 determinaron utilizando un Rotronic Higrroskop DT a 25°C

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utilizando normas 0.10-0.95 RH. Los contenidos de humedad se determinaron usando un Orion Turbo 2 utilizando la técnica de mezclado de Karl Fisher.

Cuadro 3. Actividad de agua y contenido de humedad

5	Actividad de agua	% de agua
Snickers	0.50	11.5
Milky Way	0.50	11.5
Ejemplo 1 de Comparación	0.85	26
Ejemplo 1	0.15	0.70

10 Como se puede ver del cuadro 3, la confitura a base de grasa con sabor a dulce de leche de la presente invención tiene un contenido de humedad y actividad de agua muy inferiores a cualquiera de los otros materiales probados. La humedad ultra baja y la actividad de agua ultra baja de la

15 confitura a base de grasa de sabor de dulce de leche de la presente invención la hizo particularmente apropiada para aplicaciones en las que la humedad ha sido problemática, v.gr., en combinación con otros ingredientes de baja humedad, cubierta de dulce, etc.

20 El análisis de la confitura a base de grasa con sabor a dulce de leche del Ejemplo 1 y Caramac^(B) mediante cromatografía de gas/espectrometría de masa tiene compuestos de sabor identificados como se expone en el Cuadro 4 abajo. Este análisis involucró dos pasos básicos: extracción e

25 identificación.

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Las condiciones y técnica de extracción fue idéntica para ambos la confitura a base de grasa de sabor de dulce de leche y Caramac^(R). Cada muestra (72.90 g) se congeló con nitrógeno líquido y subsecuentemente se molió. La muestra luego se mezcló con 100 ml de solución de NaCl saturada a 50°C y se agitó durante 20 minutos con un autoagitador. La solución resultante luego se clavó con una norma interna de 2-isobutiltiazol (113.6 ppm), y 75 ml de éter redestilado se añadieron. La solución resultante luego se agitó durante otros 20 minutos (autoagitador) y se centrifugó a 3500 rpm durante 10 minutos. Luego el extracto de capa de éter se decantó a través de la técnica de Evaporación de Sabor Ayudada con Solvente (SAFE) (Baeng Corp., Manchíng, Alemania). Las condiciones de SAFE fueron vacío elevado (3.2×10^{-5} mbar) durante 2 horas. El extracto se concentró usando una columna Vigreux en un baño de agua a 50°C hasta que se alcanzó un volumen final de 250 ml.

La identificación de los compuestos de sabor se logró utilizando una cromatografía de gas Agilent 6890 acoplada a un espectrómetro de masa Quadrapole Agilent 5973. El análisis de los concentrados de extracto volátil se logró utilizando los siguientes parámetros: Gas Portador: helio 36 cm/seg, 0.47 kg/cm² (6.73 psi) (35°C), flujo constante de 1.0 ml/minuto; Columna de Separación: HP-FFAP 30 m x 0.25 mm x 0.25 um; Inyección: dividida (10:1), 1 ul del

destilado de muestra, Gerstel MPS2, temperatura de entrada de 250°C; Perfil de Horno: 35°C, 1 minuto de retención; 35°C-60°C a 60°C/minuto; 60°C-230°C a 6°C/minuto; 230°C retención 10 minutos; Detector: Agilent 5973 MSD, 70EV, 35-350 exploración amu en modo de ión negativo.

Cuadro 4. Compuestos de sabor:

	Compuesto de sabor	Cantidad (ppm)	Cantidad (ppm)
		en Ejemplo 1	en Caramac ^(R)
	2-furfural	0.62	0.07
10	2-acetil furano	0.20	ND
	2-acetil-3-hidroxifurano	0.20	ND
	alcohol de 2-furfurilo	6.16	2.15
	2-(5H)furanona	0.12	0.04
	2-hidroxi-3-metil-2-ciclopenten-		
15	1-ona	0.02	ND
	3-hidroxi-2-metil-piran-4-ona	12.18	4.83
	furanoato de metilo	0.63	ND
	2,5-dimetil-4-hidroxi-3-		
	(2H)furanona	0.38	0.12
20	dihidrohidroxi maltol	1.02	0.48
	5-hidroxifetil furfural	0.15	0.04
	Vainillina	ND	19.57

*ND = no detectado

Como se puede ver del Cuadro 4, la confitura a base de grasa con sabor a dulce de leche de la presente invención

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tiene un juego de compuestos de sabor distintivo a aquellos de Caramac^(R). Estos descubrimientos son consistentes con la prueba sensorial arriba descrita.

Desde una perspectiva de química de sabor, la ausencia de 2-acetil furano, 2-acetil-3-hidroxifurano, 2-hidroxi-3-metil-2-ciclopenten-1-ona y furanoato de metilo de Caramac^(R) tiene un impacto significativo sobre el sabor total de Caramac^(R) en comparación con el sabor total de la confitura a base de grasa con sabor de dulce de leche; estos compuestos parecerían ser responsables, cuando menos en parte, por el sabor rico en leche distintivo (como se discute arriba) de la confitura de la invención. De manera similar, la ausencia de compuesto de sabor de vainilla de la confitura a base de grasa con sabor de dulce de leche de la presente invención es significativa; aquellos compuestos de sabor pueden, en parte, ser responsables por el sabor de vainilla (como se discute arriba), que hace al Caramac^(R) más similar en sabor a un caramelo tradicional que una composición de dulce de leche.

Además, las cantidades significativamente superiores de 2-furfural, alcohol de 2-furfurilo, 3-hidroxi-2-metil-piran-4-ona y 2,5-dimetil-4-hidroxi-3-(2H)furanona en la confitura a base de grasa con sabor de dulce de leche de la presente invención parecería también que es responsable, cuando menos en parte, por el sabor rico en

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leche distintivo (como se discute anteriormente) de la confitura de la invención.

Otras variaciones y modificaciones de esta invención serán evidentes a aquellos expertos en este ramo.

5 Esta invención no está limitada, excepto como se expone en las siguientes reivindicaciones.

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REIVINDICACIONES

1.- Un método para hacer una confitura a base de grasa con sabor de dulce de leche, que comprende los pasos de:

5 dispersar un edulcorante y una proteína de lecha en una grasa para formar una confitura cruda que tiene una fase de gasa continua;

 calentar la confitura cruda dentro de una escala de temperatura y durante un tiempo suficientes para generar
10 térmicamente un sabor de dulce de leche, formando de esta manera la confitura a base de grasa con sabor de dulce de leche; y

 enfriar la confitura a base de grasa con sabor de dulce de leche a una temperatura suficiente para detener la
15 generación térmica de sabor de dulce de leche.

2.- El método de conformidad con la reivindicación 1, que comprende además el paso de reducir un tamaño de partícula promedio de la confitura cruda.

20 3.- El método de conformidad con la reivindicación 2, en donde el tamaño de partícula promedio se reduce a 1 a 100 micrones.

 4.- El método de conformidad con la reivindicación 1, que comprende además el paso de reducir un tamaño de partícula promedio de la confitura a base de grasa con sabor
25 a dulce de leche.

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5.- El método de conformidad con la reivindicación 4, en donde el tamaño de partícula promedio se reduce a de 1 a 100 micrones.

5 6.- El método de conformidad con la reivindicación 1, en donde la confitura cruda se calienta dentro de una escala de temperatura entre 70°C y 180°C.

7.- El método de conformidad con la reivindicación 1, en donde el tiempo suficiente para desarrollar un sabor de dulce de leche es entre 1 minuto y 1440 minutos.

10 8.- El método de conformidad con la reivindicación 1, en donde la temperatura suficiente para detener el desarrollo de sabor de dulce de leche es inferior a 70°C.

15 9.- Una confitura a base de grasa con sabor de dulce de leche que comprende un edulcorante; una proteína de leche; y una fase continua de grasa, hecha de conformidad con un proceso que comprende los pasos de:

dispersar el edulcorante y la proteína de leche en una grasa para formar una confitura cruda que tiene una fase de grasa continua;

20 calentar la confitura cruda dentro de una escala de temperatura y durante un tiempo suficientes para generar térmicamente sabor de dulce de leche, formando de esta manera la confitura a base de grasa con sabor de dulce de leche; y

25 enfriar la confitura a base de grasa don sabor a dulce de leche a una temperatura suficiente para detener la

generación térmica de sabor de dulce de leche.

10.- Una confitura a base de grasa con sabor de dulce de leche.

5 11.- La confitura a base de grasa con sabor de dulce de leche de conformidad con la reivindicación 10, en donde la confitura a base de grasa con sabor de dulce de leche tiene una actividad de agua que varía de 0.09 a 0.38.

10 12.- La confitura a base de grasa con sabor de dulce de leche de conformidad con la reivindicación 10, en donde la humedad está presente en una cantidad que varía de 0.10% a 5.0% en peso de la confitura a base de grasa con sabor de dulce de leche.

15 13.- La confitura a base de grasa con sabor de dulce de leche de conformidad con la reivindicación 10, en donde la confitura a base de grasa con sabor a dulce de leche comprende una grasa en una cantidad que varía de 10.05 a 98.05 en peso de la confitura a base de grasa con sabor a dulce de leche.

20 14.- La confitura a base de grasa con sabor de dulce de leche de conformidad con la reivindicación 10, en donde la confitura a base de grasa con sabor a dulce de leche comprende un edulcorante en una cantidad que varía de 1.0% a 80.0% en peso de la confitura a base de grasa con sabor a dulce de leche.

25 15.- La confitura a base de grasa con sabor de

dulce de leche de conformidad con la reivindicación 10, en donde la confitura a base de grasa con sabor de dulce de leche comprende una proteína de leche en una cantidad que varía de 0.5% a 40.0% en peso de la confitura a base de grasa con sabor de dulce de leche.

16.- Una confitura a base de grasa con sabor a dulce de leche, que comprende:

un edulcorante;

una proteína de leche; y

una fase continua de grasa.

17.- Una confitura a base de grasa con sabor a dulce de leche de conformidad con la reivindicación 16, en donde el edulcorante es un material seleccionado a partir del grupo que consiste en fructosa, sucrosa, lactosa, dextrosa, polioles, otros edulcorantes naturales y artificiales y combinaciones de los mismos.

18.- La confitura a base de grasa con sabor a dulce de leche de conformidad con la reivindicación 16, en donde el edulcorante está presente en una cantidad que varía de 1.0% a 80.0% en peso de la confitura a base de grasa con sabor de dulce de leche.

19.- La confitura a base de grasa con sabor de dulce de leche de conformidad con la reivindicación 16, en donde la proteína de leche se selecciona a partir del grupo que consiste en leche seca no grasa, polvo de suero

desmineralizado, polvo de leche entera y combinaciones de los mismos.

20.- La confitura a base de grasa con sabor de dulce de leche de conformidad con la reivindicación 16, en donde la proteína de leche está presente en una cantidad que varía de 0.5% a 40.0% en peso de la confitura a base de grasa con sabor a dulce de leche.

21.- La confitura a base de grasa con sabor de dulce de leche de conformidad con la reivindicación 16, en donde la fase continua de grasa es un material seleccionado a partir del grupo que consiste en aceite de semilla de palma fraccionado, mantequilla de cocoa, grasa de leche anhidra, aceite vegetal hidrogenado, y combinaciones de los mismos.

22.- La confitura a base de grasa con sabor de dulce de leche de conformidad con la reivindicación 16, en donde la fase continua de grasa está presente en una cantidad que varía de 10.0% a 98.05 en peso de la confitura a base de grasa con sabor de dulce de leche.

23.- La confitura a base de grasa con sabor de dulce de leche de conformidad con la reivindicación 16, en donde la humedad está presente en una cantidad que varía de 0.105 a 5.0]%.

24.- La confitura a base de grasa con sabor de dulce de leche de conformidad con la reivindicación 16, en donde la confitura a base de grasa con sabor a dulce de leche

tiene una actividad de agua que varía de 0.09 a 0.38.

25.- Una confitura que comprende una confitura a base de grasa con sabor de dulce de leche.

5 26.- La confitura de conformidad con la reivindicación 25, en donde la confitura es una confitura cubierta con caramelo.

27.- Una composición de chocolate que comprende una confitura a base de grasa con sabor de dulce de leche.

10 28.- Una confitura a base de grasa que comprende 2-hidroxí-3-metil-2-ciplenten-1-ona como un componente de sabor.

29.- La confitura a base de grasa de conformidad con la reivindicación 28, que comprende además 2-acetil furano como un componente de sabor.

15 30.- La confitura a base de grasa de conformidad con la reivindicación 29, que comprende además 2-acetil-3-hidroxifurano como un componente de sabor.

20 31.- La confitura a base de grasa de conformidad con la reivindicación 30, que comprende además furanoato de metilo como un componente de sabor.

32.- La confitura a base de grasa de conformidad con la reivindicación 31, que comprende además 2,5-dimetil-4-hidroxí-3-(2H)furanona como un componente de sabor.

25 33.- La confitura a base de grasa de conformidad

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con la reivindicación 32, que comprende además 3-hidroxi-2-metil-piran-4-ona como un componente de sabor.

5 34.- La confitura a base de grasa de conformidad con la reivindicación 33, que comprende además 2-furfural como un componente de sabor.

35.- La confitura a base de grasa de conformidad con la reivindicación 34, que comprende además 2-(5H)furanona como un componente de sabor.

10 36.- La confitura a base de grasa de conformidad con la reivindicación 35, que comprende además alcohol de 2-furfurilo como un componente de sabor.

37.- La confitura a base de grasa de conformidad con la reivindicación 36, que comprende además dihidro hidroxi maltol como un componente de sabor.

15 38.- la confitura a base de grasa de conformidad con la reivindicación 37, que comprende además 5-hidroximetil furfural como un componente de sabor.

20 39.- La confitura a base de grasa de conformidad con la reivindicación 28, en donde la 2-hidroxi-3-metil-2-ciclopenten-1-ona está presente en una cantidad mayor a 0.001 ppm.

40.- La confitura a base de grasa de conformidad con la reivindicación 29, en donde el 2-acetil furano está presente en una cantidad mayor de 0.001 ppm.

25 41.- La confitura a base de grasa de conformidad

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con la reivindicación 30, en donde el 2-acetil-3-hidroxi-furano está presente en una cantidad mayor de 0.001 ppm.

5 42.- La confitura a base de grasa de conformidad con la reivindicación 31, en donde el furanoato de metilo está presente en una cantidad mayor de 0.001 ppm.

43.- La confitura a base de grasa de conformidad con la reivindicación 32, en donde la 3,5-dimetil-4-hidroxi-3-(2H)furanona está presente en una cantidad mayor de 0.15 ppm.

10 44.- La confitura a base de grasa de conformidad con la reivindicación 33, en donde la 3-hidroxi-2-metil-piran-4-ona está presente en una cantidad mayor de 5.0 ppm.

15 45.- La confitura a base de grasa de conformidad con la reivindicación 34, en donde el 2-furfural está presente en una cantidad mayor de 0.10 ppm.

46.- la confitura a base de grasa de conformidad con la reivindicación 35, en donde la 2-(5H)furanona está presente en una cantidad mayor de 0.05 ppm.

20 47.- La confitura a base de grasa de conformidad con la reivindicación 36, en donde el alcohol de 2-furfurilo está presente en una cantidad mayor de 2.5 ppm.

48.- La confitura a base de grasa de conformidad con la reivindicación 37, en donde la dihidro hidroxi maltol está presente en una cantidad mayor de 0.50 ppm.

25 49.- la confitura a base de grasa de conformidad

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con la reivindicación 38, en donde el 5-hidr ximetil furfurál está presente en una cantidad mayor de 0.05 ppm.

5 50.- La confitura a base de grasa de conformidad con la reivindicación 28, en donde la confitura a base de grasa tiene una actividad de agua que varía de 0.09 a 0.38.

51.- La confitura a base de grasa de conformidad con la reivindicación 28, en donde la humedad está presente en una cantidad que varía de 0.10% a 5.05 en peso de la confitura a base de grasa.

10 52.- La confitura a base de grasa de conformidad con la reivindicación 28, en donde la confitura a base de grasa comprende una grasa en una cantidad que varía de 10.05 a 98.05 en peso de la confitura a base de grasa.

15 53.- La confitura a base de grasa de conformidad con la reivindicación 28, en donde la confitura a base de grasa comprende un edulcorante en una cantidad que varía de 1.0% a 80.0% en peso de la confitura a base de grasa.

20 54.- La confitura a base de grasa de conformidad con la reivindicación 28, en donde la confitura a base de grasa comprende una proteína de leche en una cantidad que varía de 0.55 a 40.05 en peso de la confitura a base de grasa.

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RESUMEN DE LA INVENCION

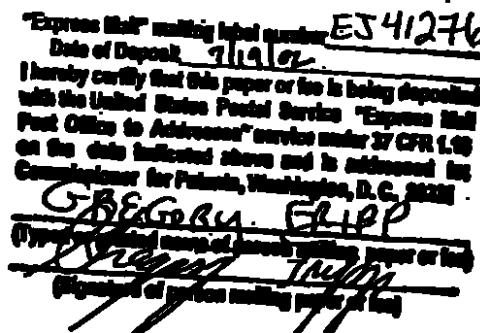
Una confección a base de grasa con sabor a dulce
que posee una sensación bucal suave y cremosa y un sabor
térmicamente generado y apropiado para uso en cubrimiento de
5 dulce. También se describe un método para hacer dicha
confección a base de grasa con sabor a dulce.

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TITLE

**DULCE DE LECHE-FLAVORED FAT-BASED CONFECTION,
METHOD FOR MAKING THE SAME AND
CONFECTIONERY CANDIES MAKING USE OF THE SAME**

BACKGROUND OF THE INVENTION

Field of the Invention

The present invention relates to a novel fat-based confection having a smooth and creamy mouthfeel and a thermally generated dulce de leche flavor. This invention further relates to a method of making such a dulce de leche-flavored fat-based confection, as well as to confectionery candies incorporating such a dulce de leche-flavored fat-based confection, in particular, candy-shelled confectionery candies.

Description of Related Art

Dulce de leche (hereinafter "dulce de leche" or "dulce"), translated from Spanish as "sweet of milk", is a popular treat in South and Central American countries. Dulce de leche is typically made by boiling sweetened condensed milk for hours to produce a sweet, caramelized pudding-like treat, which can be eaten alone or in combination with a biscuit or wafer. Dulce de leche is a water-based composition characterized by a smooth and creamy texture and a distinct rich dairy flavor with lower caramelized sugar notes. The flavor of dulce de leche is thermally generated. Dulce de leche is also known as carjeta (Mexico), arequipe (Colombia), fanqulla (Cuba) and manjar blanco (Peru).

It is known to incorporate water-based dulce de leche or dulce de leche-like compositions into certain products. For example, Haagen Das Dulce De Leche ice cream and Alfajore cookies do just that. In addition, dulce de leche spreads such as La Salamandra and Smucker's spreads are known. All known dulce de leche products contain water-based dulce de leche compositions. Typically, dulce de leche compositions contain high moisture contents, i.e., about 26% moisture by weight, and exhibit a water activity of about 0.85.

Both the high moisture content and water activity of dulce de leche impose limits on the types and quality of products which can be made using it. For example, the incorporation of water-based dulce de leche into certain applications such as candy-shelled confections is problematic. In short, dulce de leche is typically too soft to candy shell or at the very least is very difficult to process. In this same regard, water-based dulce de leche can be difficult to form in a bite-size format. Special process conditions are required, which drive up manufacturing costs and complexity. Temperature and humidity must be carefully controlled to process on traditional depositing or Open Extrusion center forming equipment. Traditional water-based dulce de leche loses its shape during processing.

Additionally, the high moisture content of water-based dulce de leche creates a moisture gradient when mixed with low moisture components such as crisp rice, biscuits, cookies, etc. Controlling this gradient can be difficult, often requiring a more complex product design that relies on the application of moisture barriers and humectants to slow the movement of water into the lower moisture components. Shortened product shelf-life, poor texture and quality are often the result.

It should also be noted that traditional water-based caramels suffer from the same inadequacies as water-based dulce de leche in certain applications. This, again, is due to a relatively high moisture content, i.e., about 5.0%-12.0% moisture by weight and a water activity ranging from about 0.40 to 0.50. Softer traditional water-based caramels have the same problems as dulce de leche, often being too soft to form in bite-size pieces or to candy shell. Further, traditional water-based caramels give a hard, chewy, unpleasant eating experience when candy-shelled and are too slow to clear the mouth upon consumption; in other words, bits of caramel and candy shell stick to the consumer's teeth, resulting in an unfavorable overall eating experience. Water-based caramels also create problematic moisture gradients as described above. In the end, however, the inadequacies of water-based caramel are irrelevant; water based caramel could never be a substitute for dulce de leche because caramels have a very different flavor characterized by caramelized sugar, vanilla and buttery notes.

Clearly, there is a need to develop a dulce de leche composition which does not suffer from the above-noted inadequacies of water-based dulce de leche. Such a dulce de leche product should offer the same rich dairy flavor as water-based dulce de leche, but offer a much greater degree of product design freedom, improved shelf-life, better texture and simple processing.

Caramac® (Nestle®) is a fat-based "caramel flavour covering" which is used to enrobe a biscuit in Nestle®'s BreakAway, which is sold in the United Kingdom. Caramac® is also marketed as a simple solid bar in Nestle®'s Caramac®. As set

forth in the ingredient declaration, Caramac® comprises vegetable fat, sugar, lactose, sweetened condensed skimmed milk, skimmed milk powder, butter, emulsifier (lecithin), treacle, salt, flavoring, and possibly nut traces. Caramac® has a flavor intensity much lower than that of conventional dulce de leche. More importantly, the flavor of Caramac® is more similar to a traditional caramel flavor than to a dulce de leche flavor. It is believed that the caramel-like flavor of the fat-based Caramac® can be solely attributed to the inclusion of treacle, a.k.a, molasses, in the composition. In other words, Caramac® does not appear to have a thermally generated flavor. What is more, Caramac® can be described as having a waxy mouthfeel.

Hence, there is clearly a need to develop a composition having a distinct thermally generated dulce de leche flavor, a smooth, creamy texture and a very low moisture content. The applications for such a composition would be manifold.

SUMMARY OF THE INVENTION

The present invention is directed to a dulce de leche-flavored fat-based confection comprising a sweetener, a dairy protein and a fat continuous phase, made according to a process comprising the steps of dispersing the sweetener and the dairy protein in a fat to form a raw confection having the fat continuous phase; heating the raw confection within a temperature range and for a time sufficient to thermally generate dulce de leche flavor, thereby forming the dulce de leche-flavored fat-based confection; and cooling the dulce de leche-flavored fat-based confection to a temperature sufficient to halt the thermal generation of dulce de leche flavor.

The present invention is also directed to a method of making a dulce de leche-flavored fat-based confection comprising the steps of dispersing a sweetener and a dairy protein in a fat to form a raw confection having a fat continuous phase; heating the raw confection within a temperature range and for a time sufficient to thermally generate a dulce de leche flavor, thereby forming the dulce de leche-

flavored fat-based confection; and cooling the dulce de leche-flavored fat-based confection to a temperature sufficient to halt the thermal generation of dulce de leche flavor.

In certain preferred embodiments of the method, there is an additional particle size reduction step either before or after the heating step. The average particle size is reduced to 1.0 to 100.0 microns. In certain preferred embodiments of the method, the raw confection is heated within a temperature range between 70°C and 180°C. In certain preferred embodiments, the time sufficient to develop a dulce de leche flavor is between 1 minute and 1440 minutes. In certain preferred embodiments, the temperature sufficient to halt the development of dulce de leche flavor is below 70°C.

In certain preferred embodiments of the invention, the confection produced has a water activity ranging from 0.09 to 0.38. In certain preferred embodiments of the invention, moisture is present in an amount ranging from 0.10% to 5.0% by weight of the confection. In additional preferred embodiments of the present invention, the confection comprises a fat in an amount ranging from 10.0% to 98.0% by weight or a sweetener in an amount ranging from 1.0% to 80.0% by weight or a dairy protein in an amount ranging from 0.5% to 40.0% by weight of the confection.

The present invention is broadly directed to a dulce de leche-flavored fat-based confection.

The present invention is further directed to a dulce de leche-flavored fat-based confection comprising a sweetener, a dairy protein and a fat continuous phase. In preferred embodiments, the sweetener is selected from fructose, sucrose, lactose, dextrose, polyols, other natural and artificial sweeteners and combinations thereof. In certain preferred embodiments, the dairy protein is selected from non-fat dry milk, demineralized whey powder, whole milk powder and combinations thereof.

In certain preferred embodiments, the fat continuous phase is selected from fractionated palm kernel oil, cocoa butter, anhydrous milk fat, hydrogenated vegetable oil, and combinations thereof.

The present invention is additionally directed to a confection, preferably a candy-shelled confection, or a chocolate composition comprising a dulce de leche-flavored fat-based confection.

The present invention is also directed to a fat-based confection comprising 2-hydroxy-3-methyl-2-cyclopenten-1-one as a flavor component. In preferred embodiments of the present invention, the fat-based confection contains an additional flavor component or additional flavor components. These flavor components are 2-acetyl furan, 2-acetyl-3-hydroxyfuran, methyl furanoate, 2,5-dimethyl-4-hydroxy-3-(2H) furanone, 3-hydroxy-2-methyl-pyran-4-one, 2-furfural, 2-(5H)furanone, 2-furfuryl alcohol, dihydro hydroxy maltol and 5-hydroxymethyl furfural.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

The present invention relates to a novel dulce de leche-flavored fat-based confection. This confection is preferably thermally processed to create special textural and flavor attributes. The inventive dulce de leche-flavored confection has a fat-based continuous phase that imparts a distinctive mouthfeel and eating experience. The creaminess of the fat-based confection enhances consumer perception of quality and overall acceptance of a finished candy using such a confection. The dulce de leche-flavored fat-based confection of the present invention solves the problems associated with traditional water-based dulce de leche, while maintaining a true thermally generated dulce de leche flavor. In sum, by virtue of an ultra-low moisture content, a low water activity and a fat continuous phase, the dulce de leche-flavored fat-based confection of the present invention offers a great degree of product design freedom, improved shelf-life, better texture and simple processing.

As used herein, the term "dulce de leche flavor" refers to a flavor characterized by a dairy main flavor with lower caramelized sugar flavor typically formed through thermal generation. As used herein, the term "dulce de leche-flavored" refers to a material having a dulce de leche flavor. As used herein, "fat-based" refers to a material having a fat/lipid continuous phase in which material components such as milk proteins and sugars are dispersed. As used herein, "water-based" refers to a material having a water continuous phase in which material components such as milk proteins and sugars are dispersed; typically water-based materials have a water activity from about 0.4 to about 0.5 and a moisture content of about 5% to about 12%. As used herein, "candy-shelled" refers to a composition having a sugar shell made by panning as known to those skilled in the art. As used herein, "dairy protein" refers to any protein derived from a dairy source; the dairy protein may be purified and/or processed and may be in the whey or casein class of milk proteins. As used herein, "sweetener" refers to any composition which provides sweetness and/or serves as a browning or reducing sugar. As used herein, "Maillard reaction" refers to a well-known food reaction which occurs between an amino source such as a dairy protein and a reducing sugar.

In a first aspect, the present invention is directed to a method of making a dulce de leche-flavored fat-based confection. In the first step, a sweetener and a dairy protein are dispersed in a fat to form a raw confection having a fat continuous phase. Dispersion is accomplished in any manner suitable to form a homogeneous dispersion, such as, for example, a Littleford Day M-5 Mixer (Littleford Day, Florence, KY) or a Hobart A-200FT Mixer (Hobart Corp., Troy, OH). Typically, dispersion is accomplished under low heat, i.e., 35-50°C, and with agitation, as it is necessary to keep the fat(s) liquid during the dispersion step. However, any method or equipment which keeps the fat(s) liquid can be employed herein.

It is important to note that since many ingredients will inherently contain water at 5% or greater, ingredients must be carefully selected to keep the overall moisture content less than about 5%, and preferably less than about 1.5%, i.e., low moisture ingredients (less than about 5% moisture) are preferably employed. For example,



if dextrose is used as a sweetener, it would need to be anhydrous dextrose, not dextrose monohydrate. Typically, commercially purchased dextrose is dextrose monohydrate, which has a substantially higher moisture content than anhydrous dextrose.

Generally, any sweetener is suitable for use in this invention as long as it has a low moisture content. Exemplary sweeteners include, without limitation and in their low moisture form if applicable, sucrose, lactose, dextrose, polyols, other natural and artificial sweeteners and combinations thereof. In a preferred embodiment of the present invention, the sweetener is a sugar such as fructose, sucrose, lactose or dextrose. One of ordinary skill in this art will readily appreciate that the above-described sweetener may not only provide sweetness to the dulce de leche-flavored fat-based confection, but in some instances may also serve as the browning or reducing sugar necessary to develop dulce de leche flavor. In certain preferred embodiments of this invention, the dulce de leche-flavored fat-based confection comprises a sweetener in an amount ranging from 1.0% to 80.0%, preferably 5.0% to 70.0%, more preferably 10.0% to 60.0%, still more preferably 15.0% to 55.0%, and most preferably 25.0% to 50.0%, by weight of the dulce de leche-flavored fat-based confection.

Likewise, any dairy protein is suitable for use in the present invention as long as it has a low moisture. Exemplary dairy proteins include, without limitation and in their low moisture form if applicable, non-fat dry milk, demineralized whey powder, whole milk powder and combinations thereof. It is also believed that soy protein could be used in place of dairy protein if so desired. One of ordinary skill in this art will readily appreciate that certain sugars may be present in the above-described dairy protein; these sugars may provide some degree of sweetness to the dulce de leche-flavored fat-based confection, as well as serve as the browning or reducing sugar necessary to develop dulce de leche flavor. In certain preferred embodiments of this invention, the dulce de leche-flavored fat-based confection comprises a dairy protein in an amount ranging from 0.5% to 40.0%, preferably 1.0% to 30.0%, more preferably 2.0% to 20.0%, still more preferably 3.0% to

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15.0%, and most preferably 4.0% to 10.0%, by weight of the dulce de leche-flavored fat-based confection.

Similarly, any fat is suitable for use in the present invention as long as it has a low moisture content. Exemplary fats include, without limitation and in their low moisture form if applicable, fractionated palm kernel oil, cocoa butter, anhydrous milk fat (AMF), hydrogenated vegetable oil such as soy fat or cottonseed oil, and combinations thereof. Fractionated palm kernel oil such as that available from Fuji under the name Palkena-SAC, is preferably used in the dulce de leche-flavored fat-based confection. In certain preferred embodiments of this invention, the dulce de leche-flavored fat-based confection comprises a fat in an amount ranging from 10.0% to 98.0%, preferably 16.0% to 85.0%, more preferably 22.0% to 75.0%, still more preferably 25.0% to 60.0%, and most preferably 28.0% to 45.0%, by weight of the dulce de leche-flavored fat-based confection.

The particular fat(s) chosen for use in the present invention is primarily responsible for the smooth, creamy mouthfeel of the present inventive dulce de leche-flavored fat-based confection. The fat(s) chosen comprises a continuous matrix which disperses the sweetener and dairy protein. The particular texture of the dulce de leche-flavored fat-based confection obtained can be manipulated by the selection of particular fat(s). Fats with relatively high melting points give a greater degree of heat stability; conversely, fats with relatively low melting points give a softer texture. According to the present invention, fat(s) with a melting point in the range of about 30°C to about 34°C is preferably used, especially when the dulce de leche-flavored fat-based confection will be used in any type of panning process. Likewise, one of ordinary skill in the art would readily appreciate that the use of fat(s) having a higher melting point would give a harder texture.

The texture of the present dulce de leche-flavored fat-based confection can be further controlled by fat type, fat content, dairy protein type, dairy protein content, sweetener type, sweetener content and particle size. In that regard, in an optional step of the present inventive method, the raw confection can be ground (refined) to

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obtain a desired average particle size. The desired average particle size ranges from 1.0 to 100.0 microns, preferably 5.0 to 75.0, more preferably 10.0 to 50.0, still more preferably 15.0 to 40.0, and most preferably 20.0 to 35.0 microns.

Grinding can be accomplished using any conventional means such as a roller refiner or a ball mill or any other means known in the art. The average particle size of the raw confection prior to size reduction will depend upon the particular sweetener and dairy protein employed; typically this will range anywhere from about 80 microns and up. One of ordinary skill in this art will readily appreciate that such a size reduction step could alternatively be conducted prior to the above-described dispersion step, i.e., size reduction of ingredients, or even after the thermal processing step described below.

One of ordinary skill in this art will also readily understand that other ingredients may and will be present in a given dulce de leche-flavored fat-based confection, in addition to the sweetener, dairy protein and fat described above. Other such ingredients include, without limitation, emulsifiers such as mono and diglycerides, salt and stabilizers such as disodium phosphate.

In a second step of the process of making the dulce de leche-flavored fat-based confection of the present invention, the raw confection is heated within a temperature range and for a time sufficient to thermally generate a dulce de leche flavor, thereby forming the dulce de leche-flavored fat-based confection. This heating step can be conducted in any scraped surface heat exchanger such as, for example, a Contherm scraped-surface heat exchanger (Alfa Laval Thermal Inc., Newburyport, MA). The temperature must be raised to a temperature sufficient to initiate flavor development reactions such as the Maillard reaction; likewise, the temperature must be maintained at a temperature and for a time sufficient to conduct such reactions, yet without developing undesirable flavors.

Typically, the raw confection is heated within a temperature range from 70°C to 180°C, preferably 75°C to 165°C, more preferably 80°C to 150°C, still more preferably 90°C to 135°C, and most preferably 100°C -125°C. Temperatures

higher than these will impart scorch notes to the dulce de leche-flavored fat-based confection; temperatures lower than these are insufficient to initiate the requisite flavor development reactions such as the Maillard reaction. Typically, the time sufficient to develop a dulce de leche flavor ranges from 1 to 1440 minutes, preferably 2 to 720 minutes, more preferably 3 to 600 minutes, still more preferably 5 to 480 minutes, and most preferably 10 to 120 minutes. Times longer than these will impart scorch notes to the dulce de leche-flavored fat-based confection; times shorter than these will be inadequate to allow dulce de leche flavor to develop. For purposes of the present invention, one of ordinary skill in this art will readily appreciate that the higher the temperature, the lower the time and vice versa. Confirmation of the formation of the desired dulce de leche-flavored fat-based confection is typically made by sensory evaluation, analytical evaluation or combination thereof.

In a final step of the present inventive process, the dulce de leche-flavored fat-based confection is cooled to a temperature sufficient to halt the development of dulce de leche flavor. It is also understood that further cooling may be undertaken in order to develop an appropriate fat crystal structure for a given end use. Typically, a temperature below 70°C is suitable for halting flavor development.

The dulce de leche-flavored fat-based confection made according to the above-described method has an ultra-low moisture content and low water activity. In certain preferred embodiments of this invention, moisture is present in an amount ranging from 0.1% to 5.0%, preferably 0.15% to 3.50%, more preferably 0.20% to 2.50%, still more preferably 0.25% to 1.50%, further preferably 0.30% to 1.25%, and most preferably 0.5% to 0.9%, by weight of the dulce de leche-flavored fat-based confection. In certain preferred embodiments of this invention, the dulce de leche-flavored fat-based confection has a water activity (A_w) ranging from 0.09 to 0.38, preferably 0.10 to 0.36, more preferably 0.11 to 0.34, still more preferably 0.12 to 0.30, and most preferably 0.13 to 0.25.

If the dulce de leche-flavored fat-based confection contains a higher amount of moisture than that noted above, the sweetener and dairy protein will come out of the fat continuous phase upon heating the raw confection; in fact, the characteristics of the dulce de leche-flavored fat-based confection will change dramatically, becoming unstable and quite brittle. The texture is no longer smooth and creamy, but quite the opposite. A discontinuous, severely grained texture forms that is composed of many hard inclusions with large quantities of fat oiling off the mass. A gentle heating process as described above, in combination with low moisture ingredients, maintains the creaminess of the present dulce de leche-flavored fat-based confection. During processing, heating and agitation are carefully controlled to prevent localized hot spots from occurring in the dulce de leche-flavored fat-based confection.

The present invention also contemplates a process wherein dulce de leche flavor is thermally generated via a sweetener and/or a dairy protein before their dispersion in a fat continuous phase. Any process by which dulce de leche flavor is thermally generated using the above-noted ingredients is within the scope of the present invention.

In a second aspect, the present invention is directed to a dulce de leche-flavored fat-based confection comprising a sweetener, a dairy protein and a fat continuous phase made according to the above-described process.

In a third aspect, the present invention is directed to a dulce de leche-flavored fat-based confection. In other words, the present invention is broadly directed to any fat-based confection which has a dulce de leche flavor as defined above. In certain preferred embodiments, the dulce de leche-flavored fat-based confection includes a sweetener in an amount and/or type noted above, includes a dairy protein in an amount and/or type noted above, and/or includes a fat in an amount and/or type noted above. Further, in certain preferred embodiments, the dulce de leche-flavored fat-based confection of the present invention has a water activity as noted above and/or a moisture content as noted above.

Given the extremely low moisture content of the above-described inventive dulce de leche-flavored fat-based confection, it is particularly suited for application to products in which an unacceptable moisture gradient would typically be present if one were using a water-based composition such as a traditional caramel or dulce de leche. When using the present dulce de leche-flavored fat-based confection in conjunction with cookies, crisp rice, crackers, etc., no moisture gradient is created; this allows for a platform of products comprising dry components combined with the dulce de leche-flavored fat-based confection which will not become soggy during shelf-life. The dulce de leche-flavored fat-based confection of the present invention can even be used as a barrier coating. What is more, the present dulce de leche-flavored fat-based confection is particularly suited for use in a candy-shelled confection. The dulce de leche-flavored fat-based confection allows for the formation of a bite-size piece, and the surface of the dulce de leche-flavored fat-based confection is stable to sugar-shelling, i.e., sugar shell will adhere.

Hence, another aspect of the present invention is directed to confections comprising the dulce de leche-flavored fat-based confection of the present invention, and, in particular, to a candy-shelled confection comprising the dulce de leche-flavored fat-based confection. It is important to note that the dulce de leche-flavored fat-based confection of the present invention can also be used as a stand alone product, e.g., in tablet form, as an inclusion, as an enrobing material, etc.

Further, the inventive dulce de leche-flavored fat-based confection can also be used as an intermediate in the manufacture of chocolate. Both SOI (standard of identity) and non-SOI chocolate is included for purposes of the present invention. In fact, using the dulce de leche-flavored fat-based confection of the present invention as an intermediate to generate developed milk notes in chocolate allows for bypass of the complicated, expensive and cumbersome crumb oven process. The crumb process generates desirable developed milk flavors for chocolate through, for example, the Maillard reaction between milk proteins and sugar to impart a flavor. Generally, fluid milk is condensed and mixed with sugar and cocoa liquor; the mixture is dried in large ovens at 75°C to 105°C for 4 to 8 hours until the moisture

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content is under 1%. Details of the crumb oven process can be found in Chocolate, Cocoa, and Confectionery by Bernard Minifie.

The cooking process used in the present dulce de leche-flavored fat-based confection creates, inter alia, an array of developed milk flavors associated with chocolate processed using the crumb oven. In short, the sugar and protein sources of the present invention can be modified to produce an array of developed milk and dairy-like flavors for chocolate. Accordingly, an additional aspect of the present invention is directed to a chocolate composition which contains the dulce de leche-flavored fat-based confection of the present invention; one of ordinary skill in this art would readily appreciate that other ingredients typically present in chocolate compositions would also be present in the chocolate composition of the present invention.

Yet another aspect of the present invention is directed to a dulce de leche-flavored fat-based confection comprising a sweetener, a dairy protein and a fat continuous phase. All of the details given above with respect to sweetener identity and amount, dairy protein and amount, fat continuous phase identity and amount, water activity, moisture content and flavor are the same for this aspect.

Yet another aspect of the present invention is directed to a fat-based confection comprising 2-hydroxy-3-methyl-2-cyclopenten-1-one as a flavor component. As used herein, "flavor component" refers to a flavor compound or a compound which provides flavor to a confection. According to the present invention, the overall flavor profile is preferably a result of thermally generated flavor components.

In preferred embodiments of the present invention, the fat-based confection contains an additional flavor component or additional flavor components. These flavor components are 2-acetyl furan, 2-acetyl-3-hydroxyfuran, methyl furanoate, 2,5-dimethyl-4-hydroxy-3-(2H) furanone, 3-hydroxy-2-methyl-pyran-4-one, 2-furfural, 2-(5H)furanone, 2-furfuryl alcohol, dihydro hydroxy maltol and 5-hydroxymethyl furfural. Analysis of the fat-based confection of the present

invention has shown these flavor compounds to be key in producing a dulce de leche flavor; hence, "dulce de leche flavor" can be more specifically defined as flavor created by some combination of these flavor components. All of the details given above for the first aspect of this invention with respect to sweetener identity and amount, dairy protein and amount, fat continuous phase identity and amount, water activity and moisture content are the same for this aspect.

In certain embodiments of the present invention, 2-hydroxy-3-methyl-2-cyclopenten-1-one is present in an amount greater than or equal to 0.001 ppm, preferably greater than or equal to 0.004 ppm, more preferably greater than or equal to 0.007 ppm, still more preferably greater than or equal to 0.010 ppm, further preferably greater than or equal to 0.013 ppm, and most preferably greater than or equal to 0.016 ppm. In certain embodiments of the present invention, 2-hydroxy-3-methyl-2-cyclopenten-1-one is present in an amount ranging from 0.001 ppm to 30.0 ppm, preferably 0.004 ppm to 25.0 ppm, more preferably 0.007 ppm to 20.0 ppm, still more preferably 0.010 ppm to 15.0 ppm, further preferably 0.013 ppm to 10.0 ppm, and most preferably 0.016 ppm to 5.0 ppm.

In certain embodiments of the present invention, 2-acetyl furan is present in an amount greater than or equal to 0.001 ppm, preferably greater than or equal to 0.020 ppm, more preferably greater than or equal to 0.040 ppm, still more preferably greater than or equal to 0.060 ppm, further preferably greater than or equal to 0.080 ppm, and most preferably greater than or equal to 0.10 ppm. In certain embodiments of the present invention, 2-acetyl furan is present in an amount ranging from 0.001 ppm to 30.0 ppm, preferably 0.020 ppm to 25.0 ppm, more preferably 0.040 ppm to 20.0 ppm, still more preferably 0.060 ppm to 15.0 ppm, further preferably 0.080 ppm to 10.0 ppm, and most preferably 0.10 ppm to 5.0 ppm.

In certain embodiments of the present invention, 2-acetyl-3-hydroxyfuran (isomalt) is present in an amount greater than or equal to 0.001 ppm, preferably greater than or equal to 0.020 ppm, more preferably greater than or equal to 0.040 ppm, still

more preferably greater than or equal to 0.060 ppm, further preferably greater than or equal to 0.080 ppm, and most preferably greater than or equal to 0.10 ppm. In certain embodiments of the present invention, 2-acetyl-3-hydroxyfuran is present in an amount ranging from 0.001 ppm to 250.0 ppm, preferably 0.020 ppm to 200.0 ppm, more preferably 0.040 ppm to 150.0 ppm, still more preferably 0.060 ppm to 100.0 ppm, further preferably 0.080 ppm to 75.0 ppm, and most preferably 0.10 ppm to 50.0 ppm.

In certain embodiments of the present invention, methyl furanoate is present in an amount greater than or equal to 0.001 ppm, preferably greater than or equal to 0.020 ppm, more preferably greater than or equal to 0.040 ppm, still more preferably greater than or equal to 0.060 ppm, further preferably greater than or equal to 0.080 ppm, and most preferably greater than or equal to 0.10 ppm. In certain embodiments of the present invention, methyl furanoate is present in an amount ranging from 0.001 ppm to 60.0 ppm, preferably 0.020 ppm to 50.0 ppm, more preferably 0.040 ppm to 40.0 ppm, still more preferably 0.060 ppm to 30.0 ppm, further preferably 0.080 ppm to 20.0 ppm, and most preferably 0.10 ppm to 10.0 ppm.

In certain embodiments of the present invention, 2,5-dimethyl-4-hydroxy-3-(2H) furanone (furanol) is present in an amount greater than or equal to 0.15 ppm, preferably greater than or equal to 0.18 ppm, more preferably greater than or equal to 0.21 ppm, still more preferably greater than or equal to 0.24 ppm, further preferably greater than or equal to 0.27 ppm, and most preferably greater than or equal to 0.30 ppm. In certain embodiments of the present invention, 2,5-dimethyl-4-hydroxy-3-(2H) furanone is present in an amount ranging from 0.15 ppm to 120.0 ppm, preferably 0.18 ppm to 100.0 ppm, more preferably 0.21 ppm to 80.0 ppm, still more preferably 0.24 ppm to 60.0 ppm, further preferably 0.27 ppm to 40.0 ppm, and most preferably 0.30 ppm to 20.0 ppm.

In certain embodiments of the present invention, 3-hydroxy-2-methyl-pyran-4-one (maltol) is present in an amount greater than or equal to 5.0 ppm, preferably greater

than or equal to 6.0 ppm, more preferably greater than or equal to 7.0 ppm, still more preferably greater than or equal to 8.0 ppm, further preferably greater than or equal to 9.0 ppm, and most preferably greater than or equal to 10.0 ppm. In certain embodiments of the present invention, 3-hydroxy-2-methyl-pyran-4-one is present in an amount ranging from 5.0 ppm to 300.0 ppm, preferably 6.0 ppm to 250.0 ppm, more preferably 7.0 ppm to 200.0 ppm, still more preferably 8.0 ppm to 150.0 ppm, further preferably 9.0 ppm to 100.0 ppm, and most preferably 10.0 ppm to 50.0 ppm.

In certain embodiments of the present invention, 2-furfural is present in an amount greater than or equal to 0.10 ppm, preferably greater than or equal to 0.15 ppm, more preferably greater than or equal to 0.20 ppm, still more preferably greater than or equal to 0.25 ppm, further preferably greater than or equal to 0.30 ppm, and most preferably greater than or equal to 0.35 ppm. In certain embodiments of the present invention, 2-furfural is present in an amount ranging from 0.10 ppm to 60.0 ppm, preferably 0.15 ppm to 50.0 ppm, more preferably 0.20 ppm to 40.0 ppm, still more preferably 0.25 ppm to 30.0 ppm, further preferably 0.30 ppm to 20.0 ppm, and most preferably 0.35 ppm to 10.0 ppm.

In certain embodiments of the present invention, 2-(5H)furanone is present in an amount greater than or equal to 0.05 ppm, preferably greater than or equal to 0.06 ppm, more preferably greater than or equal to 0.07 ppm, still more preferably greater than or equal to 0.08 ppm, further preferably greater than or equal to 0.09 ppm, and most preferably greater than or equal to 0.10 ppm. In certain embodiments of the present invention, 2-(5H)furanone is present in an amount ranging from 0.05 ppm to 120.0 ppm, preferably 0.06 ppm to 100.0 ppm, more preferably 0.07 ppm to 80.0 ppm, still more preferably 0.08 ppm to 60.0 ppm, further preferably 0.09 ppm to 40.0 ppm, and most preferably 0.10 ppm to 20.0 ppm.

In certain embodiments of the present invention, 2-furfuryl alcohol is present in an amount greater than or equal to 2.5 ppm, preferably greater than or equal to 3.0

ppm, more preferably greater than or equal to 3.5 ppm, still more preferably greater than or equal to 4.0 ppm, further preferably greater than or equal to 4.5 ppm, and most preferably greater than or equal to 5.0 ppm. In certain embodiments of the present invention, 2-furfuryl alcohol is present in an amount ranging from 2.5 ppm to 100.0 ppm, preferably 3.0 ppm to 90.0 ppm, more preferably 3.5 ppm to 80.0 ppm, still more preferably 4.0 ppm to 75.0 ppm, further preferably 4.5 ppm to 50.0 ppm, and most preferably 5.0 ppm to 25.0 ppm.

In certain embodiments of the present invention, dihydro hydroxy maltol is present in an amount greater than or equal to 0.50 ppm, preferably greater than or equal to 0.55 ppm, more preferably greater than or equal to 0.60 ppm, still more preferably greater than or equal to 0.65 ppm, further preferably greater than or equal to 0.70 ppm, and most preferably greater than or equal to 0.75 ppm. In certain embodiments of the present invention, dihydro hydroxy maltol is present in an amount ranging from 0.50 ppm to 10000.0 ppm, preferably 0.55 ppm to 1000.0 ppm, more preferably 0.60 ppm to 500.0 ppm, still more preferably 0.65 ppm to 250.0 ppm, further preferably 0.70 ppm to 100.0 ppm, and most preferably 0.75 ppm to 50.0 ppm.

In certain embodiments of the present invention, 5-hydroxymethyl furfural is present in an amount greater than or equal to 0.05 ppm, preferably greater than or equal to 0.06 ppm, more preferably greater than or equal to 0.07 ppm, still more preferably greater than or equal to 0.08 ppm, further preferably greater than or equal to 0.09 ppm, and most preferably greater than or equal to 0.10 ppm. In certain embodiments of the present invention, 5-hydroxymethyl furfural is present in an amount ranging from 0.05 ppm to 10000.0 ppm, preferably 0.06 ppm to 1000.0 ppm, more preferably 0.07 ppm to 500.0 ppm, still more preferably 0.08 ppm to 250.0 ppm, further preferably 0.09 ppm to 100.0 ppm, and most preferably 0.10 ppm to 50.0 ppm.

Another related aspect of the present invention is directed to a fat-based confection comprising one or more flavor components selected from the group consisting of

2-hydroxy-3-methyl-2-cyclopenten-1-one, 2-acetyl furan, 2-acetyl-3-hydroxyfuran and methyl furanoate. In a preferred embodiment, the fat-based confection further comprises one or more flavor components selected from the group consisting of 2,5-dimethyl-4-hydroxy-3-(2H) furanone, 3-hydroxy-2-methyl-pyran-4-one, 2-furfural, 2-(5H)furanone and 2-furfuryl alcohol. In a more preferred embodiment, the fat based confection further comprises one or more flavor components selected from the group consisting of dihydro hydroxy maltol and 5-hydroxymethyl furfural, as well as one or more flavor components selected from the group consisting of 2,5-dimethyl-4-hydroxy-3-(2H) furanone, 3-hydroxy-2-methyl-pyran-4-one, 2-furfural, 2-(5H)furanone and 2-furfuryl alcohol.

It is within the skill of one of ordinary skill in this art to vary the amounts of all of the above-described thermally generated flavor components to achieve a variety of dulce de leche flavors. Some flavor components may contribute to the dairy flavor of dulce de leche compositions. Varying amounts of the above-noted flavor components will result in dulce de leche flavors having different flavor notes brought to the forefront of the taste profile.

The examples which follow are intended as an illustration of certain preferred embodiments of the invention, and no limitation of the invention is implied.

EXAMPLE 1

Preparation of Dulce De Leche-Flavored Fat-Based Confection

A raw confection was obtained by first combining the ingredients listed in Table 1 in an agitated kettle under low heat, i.e., a 53°C water-jacketed Hobart A-200FT mixer (Hobart Corp., Troy, OH), and then reducing the average particle size of the raw confection to about 25 microns via a Buhler SDX 600 three-roll refiner (Buhler Industries, Uzwil, Switzerland).

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Table 1.

sucrose	44.50 w/w%
fractionated palm kernel oil	35 w/w%
non-fat dry milk	20 w/w%
lecithin	0.475 w/w%
ethyl vanillin	0.025 w/w%

The raw confection was heated to 115°C and held for 20 minutes using a 120°C steam-jacketed Contherm 6x6 scraped surface heat exchanger (Alfa Laval Thermal Inc., Newburyport, MA). The finished dulce de leche-flavored fat-based confection was cooled to cease the browning reaction and solidify the dulce de leche-flavored fat-based confection. The dulce de leche-flavored fat-based confection had a moisture content of less than 0.70% and a water activity of 0.15.

EXAMPLE 2

Preparation of Candy-Shelled Dulce De Leche-Flavored Fat-Based Confection

A candy-shelled dulce de leche-flavored fat-based confection is acquired by forming the dulce de leche-flavored fat-based confection as obtained in Example 1 into a bite-sized piece. The dulce de leche-flavored fat-based confection can be used alone or in conjunction with other components such as chocolate. The bite-size piece is then candy-shelled such that 25.0% of the finished product constitutes a hard-panned candy shell.

COMPARATIVE EXAMPLE 1

Preparation of Water-Based Dulce De Leche

A traditional water-based dulce de leche was made by placing sealed cans of Nestle's Carnation Sweetened Condensed Whole Milk (SCWM) in boiling water for two hours. Then, the heat is turned off, and the SCWM is allowed to slowly cool in the water. After one hour of cooling, the cans of SCWM are removed and

air cooled on a wire rack at room temperature. The resulting dulce de leche has a smooth pudding-like texture, a water activity of 0.85 and a moisture content of 26%.

COMPARATIVE EXAMPLE 2

Preparation of Water-Based Caramel

A water-based caramel was obtained by first combining the ingredients listed in Table 2 to form a raw caramel.

Table 2.

sucrose	15-40 w/w%
corn syrup	15-60 w/w%
heavy cream	10-20 w/w%
butter	3-5 w/w%
sweetened condensed milk	20-40 w/w%
salt	0.10 w/w%
ethyl vanillin	0.03 w/w%

The raw caramel was heated in a scraped surface heat exchange apparatus. In an evaporation step, water was flashed off and then browning or caramelization was accomplished in a jacketed vessel under high heat. The finished water-based caramel had a moisture content of between 5.0-12.0% and a typical water activity of 0.4-0.65.

Sensory Testing

Descriptive sensory analysis of the dulce de leche-flavored fat-based confection of Example 1, the water-based dulce de leche of Comparative Example 1, Hershey Classic Caramels, Kraft Caramels and Caramac® has been conducted. All samples were evaluated by trained taste testers using the Spectrum Method; this method uses the Universal Aromatic Scale to capture intensities of flavors in a given

sample. The flavor profiles of the dulce de leche-flavored fat-based confection of the present invention and water-based dulce de leche were the same; both samples were described as having a main dairy character with a lower caramelized sugar flavor. On the other hand, both Hershey Classic Caramels and Kraft Caramels were described as having a main character of caramelized sugar and vanilla with a lower dairy flavor and underlying buttery flavor. Caramac® was described as having a dairy character with low vanilla and caramelized sugar flavors, a flavor that was much more similar to a traditional caramel flavor than to a dulce de leche flavor.

Further, candy-shelled samples of the dulce de leche-flavored fat-based confection of the present invention obtained superior consumer scores and a strong preference, as compared with candy-shelled samples of traditional water-based caramel. Additional descriptive sensory analysis of candy-shelled samples of the dulce de leche-flavored fat-based confection of the present invention, as compared with candy-shelled samples of traditional water-based caramel, has also been conducted.

Analytical Testing

Analysis of the dulce de leche-flavored fat-based confection of Example 1, water-based caramels from Snickers and Milky Way, and the water-based dulce de leche of Comparative Example 1 has determined water activities and moisture contents as set forth in Table 3 below. The water activities were determined using a Rotronic Hygroskop DT at 25°C using 0.10-0.95 RH standards. The moisture contents were determined using an Orion Turbo 2 using the blending Karl Fisher technique.

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Table 3. Water activity and moisture content.

	water activity	% water
Snickers	0.50	11.5
Milky Way	0.50	11.5
Comparative Example 1	0.85	26
Example 1	0.15	0.70

As can be seen from Table 3, the dulce de leche-flavored fat-based confection of the present invention has a much lower moisture content and water activity than any of the other tested materials. The ultra-low moisture and ultra-low water activity of the dulce de leche-flavored fat-based confection of the present invention render it particularly suitable for applications in which moisture has been problematic, e.g., in combination with other low moisture ingredients, candy shelling, etc.

Analysis of the dulce de leche-flavored fat-based confection of Example 1 and Caramac® by gas chromatograph/mass spectrometry has identified flavor compounds as set forth in Table 4 below. This analysis involved two basic steps: extraction and identification.

The extraction conditions and technique was identical for both the dulce de leche-flavored fat-based confection and Caramac®. Each sample (72.90 g) was frozen with liquid nitrogen and subsequently ground. The sample was then mixed with 100 ml saturated NaCl solution at 50°C and shaken for 20 minutes with an autoshaker. The resulting solution was then spiked with an internal standard of 2-isobutylthiazole (113.6 ppm), and 75 ml re-distilled ether was added. The resulting solution was then shaken for another 20 minutes (autoshaker) and centrifuged at 3500 rpm for 10 minutes. Then the ether layer extract was decanted via Solvent Assisted Flavor Evaporation (SAFE) technique (Baeng Corp., Manching, Germany). SAFE conditions were high vacuum (3.2×10^{-5} mbar) for 2 hours. The

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extract was concentrated using a Vigreux column in a 50°C water bath until a final volume of 250 ml was achieved.

Identification of the flavor compounds was accomplished using an Agilent 6890 gas chromatograph coupled to a Quadrapole Agilent 5973 mass spectrometer.

Analysis of the volatile extract concentrates was accomplished using the following parameters: Carrier Gas: helium 36 cm/sec, 6.73 psi (35°C), 1.0 ml/minute constant flow; Separation Column: HP-FFAP 30 m x 0.25 mm x 0.25 μ m;

Injection: split (10:1), 1 μ l of the sample distillate, Gerstel MPS2, inlet temperature of 250°C; Oven Profile: 35°C, 1 minute hold; 35°C - 60°C at 60°C/minute; 60°C - 230°C at 6° C/minute; 230°C hold 10 minutes; Detector: Agilent 5973 MSD, 70ev, 35-350 amu scan on negative ion mode.

Table 4. Flavor compounds.

flavor compound	amount (ppm) in Example 1	amount (ppm) in Caramac®
2-furfural	0.62	0.07
2-acetyl furan	0.20	ND
2-acetyl-3-hydroxyfuran	0.20	ND
2-furfuryl alcohol	6.16	2.15
2-(5H)furanone	0.12	0.04
2-hydroxy-3-methyl-2-cyclopenten-1-one	0.02	ND
3-hydroxy-2-methyl-pyran-4-one	12.18	4.83
methyl furanoate	0.63	ND
2,5-dimethyl-4-hydroxy-3-(2H)furanone	0.38	0.12
dihydro hydroxy maltol	1.02	0.48
5-hydroxymethyl furfural	0.15	0.04
vanillin	ND	19.57

*ND = not detected

As can be seen from Table 4, the dulce de leche-flavored fat-based confection of the present invention has a set of flavor compounds distinct from those of Caramac®. These findings are consistent with the sensory testing described above.

From a flavor chemistry perspective, the absence of 2-acetyl furan, 2-acetyl-3-hydroxyfuran, 2-hydroxy-3-methyl-2-cyclopenten-1-one and methyl furanoate from Caramac® has a significant impact on the overall taste of Caramac® as compared with the overall taste of the inventive dulce de leche-flavored fat-based confection; these compounds would appear to be responsible, at least in part, for the distinct rich dairy flavor (as discussed above) of the inventive confection. Similarly, the absence of vanillin flavor compound from the dulce de leche-flavored fat-based confection of the present invention is significant; those flavor compounds may, in part, be responsible for the vanilla flavor (as discussed above), which render Caramac® more similar in flavor to a traditional caramel than to a dulce de leche composition.

Further, the significantly higher amounts of 2-furfural, 2-furfuryl alcohol, 3-hydroxy-2-methyl-pyran-4-one and 2,5-dimethyl-4-hydroxy-3-(2H)furanone in the dulce de leche-flavored fat-based confection of the present invention would appear to also be responsible, at least in part, for the distinct rich dairy flavor (as discussed above) of the inventive confection.

Other variations and modifications of this invention will be obvious to those skilled in this art. This invention is not to be limited except as set forth in the following claims.

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WHAT IS CLAIMED IS:

1. A method of making a dulce de leche-flavored fat-based confection comprising the steps of:
dispersing a sweetener and a dairy protein in a fat to form a raw confection having a fat continuous phase;
heating the raw confection within a temperature range and for a time sufficient to thermally generate a dulce de leche flavor, thereby forming the dulce de leche-flavored fat-based confection; and
cooling the dulce de leche-flavored fat-based confection to a temperature sufficient to halt the thermal generation of dulce de leche flavor.
2. The method according to claim 1 further comprising the step of reducing an average particle size of the raw confection.
3. The method according to claim 2, wherein the average particle size is reduced to 1 to 100 microns.
4. The method according to claim 1 further comprising the step of reducing an average particle size of the dulce de leche-flavored fat-based confection.
5. The method according to claim 4, wherein the average particle size is reduced to 1 to 100 microns.
6. The method according to claim 1, wherein the raw confection is heated within the temperature range between 70°C and 180°C.
7. The method according to claim 1, wherein the time sufficient to develop a dulce de leche flavor is between 1 minute and 1440 minutes.

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8. The method according to claim 1, wherein the temperature sufficient to halt the development of dulce de leche flavor is below 70°C.

9. A dulce de leche-flavored fat-based confection comprising a sweetener, a dairy protein; and a fat continuous phase, made according to a process comprising the steps of:

dispersing the sweetener and the dairy protein in a fat to form a raw confection having the fat continuous phase;

heating the raw confection within a temperature range and for a time sufficient to thermally generate dulce de leche flavor, thereby forming the dulce de leche-flavored fat-based confection; and

cooling the dulce de leche-flavored fat-based confection to a temperature sufficient to halt the thermal generation of dulce de leche flavor.

10. A dulce de leche-flavored fat-based confection.

11. The dulce de leche-flavored fat-based confection according to claim 10, wherein the dulce de leche-flavored fat-based confection has a water activity ranging from 0.09 to 0.38.

12. The dulce de leche-flavored fat-based confection according to claim 10, wherein moisture is present in an amount ranging from 0.10% to 5.0% by weight of the dulce de leche-flavored fat-based confection.

13. The dulce de leche-flavored fat-based confection according to claim 10, wherein the dulce de leche-flavored fat-based confection comprises a fat in an amount ranging from 10.0% to 98.0% by weight of the dulce de leche-flavored fat-based confection.

14. The dulce de leche-flavored fat-based confection according to claim 10, wherein the dulce de leche-flavored fat-based confection comprises a

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sweetener in an amount ranging from 1.0% to 80.0% by weight of the dulce de leche-flavored fat-based confection.

15. The dulce de leche-flavored fat-based confection according to claim 10, wherein the dulce de leche-flavored fat-based confection comprises a dairy protein in an amount ranging from 0.5% to 40.0% by weight of the dulce de leche-flavored fat-based confection.

16. A dulce de leche-flavored fat-based confection comprising:
a sweetener;
a dairy protein; and
a fat continuous phase.

17. The dulce de leche-flavored fat-based confection according to claim 16, wherein the sweetener is a material selected from the group consisting of fructose, sucrose, lactose, dextrose, polyols, other natural and artificial sweeteners and combinations thereof.

18. The dulce de leche-flavored fat-based confection according to claim 16, wherein the sweetener is present in an amount ranging from 1.0% to 80.0% by weight of the dulce de leche-flavored fat-based confection.

19. The dulce de leche-flavored fat-based confection according to claim 16, wherein the dairy protein is selected from the group consisting of non-fat dry milk, demineralized whey powder, whole milk powder and combinations thereof.

20. The dulce de leche-flavored fat-based confection according to claim 16, wherein the dairy protein is present in an amount ranging from 0.5% to 40.0% by weight of the dulce de leche-flavored fat-based confection.

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21. The dulce de leche-flavored fat-based confection according to claim 16, wherein the fat continuous phase is a material selected from the group consisting of fractionated palm kernel oil, cocoa butter, anhydrous milk fat, hydrogenated vegetable oil, and combinations thereof.

22. The dulce de leche-flavored fat-based confection according to claim 16, wherein the fat continuous phase is present in an amount ranging from 10.0% to 98.0% by weight of the dulce de leche-flavored fat-based confection.

23. The dulce de leche-flavored fat-based confection according to claim 16, wherein moisture is present in an amount ranging from 0.10% to 5.0%.

24. The dulce de leche-flavored fat-based confection according to claim 16, wherein the dulce de leche-flavored fat-based confection has a water activity ranging from 0.09 to 0.38.

25. A confection comprising a dulce de leche-flavored fat-based confection.

26. The confection according to claim 25, wherein the confection is a candy-shelled confection.

27. A chocolate composition comprising a dulce de leche-flavored fat-based confection.

28. A fat-based confection comprising 2-hydroxy-3-methyl-2-cyclopenten-1-one as a flavor component.

29. The fat-based confection according to claim 28 further comprising 2-acetyl furan as a flavor component.

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30. The fat-based confection according to claim 29 further comprising 2-acetyl-3-hydroxyfuran as a flavor component.

31. The fat-based confection according to claim 30 further comprising methyl furanoate as a flavor component.

32. The fat-based confection according to claim 31 further comprising 2,5-dimethyl-4-hydroxy-3-(2H) furanone as a flavor component.

33. The fat-based confection according to claim 32 further comprising 3-hydroxy-2-methyl-pyran-4-one as a flavor component.

34. The fat-based confection according to claim 33 further comprising 2-furfural as a flavor component.

35. The fat-based confection according to claim 34 further comprising 2-(5H)furanone as a flavor component.

36. The fat-based confection according to claim 35 further comprising 2-furfuryl alcohol as a flavor component.

37. The fat-based confection according to claim 36 further comprising dihydro hydroxy maltol as a flavor component.

38. The fat-based confection according to claim 37 further comprising 5-hydroxymethyl furfural as a flavor component.

39. The fat-based confection according to claim 28, wherein the 2-hydroxy-3-methyl-2-cyclopenten-1-one is present in an amount greater than 0.001 ppm.

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40. The fat-based confection according to claim 29, wherein the 2-acetyl furan is present in an amount greater than 0.001 ppm.

41. The fat-based confection according to claim 30, wherein the 2-acetyl-3-hydroxyfuran is present in an amount greater than 0.001 ppm.

42. The fat-based confection according to claim 31, wherein the methyl furanoate is present in an amount greater than 0.001 ppm.

43. The fat-based confection according to claim 32, wherein the 2,5-dimethyl-4-hydroxy-3-(2H) furanone is present in an amount greater than 0.15 ppm.

44. The fat-based confection according to claim 33, wherein the 3-hydroxy-2-methyl-pyran-4-one is present in an amount greater than 5.0 ppm.

45. The fat-based confection according to claim 34, wherein the 2-furfural is present in an amount greater than 0.10 ppm.

46. The fat-based confection according to claim 35, wherein the 2-(5H)furanone is present in an amount greater than 0.05 ppm.

47. The fat-based confection according to claim 36, wherein the 2-furfuryl alcohol is present in an amount greater than 2.5 ppm.

48. The fat-based confection according to claim 37, wherein the dihydro hydroxy maltol is present in an amount greater than 0.50 ppm.

49. The fat-based confection according to claim 38, wherein the 5-hydroxymethyl furfural is present in an amount greater than 0.05 ppm.

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50. The fat-based confection according to claim 28, wherein the fat-based confection has a water activity ranging from 0.09 to 0.38.

51. The fat-based confection according to claim 28, wherein moisture is present in an amount ranging from 0.10% to 5.0% by weight of the fat-based confection.

52. The fat-based confection according to claim 28, wherein the fat-based confection comprises a fat in an amount ranging from 10.0% to 98.0% by weight of the fat-based confection.

53. The fat-based confection according to claim 28, wherein the fat-based confection comprises a sweetener in an amount ranging from 1.0% to 80.0% by weight of the fat-based confection.

54. The fat-based confection according to claim 28, wherein the fat-based confection comprises a dairy protein in an amount ranging from 0.5% to 40.0% by weight of the fat-based confection.

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ABSTRACT

A dulce-flavored fat-based confection possessing a smooth and creamy mouthfeel and a thermally generated flavor and suitable for use in candy-shelling is provided. A method of making such a dulce-flavored fat-based confection is also disclosed.

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INTERNATIONAL PATENT COOPERATION TREATY

From the
INTERNATIONAL PRELIMINARY EXAMINING AUTHORITY

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To: Holowacz, Elizabeth F. FITZPATRICK CELLA HARPER & SCINTO 2003 MAY 16 A 10:00 30 Rockefeller Plaza NEW YORK, N.Y. 10112-3801 ETATS-UNIS D'AMERIQUE		RECEIVED MAY 16 A 10:00 FITZPATRICK, CELLA HARPER & SCINTO (PCT Rule 66)
Date of mailing (day/month/year)		/2/05/2003
Applicant's or agent's file reference 02280.002820.PC		REPLY DUE within 1 / 00 months/days from the above date of mailing
International application No. PCT/US 02/ 22944	International filing date (day/month/year) 19/07/2002	Priority date (day/month/year) 20/07/2001
International Patent Classification (IPC) or both national classification and IPC A23C9/154		
Applicant MARS INCORPORATED		

1. This written opinion is the first drawn up by this International Preliminary Examining Authority.

2. This opinion contains indications relating to the following items:

- I ☒ Basis of the opinion
- II ☐ Priority
- III ☒ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV ☒ Lack of unity of invention
- V ☒ Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability, citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☐ Certain defects in the international application
- VIII ☐ Certain observations on the international application

FILE NO. 2280.2800 PCT
 ATTORNEY BFH
 DUE DATE 6/10/03
 DOCKETED VMG 5/16/03

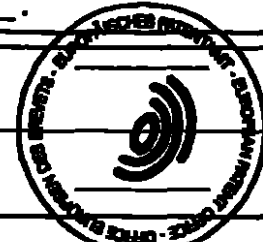
3. The applicant is hereby invited to reply to this opinion.

- When?** See the time limit indicated above. The applicant may, before the expiration of that time limit, request this Authority to grant an extension, see Rule 66.2(d).
- How?** By submitting a written reply, accompanied, where appropriate, by amendments, according to Rule 66.3. For the form and the language of the amendments, see Rules 66.8 and 66.9.
- Also** For an additional opportunity to submit amendments, see Rule 66.4.
 For the examiner's obligation to consider amendments and/or arguments, see Rule 66.4bis.
 For an informal communication with the examiner, see Rule 66.6.

If no reply is filed, the international preliminary examination report will be established on the basis of this opinion.

4. The final date by which the international preliminary examination report must be established according to Rule 69.2 is: 20/11/2003

Name and mailing address of the IPEA/  European Patent Office D-80298 Munich Tel. (+49-89) 2399-0, Tx: 523656 opau d Fax: (+49-89) 2399-4465	Authorized officer Examiner Formalities officer (incl. extension of time limits) Tel. (+49-89) 2399 2828
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I. Basis of the opinion

The basis of this written opinion is the application as originally filed.

III. Non-establishment of opinion with regard to novelty, inventive step and industrial applicability

If all the additional search fees, which the applicant has been invited to pay, have not been paid, then all the inventions or groups of inventions corresponding to the unpaid fees will not have been searched. This means that the question of whether the claimed invention appears to be novel, to involve an inventive step, or to be industrially applicable has not been and will not be the subject of the International preliminary examination in respect of the claims corresponding to these inventions or groups of inventions (Article 17(3)(a) and Rule 66.1(e) PCT; see also international search report).

IV. Lack of unity of invention

The objection as to lack of unity raised in the international search report is maintained. The reasons for the objection are the same as those indicated in the international search report.

V. Reasoned statement under Rule 66.2(a)(II) with regard to novelty, inventive step or industrial applicability

1. To the extent that the international preliminary examination has been carried out (see item III above), the following is pointed out:
2. In light of the documents cited in the international search report, it is considered that the invention as defined in at least some of the claims, which have been the subject of an international search report, does not appear to meet the criteria mentioned in Article 33(1) PCT, i.e. does not appear to be novel and/or to involve an inventive step (see international search report, in particular the documents cited X and/or Y and corresponding claim references).
3. If amendments are filed, the applicant should comply with the requirements of Rule 66.8 PCT and indicate the basis of the amendments in the documents of the application as originally filed (Article 34 (2) (b) PCT) otherwise these amendments may not be taken into consideration for the establishment of the international preliminary examination report. The attention of the applicant is drawn to the fact that if the application contains an unnecessary plurality of independent claims, no examination of any of the claims will be carried out.

NB: Should the applicant decide to request detailed substantive examination, then an international preliminary examination report will normally be established directly. Exceptionally the examiner may draw up a second written opinion, should this be explicitly requested.

PATENT COOPERATION TREATY

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INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

(Rationalized Report according to the Notice of the President of the EPO published in the OJ11/2001)

Applicant's or agent's file reference 02280.002820.PC	FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. PCT/US 02/ 22944	International filing date (day/month/year) 19/07/2002	Priority date (day/month/year) 20/07/2001
International Patent Classification (IPC) or national classification and IPC A23C9/154		
Applicant MARS INCORPORATED		

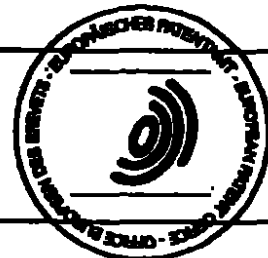
1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.
2. This REPORT consists of a total of 2 sheets, including this cover sheet.
- ☐ This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consists of a total of _____ sheets.

3. This report contains indications relating to the following items:

- I ☒ Basis of the report
- II ☐ Priority
- III ☒ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV ☒ Lack of unity of invention
- V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☐ Certain defects in the international application
- VIII ☐ Certain observations on the international application

Date of submission of the demand 10/02/2003	Date of completion of this report 09/07/2003
Name and mailing address of the IPEA/  European Patent Office D-80298 Munich Tel. (+49-89) 2399-0, Tx: 523656 sprnu d Fax: (+49-89) 2399-4465	Authorized officer KASPERS H M C Tel. (+49-89) 2399 2828



**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT**

International application No. PCT/US 02/ 22944

I. Basis of the report

The basis of this international preliminary examination is the application as originally filed.

III. Non-establishment of opinion with regard to novelty, inventive step and industrial applicability

If all the additional search fees, which the applicant has been invited to pay, have not been paid, then all the inventions or groups of inventions corresponding to the unpaid fees will not have been searched. This means that the question of whether the claimed invention appears to be novel, to involve an inventive step, or to be industrially applicable has not been the subject of the international preliminary examination in respect of the claims corresponding to these inventions or groups of inventions (Article 17(3)(a) and Rule 66.1(e) PCT; see also international search report).

IV. Lack of unity of invention

The objection as to lack of unity raised in the international search report is maintained. The reasons for the objection are the same as those indicated in the international search report.

V. Reasoned statement under Rule 66.2(a)(II) with regard to novelty, inventive step or industrial applicability

To the extent that the international preliminary examination has been carried out (see item III above), the following is pointed out:

In light of the documents cited in the international search report, it is considered that the invention as defined in at least some of the claims, which have been the subject of an international search report, does not appear to meet the criteria mentioned in Article 33(1) PCT, i.e. does not appear to be novel and/or to involve an inventive step (see international search report, in particular the documents cited X and/or Y and corresponding claim references).

PCT

REQUEST

The undersigned requests that the present international application be processed according to the Patent Cooperation Treaty.

International Application No.

International Filing Date

Name of receiving Office and "PCT International Application"

Applicant's or agent's file reference
(if desired) (12 characters maximum)

02280.002820.PC

Box No. I TITLE OF INVENTION

DULCE DE LECHE-FLAVORED FAT-BASED CONFECTION, METHOD FOR MAKING THE SAME AND CONFECTIONERY CANDIES MAKING USE OF THE SAME

Box No. II APPLICANT

☐ This person is also inventor.

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)

MARS INCORPORATED
6885 Elm Street
McLean, Virginia 22101-3883
US

Telephone No. (703) 760-1486

Facsimile No. (703) 448-9678

Teleprinter No.

Applicant's registration No. with the Office

State (that is, country) of nationality: US

State (that is, country) of residence: US

This person is applicant
for the purposes of:all designated
Statesall designated States except
the United States of Americathe United States
of America onlythe States indicated in
the Supplemental Box

Box No. III FURTHER APPLICANT(S) AND/OR (FURTHER) INVENTOR(S)

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)

WOELFEL, Keith A.
46 Center Grove Road
Randolph, New Jersey 07869
US

This person is:



applicant only



applicant and inventor

inventor only (if this check-box is marked,
do not fill in below.)

Applicant's registration No. with the Office

State (that is, country) of nationality:

State (that is, country) of residence:

This person is applicant
for the purposes of:all designated
Statesall designated States except
the United States of Americathe United States
of America onlythe States indicated in
the Supplemental Box☒ Further applicants and/or (further) inventors are indicated on a continuation sheet.

Box No. IV AGENT OR COMMON REPRESENTATIVE; OR ADDRESS FOR CORRESPONDENCE

The person identified below is hereby/has been appointed to act on behalf of applicant(s) before the competent International Authorities as:



agent



common representative

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)

HOLOWACZ, Elizabeth F.
FITZPATRICK, CELLA, HARPER & SCINTO
30 Rockefeller Plaza
New York, NY 10112-3801
US
(continued on page 4)

Telephone No. 212-218-2100

Facsimile No. 212-218-2200

Teleprinter No.

Agent's registration No. with the Office
42,667

☐ Address for correspondence: Mark this check-box where no agent or common representative is/has been appointed and the space above is used instead to indicate a special address to which correspondence should be sent.

Continuation of Box No. III FURTHER APPLICANTS AND/OR (FURTHER) INVENTORS

If none of the following sub-boxes is used, this sheet is not to be included in the request.

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence (if no State of residence is indicated below.)

CHANEY, Caroline E.
4225 Bedford Drive
Bethlehem, Pennsylvania 18020
US

This person is:

- ☐ applicant only
☐ applicant and inventor
☒ inventor only (If this check-box is marked, do not fill in below.)

Applicant's registration No. with the Office

State (that is, country) of nationality:

State (that is, country) of residence:

This person is applicant for the purposes of:

☐ all designated States☐ all designated States except the United States of America☐ the United States of America only☐ the States indicated in the Supplemental Box

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence (if no State of residence is indicated below.)

DOMBROSKI, Amy M.
3 Valley Road
Stanhope, New Jersey 07874
US

This person is:

- ☐ applicant only
☐ applicant and inventor
☒ inventor only (If this check-box is marked, do not fill in below.)

Applicant's registration No. with the Office

State (that is, country) of nationality:

State (that is, country) of residence:

This person is applicant for the purposes of:

☐ all designated States☐ all designated States except the United States of America☐ the United States of America only☐ the States indicated in the Supplemental Box

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence (if no State of residence is indicated below.)

BELLODY, Bill J.
411 Cornell Court
Hackettstown, New Jersey 07840
US

This person is:

- ☐ applicant only
☐ applicant and inventor
☒ inventor only (If this check-box is marked, do not fill in below.)

Applicant's registration No. with the Office

State (that is, country) of nationality:

State (that is, country) of residence:

This person is applicant for the purposes of:

☐ all designated States☐ all designated States except the United States of America☐ the United States of America only☐ the States indicated in the Supplemental Box

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence (if no State of residence is indicated below.)

DIEKBALIS, John
19 Elm Street
Cranford, New Jersey 07016
US

This person is:

- ☐ applicant only
☐ applicant and inventor
☒ inventor only (If this check-box is marked, do not fill in below.)

Applicant's registration No. with the Office

State (that is, country) of nationality:

State (that is, country) of residence:

This person is applicant for the purposes of:

☐ all designated States☐ all designated States except the United States of America☐ the United States of America only☐ the States indicated in the Supplemental Box☐ Further applicants and/or (further) inventors are indicated on another continuation sheet.

The following designations are hereby made under Rule 4.9(a):

Regional Patent

- ☒ AP ARIPO Patent: GH Ghana, GM Gambia, KE Kenya, LS Lesotho, MW Malawi, MZ Mozambique, SD Sudan, SL Sierra Leone, SZ Swaziland, TZ United Republic of Tanzania, UG Uganda, ZW Zimbabwe, and any other State which is a Contracting State of the Harare Protocol and of the PCT
- ☒ EA Eurasian Patent: AM Armenia, AZ Azerbaijan, BY Belarus, KG Kyrgyzstan, KZ Kazakhstan, MD Republic of Moldova, RU Russian Federation, TJ Tajikistan, TM Turkmenistan, and any other State which is a Contracting State of the Eurasian Patent Convention and of the PCT
- ☒ EP European Patent: AT Austria, BE Belgium, CH & LI Switzerland and Liechtenstein, CY Cyprus, DE Germany, DK Denmark, ES Spain, FI Finland, FR France, GB United Kingdom, GR Greece, IE Ireland, IT Italy, LU Luxembourg, MC Monaco, NL Netherlands, PT Portugal, SE Sweden, TR Turkey, and any other State which is a Contracting State of the European Patent Convention and of the PCT
- ☒ OA OAPI Patent: BF Burkina Faso, BJ Benin, CF Central African Republic, CG Congo, CI Côte d'Ivoire, CM Cameroon, GA Gabon, GN Guinea, GQ Equatorial Guinea, GW Guinea-Bissau, ML Mali, MR Mauritania, NE Niger, SN Senegal, TD Chad, TG Togo, and any other State which is a member State of OAPI and a Contracting State of the PCT (if other kind of protection or treatment desired, specify on the dotted line)

National Patent (if other kind of protection or treatment desired, specify on dotted line):

- | | | |
|---|--|--|
| ☒ AE United Arab Emirates | ☒ GH Ghana | ☒ MZ Mozambique |
| ☒ AG Antigua and Barbuda | ☒ GM Gambia | ☒ NO Norway |
| ☒ AL Albania | ☒ HR Croatia | ☒ NZ New Zealand |
| ☒ AM Armenia | ☒ HU Hungary | ☒ OM Oman |
| ☒ AT Austria | ☒ ID Indonesia | ☒ PH Philippines |
| ☒ AU Australia | ☒ IL Israel | ☒ PL Poland |
| ☒ AZ Azerbaijan | ☒ IN India | ☒ PT Portugal |
| ☒ BA Bosnia and Herzegovina | ☒ IS Iceland | ☒ RO Romania |
| ☒ BB Barbados | ☒ JP Japan | ☒ RU Russian Federation |
| ☒ BG Bulgaria | ☒ KE Kenya | ☒ SD Sudan |
| ☒ BR Brazil | ☒ KG Kyrgyzstan | ☒ SE Sweden |
| ☒ BY Belarus | ☒ KP Democratic People's Republic of Korea | ☒ SG Singapore |
| ☒ BZ Belize | ☒ KR Republic of Korea | ☒ SI Slovenia |
| ☒ CA Canada | ☒ KZ Kazakhstan | ☒ SK Slovakia |
| ☒ CH & LI Switzerland and Liechtenstein | ☒ LC Saint Lucia | ☒ SL Sierra Leone |
| ☒ CN China | ☒ LK Sri Lanka | ☒ TJ Tajikistan |
| ☒ CO Colombia | ☒ LR Liberia | ☒ TM Turkmenistan |
| ☒ CR Costa Rica | ☒ LS Lesotho | ☒ TN Tunisia |
| ☒ CU Cuba | ☒ LT Lithuania | ☒ TR Turkey |
| ☒ CZ Czech Republic | ☒ LU Luxembourg | ☒ TT Trinidad and Tobago |
| ☒ DE Germany | ☒ LV Latvia | ☒ TZ United Republic of Tanzania |
| ☒ DK Denmark | ☒ MA Morocco | ☒ UA Ukraine |
| ☒ DM Dominica | ☒ MD Republic of Moldova | ☒ UG Uganda |
| ☒ DZ Algeria | ☒ MG Madagascar | ☐ US United States of America |
| ☒ EC Ecuador | ☒ MK The Former Yugoslav Republic of Macedonia | ☒ UZ Uzbekistan |
| ☒ EE Estonia | ☒ MN Mongolia | ☒ VN Viet Nam |
| ☒ ES Spain | ☒ MW Malawi | ☒ YU Yugoslavia |
| ☒ FI Finland | ☒ MX Mexico | ☒ ZA South Africa |
| ☒ GB United Kingdom | | ☒ ZM Zambia |
| ☒ GD Grenada | | ☒ ZW Zimbabwe |
| ☒ GE Georgia | | |

Check-boxes reserved for designating States which have become party to the PCT after issuance of this sheet:

☐	☐	☐
☐	☐	☐

Precautionary Designation Statement: In addition to the designations made above, the applicant also makes under Rule 4.9(b) all other designations which would be permitted under the PCT except any designation(s) indicated in the Supplemental Box as being excluded from the scope of this statement. The applicant declares that those additional designations are subject to confirmation and that any designation which is not confirmed before the expiration of 15 months from the priority date is to be regarded as withdrawn by the applicant at the expiration of that time limit. (Confirmation (including fees) must reach the receiving Office within the 15-month time limit.)

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1. If, in any of the Boxes, except Boxes Nos. VIII(i) to (v) for which a special continuation box is provided the space is insufficient to furnish all the information: in such case, write "Continuation of Box No. ..." [indicate the number of the Box] and furnish the information in the same manner as required according to the captions of the Box in which the space was insufficient, in particular:
- (i) If more than two persons are involved as applicants and/or inventors and no "continuation sheet" is available: in such case, write "Continuation of Box No. III" and indicate for each additional person the same type of information as required in Box No. III. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below;
- (ii) If, in Box No. II or in any of the sub-boxes of Box No. III, the indication "the States indicated in the Supplemental Box" is checked: in such case, write "Continuation of Box No. II" or "Continuation of Box No. III" or "Continuation of Boxes No. II and No. III" (as the case may be), indicate the name of the applicant(s) involved and, next to (each) such name, the State(s) (and/or, where applicable, ARIPO, European or OAPI patent) for the purposes of which the named person is applicant;
- (iii) If, in Box No. II or in any of the sub-boxes of Box No. III, the inventor or the inventor/applicant is not inventor for the purposes of all designated States or for the purposes of the United States of America: in such case, write "Continuation of Box No. II" or "Continuation of Box No. III" or "Continuation of Boxes No. II and No. III" (as the case may be), indicate the name of the inventor(s) and, next to (each) such name, the State(s) (and/or, where applicable, ARIPO, European or OAPI patent) for the purposes of which the named person is inventor;
- (iv) If, in addition to the agent(s) indicated in Box No. IV, there are further agents: in such case, write "Continuation of Box No. IV" and indicate for each further agent the same type of information as required in Box No. IV;
- (v) If, in Box No. V, the name of any State (or OAPI) is accompanied by the indication "patent of addition," or "certificate of addition," or if, in Box No. V, the name of the United States of America is accompanied by an indication "continuation" or "continuation-in-part": in such case, write "Continuation of Box No. V" and the name of each State involved (or OAPI), and after the name of each such State (or OAPI), the number of the parent title or parent application and the date of grant of the parent title or filing of the parent application;
- (vi) If, in Box No. VI, there are more than five earlier applications whose priority is claimed: in such case, write "Continuation of Box No. VI" and indicate for each additional earlier application the same type of information as required in Box No. VI.
2. If, with regard to the precautionary designation statement contained in Box No. V, the applicant wishes to exclude any State(s) from the scope of that statement: in such case, write "Designation(s) excluded from precautionary designation statement" and indicate the name or two-letter code of each State so excluded.

FITZPATRICK, Joseph M. (Registration No. 17,398), SCINTO, Lawrence F. (Registration No. 18,973), BELUNST, William J. (Registration No. 20,452), BABCHTOLD, Robert L. (Registration No. 20,860), O'BRIEN, John A. (Registration No. 24,367), KRUMHOLTZ, John A. (Registration No. 24,613), RENK, Henry J. (Registration No. 25,499), SACKIN, Peter (Registration No. 24,947), ZUPCIC, Anthony M. (Registration No. 27,376), BAKER, Charles F. (Registration No. 24,702), BOSSER, Steven J. (Registration No. 22,391), VASSALLO, Edward E. (Registration No. 28,117), CLAYTON, Ronald A. (Registration No. 26,718), STAHL, Lawrence A. (Registration No. 30,110), BAUER, Lena A. (Registration No. 29,767), DIANA, Leonard P. (Registration No. 29,296), KALLAS, Nicholas N. (Registration No. 31,530), WANNISKY, William M. (Registration No. 28,373), PERRY, Lawrence S. (Registration No. 31,863), FISCHER, Robert H. (Registration No. 30,051), WHEAT, Christopher Philip (Registration No. 32,078), JACOBS, Gary M. (Registration No. 28,861), O'NEILL, Michael K. (Registration No. 32,622), HAAE, Bruce C. (Registration No. 32,734), REED, Scott E. (Registration No. 32,433), MALPEDE, Scott D. (Registration No. 32,535), ZULLOW, Fredrick M. (Registration No. 32,452), OLSEN, Wazzen E. (Registration No. 27,280), WARNER, Steven E. (Registration No. 31,326), O'CONNELL, Thomas J. (Registration No. 32,202), CUBERT, Jack S. (Registration No. 34,245), WILLIAMSON, Mark A. (Registration No. 33,828), DUDEK, Jon K. (Registration No. 30,938), MANDRA, Raymond R. (Registration No. 34,312), CONDE, Donald A. (Registration No. 31,836), RAZZANO, Pasquale A. (Reg. No. 25,512), BEHRINGER, John W. (Registration No. 21,086), KLINE, Robert C. (Registration No. 17,739), SANDONATO, Michael P. (Registration No. 35,345), CARLIN, John D. (Registration No. 37,292), GLUECK, Daniel S. (Registration No. 37,838), RAQUA, Joseph W. (Registration No. 38,586), KLOCK, Brian L. (Registration No. 34,578), MAHER, Anne M. (Registration No. 31,231), WEXLER, Bruce M. (Registration No. 35,409), TAYLOR, Errol B. (Registration No. 39,833), SHARROTT, Douglas (Registration No. 39,832), SMITH, Leim M. (Registration No. 39,378), HOLOWACZ, Elizabeth F. (Registration No. 42,667), DELUCIA, Frank A., Jr. (Registration No. 42,476), DALKER, David P. (Registration No. 40,980), QUINN, Carole A. (Registration No. 39,000), HAUGHEY III, Edmund J. (Registration No. 44,749), OLIVER, Judith J. (Registration No. 44,986), YU-JAHNEE, Lock See (Registration No. 38,667), PENSABENE, Miro J. (Registration No. 37,416), DUCHENE, Dennis A. (Registration No. 40,595), KMETT, Edward A. (Registration No. 42,746), MEE, Brandon (Registration No. 41,391), HADLEY, Joann (Registration No. 46,009), RATLIFF II, Preston (Registration No. 41,034), WECHHUSEN, Carl B. (Registration No. 43,275), HELELE, Stephen E. (Registration No. 44,546), BERSCHADEKY, Jonathan (Registration No. 44,551), THURLOW, Peter (Registration No. 47,130), ROBERTS, Simon (Registration No. 47,342), FRASER, Sherris W. (Registration No. 45,886), DERZKO, Natalie M. (Registration No. 48,102), KHOO, Carol K. (Registration No. 46,270), FINEKY, Douglas W. (Registration No. 46,994), THU, Victor (Registration No. 46,185), SHATZ, Howard D. (Registration No. 47,936), DIPERNA, Raymond (Registration No. 44,067), BARON, Jacob K. (Registration No. 48,961), CALLAGHAN, Edward I. (Registration No. 46,594), KONDOUDI, Michael E. (Registration No. 42,738), LOH, Christopher B. (Registration No. 46,000), and OKLIN, Jason M. (Registration No. 48,512), TAPPY, Joseph (Registration No. 50,973), KLANTSCHIL, Fritz (Registration No. 50,333), ALY, Ann O. (Registration No. 50,525) and MICKELSEN, Andrew D. (Registration No. 50,957) all at:

FITZPATRICK, CELLA, HARPER & SCINTO
39 Rockefeller Plaza
New York, New York 10112-3801
United States of America

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This international application contains: (a) the following number of sheets in paper form: request (including declaration sheets) : 6 description (excluding sequence listing part) : 25 claims : 7 abstracts : 1 drawings : _____ Sub-total number of sheets : 39 sequence listing part of description (actual number of sheets if filed in paper form, whether or not also filed in computer readable form; see (b) below) : _____ Total number of sheets : 39 (b) sequence listing part of description filed in computer readable form (i) ☐ only (under Section 801(a)(i)) (ii) ☐ in addition to being filed in paper form (under Section 801(a)(ii)) Type and number of carriers (diskette, CD-ROM, CD-R or other) on which the sequence listing part is contained (additional copies to be indicated under item 9(ii), in right column): 	This international application is accompanied by the following item(s) (mark the applicable check-boxes below and indicate in right column the number of each item(s)): 1. ☒ fee calculation sheet : 2. ☐ original separate power of attorney : 3. ☐ original general power of attorney : 4. ☐ copy of general power of attorney, reference number, if any: : 5. ☐ statement explaining lack of signature : 6. ☐ priority document(s) identified in Box No. VI as item(s) : 7. ☐ translation of international application into language) : 8. ☐ separate indications concerning deposited microorganism or other biological material : 9. ☐ sequence listing in computer readable form (Indicate also type and number of carriers (diskette, CD-ROM, CD-R or other)) (i) ☐ copy submitted for the purposes of international search under Rule 13ter only (and not as part of the international application) : (ii) ☐ (only where check-box (b)(i) or (b)(ii) is marked in left column) additional copies including, where applicable, the copy for the purposes of international search under Rule 13ter : (iii) ☐ together with relevant statement as to the identity of the copy or copies with the sequence listing part mentioned in left column : 10. ☐ other (specify) :	Number of items 115
Figure of the drawings which should accompany the abstract:	Language of filing of the international application: English	

Box No. X SIGNATURE OF APPLICANT, AGENT OR COMMON REPRESENTATIVE

Next to each signature, indicate the name of the person signing and the capacity in which the person signs (if such capacity is not obvious from reading the request).


Elizabeth F. HOLOWACZ - Agent

For receiving Office use only	
1. Date of actual receipt of the purported international application:	2. Drawings: ☐ received: ☐ not received:
3. Corrected date of actual receipt due to later but timely received papers or drawings completing the purported international application:	
4. Date of timely receipt of the required corrections under PCT Article 11(2):	
5. International Searching Authority specified by the applicant: ISA/	6. ☐ Transmittal of search copy delayed until search fee is paid
For International Bureau use only	
Date of receipt of the record copy by the International Bureau:	

PATENT COOPERATION TREATY

PCT

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference 02280.002820	FOR FURTHER ACTION see Notification of Transmittal of International Search Report (Form PCT/ISA/220) as well as, where applicable, item 5 below.	
International application No. PCT/US 02/ 22944	International filing date (day/month/year) 19/07/2002	(Earliest) Priority Date (day/month/year) 20/07/2001
Applicant MARS INCORPORATED		

This International Search Report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This International Search Report consists of a total of 8 sheets.

☒ It is also accompanied by a copy of each prior art document cited in this report.

1. Basis of the report

- a. With regard to the language, the international search was carried out on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.

☐ the international search was carried out on the basis of a translation of the international application furnished to this Authority (Rule 28.1(b)).

- b. With regard to any nucleotide and/or amino acid sequence disclosed in the international application, the international search was carried out on the basis of the sequence listing:

☐ contained in the international application in written form.

☐ filed together with the international application in computer readable form.

☐ furnished subsequently to this Authority in written form.

☐ furnished subsequently to this Authority in computer readable form.

☐ the statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.

☐ the statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

2. ☐ Certain claims were found unsearchable (See Box I).

3. ☒ Unity of invention is lacking (see Box II).

4. With regard to the title,

☒ the text is approved as submitted by the applicant.

☐ the text has been established by this Authority to read as follows:

5. With regard to the abstract,

☒ the text is approved as submitted by the applicant.

☐ the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box III. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. The figure of the drawings to be published with the abstract is Figure No.

☐ as suggested by the applicant.

☐ because the applicant failed to suggest a figure.

☐ because this figure better characterizes the invention.

☐ None of the figures.

INTERNATI NAL SEARCH REPORT

International application No.
PCT/US 02/22944

Box I Observations where certain claims were found unsearchable (Continuation of Item 1 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☐ Claims Nos.:
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:
3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box II Observations where unity of invention is lacking (Continuation of Item 2 of first sheet)

This International Searching Authority found multiple inventions in this International application, as follows:

see additional sheet

1. ☒ As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☒ No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/SA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. Claims: 1-27.

Method of making a dulce de leche flavored fat-based confection and product obtained.

2. Claims: 28-54

A fat-based confection comprising 2-hydroxy 3-methyl 2-cyclopenten 1-one as flavor.

INT · NATIONAL SEARCH REPORT

International Application No

PCT/US 02/22944

A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 A23C9/154 A23G9/02 A23G3/00 A23D9/007 A23L1/236

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 7 A23C A23G A23D 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 practical, search terms used)

EPO-Internal, WPI Data, PAJ, FSTA

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2 558 528 A (GOLDEN STATE COMP.) 26 July 1951 (1951-07-26) column 2, line 32 - line 46	1,6-10, 12-23
X	BE 461 621 A (AMIK) 31 January 1946 (1946-01-31)	1,6-24
Y	page 2, line 38 -page 3, line 4; examples page 1, line 29 -page 2, line 5	25,27
Y	FR 782 478 A (L. CAQUIN) 5 June 1935 (1935-06-05) abstract page 1, column 1, line 10 - line 23 page 2, column 1, line 4 - line 17	25,27
	-/-	

☒ Further documents are listed in the continuation of box C.☒ Patent family members are listed in annex.

* Special categories of cited documents:

- *A* document defining the general state of the art which is not considered to be of particular relevance
- *E* earlier document but published on or after the international filing date
- *L* document which may throw doubt on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- *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

- *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
- *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
- *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
- *Z* document member of the same patent family

Date of the actual completion of the international search

10 Apr11 2003

Date of mailing of the international search report

29 04 2003

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
Fax (+31-70) 340-3016

Authorized officer

Guyon, R

INTL IATIONAL SEARCH REPORT

International Application No
PCT/US 02/22944

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	DE 31 22 672 A (FDF) 23 December 1982 (1982-12-23) page 12, paragraphs 1,2; table 3	1,6-10, 12-18, 20-23,25
X	FR 556 927 A (R. HARILAOS) 31 July 1923 (1923-07-31) page 1, column 2, line 29 -page 2, column 1, line 2	1,6-10, 12-15.
X	FR 373 747 A (J.B. ARABEHETY) 25 May 1907 (1907-05-25)	1,6-18, 20-25 2-5
Y	page 1, line 1 - line 63	
Y	EP 0 564 077 A (GEN FOODS INC) 6 October 1993 (1993-10-06) the whole document	2-5
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X	US 5 591 474 A (MILLER VAN) 7 January 1997 (1997-01-07) column 7, line 41 - line 48; claims 1,6,8	1-5,10, 16,25,26
X	US 4 892 966 A (WILD HANS J) 9 January 1990 (1990-01-09)	28,34, 38,50-54 29,30, 40,41
Y	column 8, line 1 - line 52; example 10 column 5, line 20 - line 62	
X	PATENT ABSTRACTS OF JAPAN vol. 008, no. 046 (C-212); 29 February 1984 (1984-02-29) -& JP 58 203951 A (SANYO KASEI KOGYO KK), 28 November 1983 (1983-11-28)	28
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A	column 1, line 9 - line 25; claims 1,8,9	36,47
X	CH 644 837 A (GIVAUDAN & CIE SA) 31 August 1984 (1984-08-31) page 1, column 1, line 27 - line 43	28
	-/-	

INTERNATIONAL SEARCH REPORT

International Application No.

PCT/US 02/22944

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	CH 643 228 A (GIVAUDAN & CIE SA) 30 May 1984 (1984-05-30) page 1, column 1, line 1 -column 2, last line; claim 1	28
X,P	DE 100 05 374 A (FERRERO OHG) 16 August 2001 (2001-08-16) page 3, line 64 - line 66; claims; examples 1,2	1
X	DATABASE FSTA 'Online! INTERNATIONAL FOOD INFORMATION SERVICE (IFIS), FRANKFURT/MAIN, DE; SOUZA & DE ET AL: "Preliminary studies on production of caramelized condensed milk (doce de leite) from a milk/soya mixture." Database accession no. 81-1-01-p0029 XP002217589 abstract & BOLETIN DO INSTITUTO DE TECNOLOGIA DE ALIMENTOS, vol. 16, no. 1, 1979, pages 35-40,	1
A	DATABASE WPI Section Ch, Week 197537 Derwent Publications Ltd., London, GB; Class B05, AN 1975-61531W XP002231959 & JP 50 025018 B (SAN-EI CHEM IND LTD), 20 August 1975 (1975-08-20) abstract	28
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INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No
PCT/US 02/22944

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
US 2558528	A	26-06-1951	NONE	
BE 461621	A		NONE	
FR 782478	A	05-06-1935	NONE	
DE 3122672	A	23-12-1982	DE 3122672 A1	23-12-1982
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INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/US 02/22944

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
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JP 50025018	B 20-08-1975	NONE	
US 2002114869	A1 22-08-2002	BR 0103273 A	10-09-2002

From the INTERNATIONAL BUREAU

To:

RECEIVED

HOLOWACZ, Elizabeth, F. 2001 FEB 20 A 10: 04
Fitzpatrick, Cella, Harper & Scinto
30 Rockefeller Plaza
New York, NY 10112-3801 FITZPATRICK, CELLA, HARPER & SCINTO
ETATS-UNIS D'AMERIQUE

NOTICE INFORMING THE APPLICANT OF THE
COMMUNICATION OF THE INTERNATIONAL
APPLICATION TO THE DESIGNATED OFFICES

(PCT Rule 47.1(c), first sentence)

Date of mailing(day/month/year) 30 January 2003 (30.01.03)		IMPORTANT NOTICE	
Applicant's or agent's file reference 02280.002820			
International application No. PCT/US02/022944	International filing date(day/month/year) 19 July 2002 (19.07.02)	Priority date(day/month/year) 20 July 2001 (20.07.01)	
Applicant MARS INCORPORATED			

1. Notice is hereby given that the International Bureau has communicated, as provided in Article 20, the international application to the following designated Offices on the date indicated above as the date of mailing of this notice:

KP, KR

In accordance with Rule 47.1(c), third sentence, those Offices will accept the present notice as conclusive evidence that the communication of the international application has duly taken place on the date of mailing indicated above and no copy of the international application is required to be furnished by the applicant to the designated Office(s).

2. The following designated Offices have waived the requirement for such a communication at this time:

AE, AG, AL, AM, AP, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EA, EC, EE, EP, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, OA, OM, PH, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, UZ, VN, YU, ZA, ZM, ZW

The communication will be made to those Offices only upon their request. Furthermore, those Offices do not require the applicant to furnish a copy of the international application (Rule 49.1(a-bis)).

3. Enclosed with this notice is a copy of the international application as published by the International Bureau on 30 January 2003 (30.01.03) under No. WO 03/007725.

4. **TIME LIMITS** for filing a demand for international preliminary examination and for entry into the national phase

The applicable time limit for entering the national phase will, subject to what is said in the following paragraph, be 30 MONTHS from the priority date, not only in respect of any elected Office if a demand for international preliminary examination is filed before the expiration of 19 months from the priority date, but also in respect of any designated Office, in the absence of filing of such demand, where Article 22(1) as modified with effect from 1 April 2002 applies in respect of that designated Office. For further details, see *PCT Gazette* No. 44/2001 of 1 November 2001, pages 19926, 19932 and 19934, as well as the *PCT Newsletter*, October and November 2001 and February 2002 issues.

In practice, time limits other than the 30-month time limit will continue to apply, for various periods of time, in respect of certain designated or elected Offices. For regular updates on the applicable time limits (20, 21, 30 or 31 months, or other time limit), Office by Office, refer to the *PCT Gazette*, the *PCT Newsletter* and the *PCT Applicant's Guide*, Volume II, National Chapters, all available from WIPO's Internet site, at <http://www.wipo.int/pct/en/index.html>.

For filing a demand for international preliminary examination, see the *PCT Applicant's Guide*, Volume I/A, Chapter IX. Only an applicant who is a national or resident of a PCT Contracting State which is bound by Chapter II has the right to file a demand for international preliminary examination (at present, all PCT Contracting States are bound by Chapter II).

It is the applicant's sole responsibility to monitor all these time limits.

The International Bureau of WIPO
34, chemin des Colombettes
1211 Geneva 20, Switzerland

Authorized officer

Judith Zahra

Facsimile No.(41-22) 740.14.35

Telephone No.(41-22) 338.91.11

The demand must be filed directly with the competent International Preliminary Examining Authority or, if two or more Authorities are competent, with the one chosen by the applicant. The full name or two-letter code of that Authority may be indicated by the applicant on the line below:

PEA/ EP

PCT
DEMAND

125
CHAPTER II

under Article 31 of the Patent Cooperation Treaty:
The undersigned requests that the international application specified below be the subject of international preliminary examination according to the Patent Cooperation Treaty and hereby elects all eligible States (except where otherwise indicated).

For International Preliminary Examining Authority use only		
Identification of IPEA		Date of receipt of DEMAND
Box No. I IDENTIFICATION OF THE INTERNATIONAL APPLICATION		Applicant's or agent's file reference 02280.002820. PC
International application No. PCT/US02/22944	International filing date (day/month/year) 19 JULY 2002 (19.07.02)	(Earliest) Priority date (day/month/year) 20 JULY 2001 (20.07.01)
Title of invention DULCE DE LECHE-FLAVORED FAT-BASED CONFECTION, METHOD FOR MAKING THE SAME AND CONFECTIONERY CANDIES MAKING USE OF THE SAME		
Box No. II APPLICANT(S)		
Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.) MARS, INCORPORATED 6685 Elm Street McLean, Virginia 22101-3883 US		Telephone No. (703) 760-1486
		Facsimile No. (703) 448-9678
		Teleprinter No.
		Applicant's registration No. with the Office
State (that is, country) of nationality: US		State (that is, country) of residence: US
Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)		
State (that is, country) of nationality:		State (that is, country) of residence:
Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)		
State (that is, country) of nationality:		State (that is, country) of residence:
☐ Further applicants are indicated on a continuation sheet.		

Box No. III AGENT OR COMMON REPRESENTATIVE; OR ADDRESS FOR CORRESPONDENCE

The following person is ☒ agent ☐ common representativeand ☒ has been appointed earlier and represents the applicant(s) also for international preliminary examination.☐ is hereby appointed and any earlier appointment of (an) agent(s)/common representative is hereby revoked.☐ is hereby appointed, specifically for the procedure before the International Preliminary Examining Authority, in addition to the agent(s)/common representative appointed earlier.Name and address: (Specify names followed by given names; for a legal entity, full official designation.
The address must include postal code and name of country.)HOLOWACZ, Elizabeth F.
Fitzpatrick, Cella, Harper & Scinto
30 Rockefeller Plaza
New York, New York 10112-3801
US

Telephone No. (212) 218-2100

Facsimile No. (212) 218-2200

Teleprinter No.

Agent's registration No. with the Office
42,667☐ Address for correspondence: Mark this check-box where no agent or common representative is/has been appointed and the space above is used instead to indicate a special address to which correspondence should be sent.

Box No. IV BASIS FOR INTERNATIONAL PRELIMINARY EXAMINATION

Statement concerning amendments:*

1. The applicant wishes the DETAILED international preliminary examination to start on the basis of:

☒ the international application as originally filed.the description ☐ as originally filed☐ as amended under Article 34the claims ☐ as originally filed☐ as amended under Article 19 (together with any accompanying statement)☐ as amended under Article 34the drawings ☐ as originally filed☐ as amended under Article 342. ☐ The applicant wishes any amendment to the claims under Article 19 to be considered as reversed.3. ☐ The applicant wishes the start of the international preliminary examination to be postponed until the expiration of 20 months from the priority date unless the International Preliminary Examining Authority receives a copy of any amendments made under Article 19 of a notice from the applicant that he does not wish to make such amendments (Rule 69.1(d)). (This check-box may be marked only where the time limit under Article 19 has not yet expired.)

* Where no check-box is marked, international preliminary examination will start on the basis of the international application as originally filed or, where a copy of amendments to the claims under Article 19 and/or amendments of the international application under Article 34 are received by the International Preliminary Examining Authority before it has begun to draw up a written opinion or the international preliminary examination report, as so amended.

Language for the purposes of international preliminary examination: ENGLISH

☒ which is the language in which the international application was filed.☐ which is the language of a translation furnished for the purposes of international search.☐ which is the language of publication of the international application.☐ which is the language of the translation (to be) furnished for the purposes of international preliminary examination.

Box No. V ELECTION OF STATES

Box No. VI CHECK LIST

The demand is accompanied by the following elements, in the language referred to in Box No. IV, for the purposes of international preliminary examination:

- | | | |
|---|---|--------|
| 1. translation of international application | : | sheets |
| 2. amendments under Article 34 | : | sheets |
| 3. copy (or, where required, translation) of amendment under Article 19 | : | sheets |
| 4. copy (or, where required, translation) of statement under Article 19 | : | sheets |
| 5. letter | : | sheets |
| 6. other (specify) | : | sheets |

For International Preliminary
Examining Authority use only

received	not received
☐	☐
☐	☐
☐	☐
☐	☐
☐	☐
☐	☐

The demand is also accompanied by the item(s) marked below:

- | | |
|--|--|
| 1. ☒ fee calculation sheet | 5. ☐ statement explaining lack of signature |
| 2. ☐ original separate power of attorney | 6. ☐ sequence listing in computer readable form |
| 3. ☐ original general power of attorney | 7. ☐ other (specify) |
| 4. ☐ copy of general power of attorney; reference number, if any: | |

Box No. VII SIGNATURE OF APPLICANT, AGENT OR COMMON REPRESENTATIVE

Next to each signature, indicate the name of the person signing and the capacity in which the person signs (if such a capacity is not obvious from reading the demand).


Elizabeth F. Holowacz-Agent

For International Preliminary Examining Authority use only

- | | |
|--|---|
| 1. Date of actual receipt of DEMAND: | |
| 2. Adjusted date of receipt of demand due to CORRECTIONS under Rule 60.1(b): | |
| 3. ☐ The date of receipt of the demand is AFTER the expiration of 19 months from the priority date and item 4 or 5, below, does not apply. | ☐ The applicant has been informed accordingly. |
| 4. ☐ The date of receipt of the demand is WITHIN the period of 19 months from the priority date as extended by virtue of Rule 80.5 | |
| 5. ☐ Although the date of receipt of the demand is after the expiration of 19 months from the priority date, the delay in arrival is EXCUSED pursuant to Rule 82. | |

For International Bureau Use Only

Demand received from IPBA on:



CONSULADO GENERAL DE COLOMBIA

10 EAST 48TH STREET
NUEVA YORK, N.Y. 10017

TEL. 949-3598

EL SUSCRITO CONSUL DE COLOMBIA,

VISTOS LOS DOCUMENTOS PRESENTADOS POR LOS INTERESADOS,

CERTIFICA:

Que ante la Oficina del County Clerk NORMAN GOODMAN
de la Corte Suprema del Estado de NUEVA YORK
se encuentra debidamente registrado el señor MARIE R. PORCELLO
como Notario del Estado de NUEVA YORK y ante quien
se AUTENTICO LA FIRMA DEL SIGNATARIO DEL PRESENTE PODER.
Que la compañía MARS, INC.
es una sociedad constituida de acuerdo con las leyes del Estado de DELAWARE
ESTADOS UNIDOS DE AMERICA y cumple su objetivo conforme a las mismas.
Que el señor GARO A. PARTOYAN
quien en su carácter de SECRETARIO ASISTENTE
de la citada compañía, conlleva EL PODER PRECEDENTE, cuya firma fue autenticada ante
Notario, es su representante legal.

EL CONSUL NO ASUME RESPONSABILIDAD POR EL CONTENIDO DEL DOCUMENTO.

Este Certificado se expide en Nueva York, Estados Unidos de América, a los 23 días
del mes de ABRIL de 1992

JUN. 09 1992

PAGO IMPUESTO DE TIMBRE
VALOR US\$6.00 (SEIS DOLARES)
NUEVA YORK



Gloria Hernández. S.
TRADUCTOR E INTERPRETE OFICIAL
RESOLUCION 1992 - MINJUSTICIA

Liliana Pinzon Urdaneta
Cónsul

BRIGARD & CASTRO

(CON CERTIFICACION CONSULAR)

(CONSULAR CERTIFICATION)

Yo (nosotros), Mars, Inc.,
a corporation of the state
of Delaware, U.S.A.,

domiciliada(s) en 6885 Elm Street,
McLean, Virginia 22101-3883,
United States of America,

Nombres(as) a:

RAMIRO CASTRO DUQUE y/o. BEATRIZ
JARAMILLO DE LLOREDA

de Bogotá, Colombia, apoderados verdaderos
y legales con poder especial, ample y
suficiente, para recibir de las Oficinas y
autoridades colombianas administrativas,
judiciales y de policía, en cualquier
instancia o recurso la obtención de
patentes de privilegio de invención, de
dibujos y modelos industriales, registros
de marcas, depósitos de nombres
comerciales y enseñas, así como sus
traspasos, prórrogas, renovaciones y
cambios de nombres, elaborar, transferir,
otorgar y registrar contratos de licencia
y licencias de cualesquiera clases;
intervenir como demandante o como
demandado en cualquier instancia y recurso
y ante cualquier juez, corporación,
funcionario público o autoridad en
acciones judiciales, administrativas y de
policía, tales como oposición al registro
de marcas; acciones de caducidad y
nulidad; acciones reivindicatorias;
acciones derivadas de la obtención o
explotación de licencias; acciones de
competencia desleal; demandas penales;
acciones de indemnización de perjuicios,
reclamos u observaciones a solicitudes de
patentes, modelos y dibujos industriales,
en el ejercicio de medidas cautelares y en
otras acciones o medidas similares.

A este efecto, los(as) facultados(as) para
elevar solicitudes, formular descrip-
ciones, enmiendas, protestas, declaraciones,
oposiciones, cancelaciones, nulidades,
apelaciones y reclamos; pagar impuestos,
cuotas y gravámenes prescritos por la ley;
renunciar o desistirse a derechos concedidos
o en curso de concesión; recibir toda
clase de documentos y valores; dando el
descargo respectivo, y, en general, para
dar ante dichas autoridades todos los
pasos necesarios al efecto indicado y
tomar todas las medidas que creyeron
conducientes al resguardo de mis(nuestros)
intereses, con todas las demás facultades
legales necesarias, y por el presente
documento desde ahora declaro(amos) válido
y bueno todo cuanto los apoderados
hicieren en mis(nuestro) beneficio.

(We)

domiciled in

Hereby appoint

RAMIRO CASTRO DUQUE and/or

of Bogotá, Colombia, my(our) true and
lawful attorneys with special ample and
sufficient power to obtain from the
Colombian administrative, judicial and
police offices and authorities, in any
instance, privileged patents of invention,
registration of trademarks, industrial
models and designs; registration of
commercial names and signs; and also
assignments, extensions, renewals of
changes of name concerning such actions;
to appear, prosecute, defend and register
licensing of any kind; intervene as
plaintiff or defendant in any instance or
recurso and before any judge,
corporation, public official or authority
in judicial, administrative and police
actions, such as oppositions to the
registration of trademarks; actions of
caducity and nullity; claims actions
derived from the obtaining or exploitation
of licenses; actions of unfair
competition; penal demands; actions of
indemnities for damages; claims or
observations on patent applications,
models and industrial designs; in the
exercise of preventive measures; and in
other actions of similar proceedings.

And to that effect they are hereby
empowered to file applications formulate
descriptions, amendments, protest,
declarations, oppositions, cancellations,
nullities appeals and claims; to pay taxes
quotas and assessments prescribed by law,
renounce or waive the rights granted or in
the process of concession; to receive all
kinds of documents and values, giving the
respective release of receipt, and, in
general, to take before said authorities
and steps necessary to such effect, and
any measures that they may deem pertinent
to the safeguard of my(our) interests;
with all the other necessary legal powers,
and I/we hereby from this moment declare
valid and good all that said attorneys may
do for my(our) benefit.

Este poder comprende la facultad de ratificar o confirmar en mi(nuestro) nombre lo actuado así como la facultad de desistír, transigir, comprometer y la de sustituirlo en todo o en parte y revocar sustituciones. Asimismo nombro(nos) a RAMIRO CASTRO DUQUE y/o

domiciliado(s) en: Carrera 7. No 16-56 piso 9, BOGOTÁ, COLOMBIA, mis(nuestras) representantes, con facultades de recibir notificaciones y para designar apoderados judiciales o extrajudiciales.

Otorgado y firmado en
27 de de 19

DECLARACION CONSULAR
(personas naturales)

A los días del mes de
de 19 comparecieron personalmente
ante mí, Cónsul de Colombia en

a quienes) doy fe de conocer y me consta que es(sen) la(s) persona(s) y firmante(s) del documento que precede, y declaran(n) que otorgan(n) el mismo para los fines y propósitos que en él se expresan.

El Cónsul.

SOCIEDADES

El infrascripto Cónsul de Colombia en

certifica: que la firma que antecede y dice:

es auténtica; que el signatario es de

que tiene facultad para otorgar este poder, y que dicha compañía ejerce los fines sociales, existe y está organizada en

conforme a las leyes de

Todos los hechos anteriores me constan por haber examinado los documentos respectivos que tuve a mi vista y de todo ello soy fe,

Dado y firmado en

El Cónsul.

This power includes the faculty to ratify or confirm, on my(our) behalf, and to substitute it in whole or in part and to revoke substitutions. At the same time I/We hereby appoint RAMIRO CASTRO DUQUE and/or domiciled in Carrera 7 No 16-56, piso 9, my(our) representative(s) in BOGOTÁ, COLOMBIA, with powers to receive notifications and to designate judicial and extrajudicial attorneys.

Granted and signed at New York, New York, USA
this 27th day of 19
by

Title Garo A. Partoyan
Assistant Secretary
CONSUL OF COLOMBIA
(natural persons)

This day of personally appeared before me, Consul of Colombia,

to whom, and known to me, to be the person(s) described in and who executed the foregoing document, and he(they) duly acknowledge to me that he(they) executed same for the uses and purposes therein expressed.

The Consul.

CORPORATIONS

The undersigned Consul of Colombia

certifies: that the proceeding signature reading

is authentic; that the signer is of

that he is empowered to grant this power and that said company follows the social objectives exist and is organized in

in accordance with the laws of

All the foregoing facts are known to me the Consul due to my having examined the respective documents to which I, the Consul attest.

Granted and signed in

The Consul.

NOT BE USED IN COLUMBIA

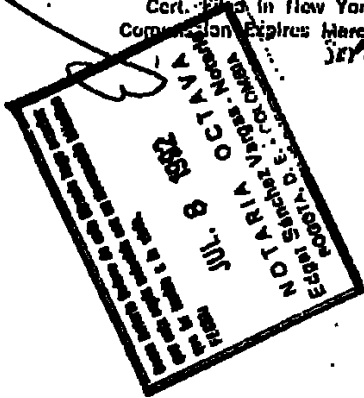
COUNTY
Subscribed and sworn ~~before~~ before me this
18th day of March, 1992.

Michael J. ...
Notary Public, State of New York
No. 603134850

Qualified in Westchester County
Cert. filed in New York County
Commission Expires March 20, 1993

(SEAL)

SEP 18 1992



Clara ... S.
PRODUCER & ... OFFICIAL
RESOLUTION ... MINISTRIA

131



Nº 4520 Form 1

State of New York
County of New York

I, NORMAN GOODMAN, County Clerk and Clerk of the Supreme Court of the State of New York, in and for the County of New York, a Court of Record, having by law a seal, DO HEREBY CERTIFY pursuant to the Executive Law of the State of New York, that

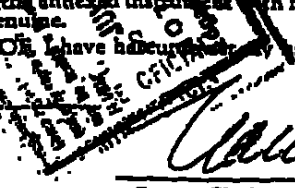
John J. E. ...

whose name is subscribed to the annexed ... certificate of acknowledgment or proof, was at the time of taking the same, NOTARY PUBLIC in and for the State of New York duly commissioned, sworn and qualified to act as such; that pursuant to law a commission or a certificate of his official character, with his autograph signature has been filed in my office; that at the time of taking such proof, acknowledgment or oath, he was duly authorized to take the same; that I am well acquainted with the handwriting of such NOTARY PUBLIC or have compared the signature which annexed ... with his autograph signature deposited in my office, and I believe that such signature is genuine.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed my official seal this

FEE PAID \$1.00
APR 21 1992

Clerk
TRACED
RESOLVED



Norman Goodman
County Clerk and Clerk of the Supreme Court, New York County

251

Estado de New York
Condado de New York,

No. 4520

Yo, NORMAN GOODMAN, Escribano del Condado y Escribano del Tribunal Superior del Estado de New York, en y para el Condado de New York, un Tribunal de Registro, que tiene por ley un sello,

POR MEDIO DEL PRESENTE CERTIFICO de acuerdo con la Ley Ejecutiva del Estado de New York, que **MARY R. PORCELLO** cuyo nombre está suscrito a la declaración escrita anexa, disposición, certificado de reconocimiento o prueba, era en el momento de tomarlo un NOTARIO PUBLICO en y para el Estado de New York debidamente comisionado, juramentado y calificado para actuar como tal; que de acuerdo con la ley, una comisión o un certificado de su carácter oficial, con su firma autógrafa ha sido presentado en mi oficina; que en el momento de tomar tal prueba, reconocimiento o juramento, estaba debidamente habilitado para tomarlo; que estoy familiarizado con la caligrafía de tal NOTARIO PUBLICO o he comparado la firma en el instrumento anexo con su firma autógrafa depositada en mi oficina, y creo que tal firma es genuina.

EN TESTIMONIO DE LO CUAL, he firmado el presente de mi puño y letra y fijado mi sello oficial este día 21 de Julio, de 1992

Firma ilegible (firmado)
Escribano del Condado y Escribano del Tribunal Superior,
Condado de New York.

HONORARIO PAGADO \$3.00
SELLO EN RELIEVE.

64
Gloria Hernández S.
TRADUCTOR E INTERPRETE OFICIAL
RESOLUCION 1462 - MINJUSTICIA

33

TRADUCCION OFICIAL No. 0173/92 de las Legalizaciones que se encuentran a continuación de un Poder otorgado por Mars, Inc., una sociedad del Estado de Delaware, domiciliada en 6885 Elm Street, McLean, Virginia 22101-3883, Estados Unidos de América al doctor RAMIRO CASTRO DUQUE y/o BEATRIZ JAKAMILLO DE LLOREDA, de Santafé de Bogotá, D.C., Colombia, del inglés al español, las cuales para su identificación se sellan con el Sello del Traductor al mismo tiempo que la presente.-

ANEXOS: El Poder arriba mencionado, Certificación Notarial, Certificación de la Firma Notarial, Legalización del Consulado General de Colombia en New York, Estado de New York, Estados Unidos de América, Autenticación por el Ministerio de Relaciones Exteriores de Colombia.-

Suscrito y jurado ante mí este octavo día de Marzo de 1992.

Firma Ilegible (firmado)

Notario Público

HAY UN SELLO QUE DICE:

MARY R. PORCELLO

Notario Público, Estado de New York

No. 60-3134850

Calificado en el Condado de Westchester

Cert. Presentado en el Condado de New

York

Gloria Hernández S.

Gloria Hernández S.

TRADUCTOR E INTERPRETE OFICIAL
RESOLUCION 1462 - MINJUSTICIA

13X

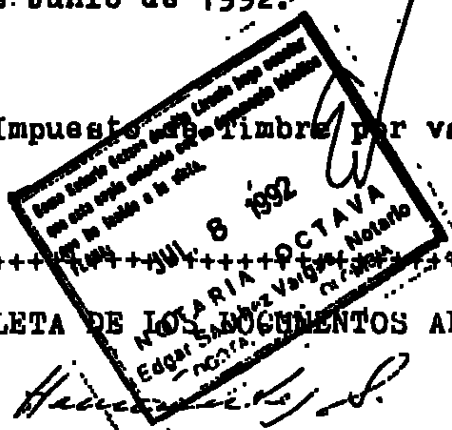
La Comisión Expira el 30 de Septiembre de 1993.

SELLO NOTARIAL EN RELIEVE.

+++++

EN ESPAÑOL: La Legalización del Consulado General de Colombia en New York, Estado de New York, Estados Unidos de América de fecha 23 de Abril de 1992; Autenticación hasta por el Ministerio de Relaciones Exteriores de Colombia bajo el número 146027 de fecha 23 de Junio de 1992.

(Pagado Impuesto de Timbre por valor de \$ 6.00 Dólares).



+++++

ES TRADUCCION FIEL Y COMPLETA DE LOS DOCUMENTOS ADJUNTOS.

Glória Hernández S.

Glória Hernández S.
TRADUCTOR E INTERPRETE OFICIAL
RESOLUCION 1402 - MINJUSTICIA

Resolución número 1402 del Ministerio de Justicia.

Fecha: Junio 24 de 1992.

135

SUPERINDUSTRIA Y COMERCIO
Radicacion : 84818932 00000000
Fecha (RIB): 2004-02-18 17:23:47
Tramite : 011 PCT-PATENT 379 FREE NACI 411 PRESENTAC
Dependencia: 2028 DIVISION DE NUEVAS CREACIONES

Folios: 134

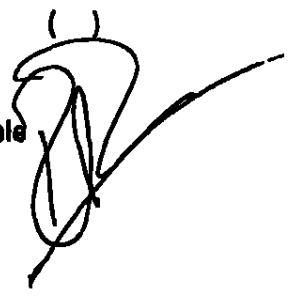
REQUISITOS NECESARIOS PARA PRESENTACION Y AGILIZACION DEL TRAMITE

	USUARIO	RADICADOR
PATENTE DE INVENCION ✓	()	() ✓
MODELO DE UTILIDAD	()	() ✓
Indicacion de que se solicita la concesion de una patente	()	() ✓
Datos de identificación del solicitante o de la persona que se presenta la solicitud	()	() ✓
Descripción de la invención	()	() ✓
Dibujos de ser estos pertinentes	()	() ✓
Comprobante de Pago de las tasas establecidas	()	() ✓
COMPLETA () ✓	INCOMPLETA ()	()

DISEÑO INDUSTRIAL ()		
Indicación de que se solicita el registro de Diseño Industrial	()	()
Datos de identificación del solicitante o de la persona que presenta la solicitud	()	()
Representación grafica y fotografica del Diseño Industrial o muestra del Material que incorpora el diseño	()	()
Comprobante de pago de las tasas establecidas	()	()
COMPLETA ()	INCOMPLETA ()	()

ESQUEMA DE TRAZADO ()		
Indicacion de que solicita el registro de un Esquema de trazado	()	()
Datos de identificación del solicitante o de la persona que presenta la solicitud	()	()
Representacion grafica del esquema de trazado	()	()
Comprobante de pago de las tasas establecidas	()	()
COMPLETA ()	INCOMPLETA ()	()

Firma Responsable



Fecha