(19) DANMARK

(10) **DK/EP 4093209 T3**

Patent- og Varemærkestyrelsen

(12) Oversættelse af europæisk patentskrift

(51) Int.Cl.: ***A 23 D 7/00 (2006.01)*** ***A 23 D 7/04 (2006.01)*** ***C 11 C 1/00 (2006.01)***

(45) Oversættelsen bekendtgjort den: **2024-03-25**

(80) Dato for Den Europæiske Patentmyndigheds bekendtgørelse om meddelelse af patentet: **2024-03-06**

(86) Europæisk ansøgning nr.: **21701952.0**

(86) Europæisk indleveringsdag: **2021-01-21**

(87) Den europæiske ansøgnings publiceringsdag: **2022-11-30**

(86) International ansøgning nr.: **EP2021051343**

(87) Internationalt publikationsnr.: **WO2021148540**

(30) Prioritet: **2020-01-24 EP 20275016**

(84) Designerede stater: **AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR**

(73) Patenthaver: **Bunge Loders Croklaan B.V., Hogeweg 1, 1521 AZ Wormerveer, Holland**

(72) Opfinder: **VERKUIJL, Bastiaan Jeroen Victor, Bunge Loders Croklaan B.V., Hogeweg 1, 1521 AZ Wormerveer, Holland**
MAN, Hang Kam, Bunge Loders Croklaan B.V. Hogeweg 1, 1521 AZ Wormerveer, Holland

(74) Fuldmægtig i Danmark: **Potter Clarkson A/S, Havnegade 39, 1058 København K, Danmark**

(54) Benævnelse: **AERATED FAT EMULSION**

(56) Fremdragne publikationer:
EP-A1- 0 667 104
WO-A1-2013/149816
WO-A1-2017/055101
WO-A1-2019/020714
GB-A- 2 437 239

DESCRIPTION

[0001] This invention relates to an aerated fat emulsion, a method of making the aerated fat emulsion, uses thereof and a confectionery product or a bakery product comprising the aerated fat emulsion.

Background

[0002] Edible aerated oil-in-water emulsions like whipped cream are well known food products comprising a continuous water phase and oil droplets suspended in the aqueous phase.

[0003] Fats and oils are important ingredients of food products. Fats and oils are occasionally subjected to an interesterification process which randomly redistributes the fatty acid acyl residues amongst the glyceride molecules. This process can alter the physical properties of the fat or oil.

[0004] Lauric oils, such as coconut oil, are vegetable oils comprising predominantly short- and medium chain fatty acid (caprylic acid (C8:0), capric acid (C10:0), lauric acid (C12:0) and myristic acid (C14:0)). Lauric oils are extensively used in the food industries, where the uses include filling cream, ice cream, non-dairy whipped cream, coffee whiteners, cacao butter substitutes and medium chain triglycerides (MCTs).

[0005] Sal fat is an edible oil extracted from the seeds of *Shorea robusta.* Shea butter is a fat obtained from the nuts of *Vitellaria paradoxa.* Both fats are relatively rich in stearic acid (C18:0) and oleic acid (C18:1) and can be fractionated to produce a stearin fraction rich in StOSt (1,3-distearoyl-2-oleoyl glyceride) often to be used in a cocoa butter equivalent. WO 2017/055101 A1 discloses a low SAFA fat composition for use in an aerated emulsion, such as a filling cream, wherein the composition comprises less than 35% by weight of SAFA based on the total weight of fatty acid residues.

[0006] WO 2013/149816 A1 discloses a method for the production of aerated water-in-oil emulsions containing sucrose fatty acid esters.

[0007] GB 2 437 239 A discloses a low fat whipping cream preparation for people suffering from obesity.

[0008] EP A1 0 667 104 discloses a low-fat cream which can be produced without the necessity for using a large amount of a specified emulsifier even when the fat content is as low as 40% or less and a fat to be used for producing the cream, where the fat comprises at least 30% of a SUS-type glyceride and 5-60% of a laurin fat.

[0009] EP A1 3 466 278 relates to an oil-in-water food emulsion comprising, in weight percent

based on the total weight of the emulsion, between 15 and 45% of a fat phase, the fat phase comprising glycerides wherein at least 65% of the chains deriving from fatty acids, in weight percent based on the total of weight of the chains, are chains having 18 carbon atoms; and at least one emulsifier.

[0010] WO 2012/052471 A1 provides an edible product containing 15-80 wt% of triglycerides, 20-85 of filler, and at most 15 wt% water, wherein the triglycerides contain as acid residues 20-70 wt% of total SAFA, at most 5 wt% of TFA, thereby C8, C10 and C12 in a weight ratio of (C8+C10+C12)/total SAFA of at least 10% and a weight ratio of (C8+C10)/C12 of at least 5%, whereby the weight ratio D/B is at least 1.5 and the weight ratio of B/total SAFA is at most 0.5, in which D represents the sum of the amounts of all MUFA and PUFA, and B represents the sum of the amounts of C14 and C16, and which triglyceride composition has an SFC at 20°C of at least 5 wt%.

[0011] WO 2016/150968 A1 relates to a food composition comprising a lipid-in-water emulsion wherein gas is dispersed in the lipid in the form of a foam.

[0012] WO 2019/020714 A1 discloses a non-hydrogenated fat composition comprising greater than 28% by weight stearic acid (C18:0) fatty acid residues; greater than 44% by weight oleic acid (C18:1) fatty acid residues, and less than 10% by weight of palmitic acid (C16) fatty acid residues, based on the total C8-C24 fatty acid residues, and greater than 30% by weight of the combined amounts of StOSt, StStO, StOO and OStO triglycerides based on the total glycerides present in the composition, wherein the weight ratio of (StOSt+StStO)/(StOO + OStO) is from 0.6-1.5.

[0013] WO 2019/185444 A1 provides a non-hydrogenated fat composition comprising from 3.2% to 10% by weight of total caprylic acid (C8:0) and capric acid (C10:0); from 13% to 32% by weight lauric acid; and from 20% to 45% by weight stearic acid (C18:0) fatty acid residues; the percentages of acids referring to acids bound as acyl groups in glycerides in the fat composition and being based on the total weight of C8 to C24 fatty acids; and from 7% to 15% by weight CN46 triglycerides; from 4% to 30% by weight CN54 triglycerides; and from 15% to 28% by weight of total CN42 triglycerides and CN44 triglycerides; the percentages of triglycerides referring to the total triglycerides present in the composition.

[0014] There remains a need for an aerated fat emulsion which has an improved air incorporation in order to improve the organoleptic properties while the texture of the product is still desirable.

Description of the invention

[0015] According to the present invention, there is provided an aerated fat emulsion comprising from 10% to 90% by weight of water; and from 10% to 90% by weight of a fat composition, wherein the fat composition comprises:

from 75% to 99% by weight of a lauric fat comprising from 35% to 65% lauric acid (C12:0); said percentages of acids referring to acids bound as acyl groups in glycerides in the fat and being based on the total weight of C8 to C24 fatty acids; and

from 1 % to 25% by weight of an interesterified fat comprising from 30% to 70% by weight of total stearic acid (C18:0) and arachidic acid (C20:0); from 1% to 10% by weight of palmitic acid (C16:0) and less than 2% by weight of lauric acid (C12:0), said percentages of acids referring to acids bound as acyl groups in glycerides in the fat and being based on the total weight of C8 to C24 fatty acids; and from 5% to 35% by weight of combined amounts of StStSt and AStSt triglycerides, based on total triglycerides present in the composition, wherein St is stearic acid and A is arachidic acid.

[0016] The aerated fat emulsion of this invention has been found to be particularly advantageous when used in confectionery products or bakery products to provide improved aeration which is desirable to obtain the desired organoleptic properties of the products. In particular, the aerated fat emulsion according to the invention also surprisingly maintains good texture properties which allows the products to have a good appearance and to be processable and transportable.

[0017] The term "fat emulsion" refers to a mixture of at least a fat phase and an aqueous phase which are immiscible. The fat emulsions for aeration according to the invention are typically oil in water emulsions.

[0018] The term "aerated" refers to incorporation of a gas, typically air, into the emulsion.

[0019] The term "fat" refers to glyceride fats and oils containing fatty acid acyl groups and does not imply any particular melting point. The term "oil" is used synonymously with "fat".

[0020] The term "fatty acid" refers to straight chain saturated or unsaturated (including mono- and poly unsaturated) carboxylic acids having from 8 to 24 carbon atoms. A fatty acid having x carbon atoms and y double bonds may be denoted Cx:y. For example, palmitic acid may be denoted C16:0 and oleic acid may be denoted C18:1. Percentages of fatty acids in compositions referred to herein include acyl groups in tri-, di- and mono- glycerides present in the glycerides and are based on the total weight of C8 to C24 fatty acids. The fatty acid profile (i.e., composition) may be determined, for example, by fatty acid methyl ester analysis (FAME) using gas chromatography according to ISO 12966-2 and ISO 12966-4.

[0021] The fat composition of the aerated fat emulsion according to the invention may be made from naturally occurring or synthetic fats, fractions of naturally occurring or synthetic fats, or mixtures thereof.

[0022] Amounts of triglycerides specified herein are percentages by weight based on total

triglycerides present in the fat composition. The notation triglyceride XYZ denotes triglycerides having fatty acid acyl groups X, Y and Z at any of the 1-, 2- and 3- positions of the glyceride. The notation A2B includes both AAB and ABA, and AB2 includes both ABB and BAB. Triglyceride content may be determined for example by GC (ISO 23275).

[0023] The term "lauric fat" refers to a fat containing mainly lauric acid (C12:0), typically derived from sources such as coconut oil or palm kernel oil.

[0024] The term "interesterified fat" refers to a fat subjected to a random non-specific redistribution of the fatty acid moieties present in a triglyceride oil over its glycerol moieties.

[0025] The aerated fat emulsion according to the invention preferably has an overrun from 100% to 400%, more preferably from 150% to 300% and even more preferably from 200% to 300%.

[0026] The term "overrun" refers to the percentage increase in volume that occurred as a result of the gas incorporation. The overrun is calculated as follows: (density in g\ml of unwhipped cream / density in g/ml of whipped cream) * 100%.

[0027] The aerated fat emulsion according to the invention preferably comprises from 20% to 80% by weight of water and from 10% to 70% by weight of the fat composition. More preferably, the aerated fat emulsion according to the invention comprises from 30% to 70% by weight of water and from 15% to 65% by weight of the fat composition. Even more preferably, the aerated fat emulsion according to the invention comprises 35% to 65% by weight of water and from 20% to 55% by weight of the fat composition. Most preferably, the aerated fat emulsion according to the invention comprises from 40% to 55% by weight of water and from 25% to 50% by weight of the fat composition.

[0028] The fat composition of the aerated fat emulsion according to the invention comprises from 75% to 99% by weight of a lauric fat, preferably from 80% to 99% by weight, more preferably from 85% to 99% by weight and even more preferably from 90% to 99% by weight.

[0029] The lauric fat of the fat composition of the aerated fat emulsion according to the invention comprises from 35% to 65% by weight of lauric acid; said percentage referring to acid bound as acyl groups in glycerides in the fat and being based on the total weight of C8 to C24 fatty acids, preferably from 40% to 60% by weight, more preferably from 42% to 58% and even more preferably from 43% to 55% by weight.

[0030] The lauric fat of the fat composition of the aerated fat emulsion according to the invention is preferably selected from coconut oil, palm kernel oil, fully hydrogenated coconut oil, fully hydrogenated palm kernel oil, fractions thereof and mixtures thereof. More preferably, the lauric fat of the fat composition of the aerated fat emulsion according to the invention consists of coconut oil.

[0031] The fat composition of the aerated fat emulsion according to the invention comprises from 1% to 25% by weight of the interesterified fat, preferably from 1% to 20% by weight, more preferably from 1% to 15% by weight and even more preferably from 1% to 10% by weight.

[0032] The interesterified fat of the fat composition of the aerated fat emulsion according to the invention comprises from 30% to 70% by weight of total stearic acid (C18:0) and arachidic acid (C20:0); from 1% to 10% by weight of palmitic acid (C16:0) and less than 2% by weight of lauric acid (C12:0); said percentage of acids referring to acids bound as acyl groups in glycerides in the fat and being based on the total weight of C8 to C24 fatty acids. Preferably, the interesterified fat of the fat composition of the aerated fat emulsion according to the invention comprises from 35% to 68% by weight of total stearic acid (C18:0) and arachidic acid (C20:0); from 1% to 9% by weight of palmitic acid (C16:0) and from 0.0% to 1.5% by weight of lauric acid (C12:0); said percentage of acids referring to acids bound as acyl groups in glycerides in the fat and being based on the total weight of C8 to C24 fatty acids. More preferably, the interesterified fat of the fat composition of the aerated fat emulsion according to the invention comprises from 40% to 65% by weight of total stearic acid (C18:0) and arachidic acid (C20:0); from 1% to 8% by weight of palmitic acid (C16:0) and from 0.1% to 1.0% by weight of lauric acid (C12:0); said percentage of acids referring to acids bound as acyl groups in glycerides and being based on the total weight of C8 to C24 fatty acids.

[0033] The interesterified fat of the fat composition of the aerated fat emulsion according to the invention comprises from 5% to 35% by weight of the combined amounts of StStSt and AStSt triglycerides, based on total triglycerides present in the composition, wherein St is stearic acid and A is arachidic acid, preferably from 7% to 30% by weight, more preferably from 8% to 28% by weight and even more preferably from 9% to 26%.

[0034] in a preferred embodiment, the aerated fat emulsion comprises: from 20% to 80% by weight of water; and from 10% to 70% by weight of a fat composition, wherein the fat composition comprises: from 80% to 99% by weight of a lauric fat comprising from 40% to 60% lauric acid (C12:0); said percentages of acids referring to acids bound as acyl groups in glycerides in the fat and being based on the total weight of C8 to C24 fatty acids; and from 1% to 20% by weight of an interesterified fat comprising from 35% to 68% by weight of total stearic acid (C18:0) and arachidic acid (C20:0); from 1% to 9% by weight of palmitic acid (C16:0) and from 0.0% to 1.5% by weight of lauric acid (C12:0); and from 7% to 30% by weight of the combined amounts of StStSt and AStSt triglycerides, based on total triglycerides present in the composition, wherein St is stearic acid and A is arachidic acid.

[0035] In a more preferred embodiment, the aerated fat emulsion comprises: from 30% to 70% by weight of water; and from 15% to 65% by weight of a fat composition, wherein the fat composition comprises: from 85% to 99% by weight of a lauric fat comprising from 42% to 58% lauric acid (C12:0); said percentages of acids referring to acids bound as acyl groups in glycerides in the fat and being based on the total weight of C8 to C24 fatty acids; and from 1% to 15% by weight of an interesterified fat comprising from 40% to 65% by weight of total stearic acid (C18:0) and arachidic acid (C20:0); from 1% to 8% by weight of palmitic acid (C16:0) and

from 0.1% to 1.0% by weight of lauric acid (C12:0); and from 8% to 28% by weight of the combined amounts of StStSt and AStSt triglycerides, based on total triglycerides present in the composition, wherein St is stearic acid and A is arachidic acid.

[0036] In an even more preferred embodiment, the aerated fat emulsion comprises: from 35% to 65% by weight of water; and from 20% to 55% by weight of a fat composition, wherein the fat composition comprises: from 90% to 99% by weight of a lauric fat comprising from 43% to 55% lauric acid (C12:0); said percentages of acids referring to acids bound as acyl groups in glycerides in the fat and being based on the total weight of C8 to C24 fatty acids; and from 1% to 10% by weight of an interesterified fat comprising from 40% to 65% by weight of total stearic acid (C18:0) and arachidic acid (C20:0); from 1% to 8% by weight of palmitic acid (C16:0) and from 0.1% to 1.0% by weight of lauric acid (C12:0); and from 9% to 26% by weight of the combined amounts of StStSt and AStSt triglycerides, based on total triglycerides present in the composition, wherein St is stearic acid and A is arachidic acid.

[0037] The interesterified fat of the fat composition of the aerated fat emulsion according to the invention preferably has a weight ratio of StOSt:StOO less than 2.5, more preferably from 0.5 to 2.3, wherein St is stearic acid and O is oleic acid.

[0038] The interesterified fat of the fat composition of the aerated fat emulsion according to the invention preferably has from 45.0 to 68.0 solid fat content at 10°C, more preferably from 48.0 to 67.5; measured on unstabilized fat according to ISO 8292-1.

[0039] The interesterified fat of the fat composition of the aerated fat emulsion according to the invention preferably has from 15.0 to 70.0 solid fat content at 25°C, more preferably from 20.0 to 65.0; measured on unstabilized fat according to ISO 8292-1.

[0040] The interesterified fat of the fat composition of the aerated fat emulsion according to the invention preferably has from 15.0 to 59.0 solid fat content at 30°C, more preferably from 20.0 to 55.0; measured on unstabilized fat according to ISO 8292-1.

[0041] The interesterified fat of the fat composition of the aerated fat emulsion according to the invention preferably has from 10.0 to 55.0 solid fat content at 35°C, more preferably from 15.0 to 50.0; measured on unstabilized fat according to ISO 8292-1.

[0042] The interesterified fat of the fat composition of the aerated fat emulsion according to the invention preferably has from 5.0 to 45.0 solid fat content at 40°C, more preferably from 10.0 to 40.0; measured on unstabilized fat according to ISO 8292-1.

[0043] In a preferred embodiment, the aerated fat emulsion comprises: from 30% to 70% by weight of water; and from 15% to 65% by weight of a fat composition, wherein the fat composition comprises: from 85% to 99% by weight of a lauric fat comprising from 42% to 58% lauric acid (C12:0); said percentages of acids referring to acids bound as acyl groups in glycerides in the fat and being based on the total weight of C8 to C24 fatty acids; and from 1%

to 15% by weight of an interesterified fat comprising from 40% to 65% by weight of total stearic acid (C18:0) and arachidic acid (C20:0); from 1% to 8% by weight of palmitic acid (C16:0) and from 0.1% to 1.0% by weight of lauric acid (C12:0); and from 8% to 28% by weight of the combined amounts of StStSt and AStSt triglycerides and a weight ratio of StOSt:StOO less than 2.5, based on total triglycerides present in the composition, wherein St is stearic acid, A is arachidic acid and O is oleic acid.

[0044] In a more preferred embodiment, the aerated fat emulsion comprises: from 35% to 65% by weight of water; and from 20% to 55% by weight of a fat composition, wherein the fat composition comprises: from 90% to 99% by weight of a lauric fat comprising from 43% to 55% lauric acid (C12:0); said percentages of acids referring to acids bound as acyl groups in glycerides in the fat and being based on the total weight of C8 to C24 fatty acids; and from 1% to 10% by weight of an interesterified fat comprising from 40% to 65% by weight of total stearic acid (C18:0) and arachidic acid (C20:0); from 1% to 8% by weight of palmitic acid (C16:0) and from 0.1% to 1.0% by weight of lauric acid (C12:0); and from 9% to 26% by weight of the combined amounts of StStSt and AStSt triglycerides and a weight ratio of StOSt:StOO from 0.5 to 2.3, based on total triglycerides present in the composition, wherein St is stearic acid, A is arachidic acid and O is oleic acid.

[0045] In an even more preferred embodiment, the aerated fat emulsion comprises: from 30% to 70% by weight of water; and from 15% to 65% by weight of a fat composition, wherein the fat composition comprises: from 85% to 99% by weight of a lauric fat comprising from 42% to 58% lauric acid (C12:0); said percentages of acids referring to acids bound as acyl groups in glycerides in the fat and being based on the total weight of C8 to C24 fatty acids; and from 1% to 15% by weight of an interesterified fat comprising from 40% to 65% by weight of total stearic acid (C18:0) and arachidic acid (C20:0); from 1% to 8% by weight of palmitic acid (C16:0) and from 0.1% to 1.0% by weight of lauric acid (C12:0); and from 8% to 28% by weight of the combined amounts of StStSt and AStSt triglycerides and a weight ratio of StOSt:StOO less than 2.5, based on total triglycerides present in the composition, wherein St is stearic acid, A is arachidic acid and O is oleic acid; and from 45.0 to 68.0 solid fat content at 10°C; and from 15.0 to 70.0 solid fat content at 25°C; and from 15.0 to 59.0 solid fat content at 30°C; and from 10.0 to 55.0 solid fat content at 35°C; and from 5.0 to 45.0 solid fat content at 40°C; measured on unstabilized fat according to ISO 8292-1.

[0046] In a most preferred embodiment, the aerated fat emulsion comprises: from 35% to 65% by weight of water; and from 20% to 55% by weight of a fat composition, wherein the fat composition comprises: from 90% to 99% by weight of a lauric fat comprising from 43% to 55% lauric acid (C12:0); said percentages of acids referring to acids bound as acyl groups in glycerides in the fat and being based on the total weight of C8 to C24 fatty acids; and from 1% to 10% by weight of an interesterified fat comprising from 40% to 65% by weight of total stearic acid (C18:0) and arachidic acid (C20:0); from 1% to 8% by weight of palmitic acid (C16:0) and from 0.1% to 1.0% by weight of lauric acid (C12:0); and from 9% to 26% by weight of the combined amounts of StStSt and AStSt triglycerides and a weight ratio of StOSt:StOO from 0.5 to 2.3, based on total triglycerides present in the composition, wherein St is stearic acid, A is

arachidic acid and O is oleic acid; and from 48.0 to 67.5 solid fat content at 10°C; and from 20.0 to 65.0 solid fat content at 25°C; and from 20.0 to 55.0 solid fat content at 30°C; and from 15.0 to 50.0 solid fat content at 35°C; and from 10.0 to 40.0 solid fat content at 40°C; measured on unstabilized fat according to ISO 8292-1.

[0047] The interesterified fat of the fat composition of the aerated fat emulsion according to the invention is preferably selected from interesterified shea butter, interesterified shea stearin, interesterified sal butter, interesterified sal stearin, interesterified kokum butter, interesterified kokum butter stearin, interesterified cocoa butter, interesterified cocoa butter stearin and mixtures thereof. More preferably, the interesterified fat of the fat composition of the aerated fat emulsion according to the invention is selected from interesterified sal butter, interesterified shea stearin and mixtures thereof.

[0048] The aerated fat emulsion according to the invention preferably comprises from 35% to 65% by weight of water; from 20% to 55% by weight of the fat composition; and from 5% to 25% by weight of sugar. More preferably, the aerated fat emulsion according to the invention comprises from 40% to 55% by weight of water; from 25% to 50% by weight of the fat composition; and from 10% to 20% by weight of sugar.

[0049] The aerated fat emulsion according to the invention preferably further comprises from 0.5% to 2% by weight of sodium caseinate, more preferably from 0.8% to 1.2% by weight. Accordingly, the aerated fat emulsion according to the invention preferably comprises from 40% to 55% by weight of water; from 25% to 50% by weight of the fat composition; from 10% to 20% by weight of sugar; and 0.8% to 1.2% by weight of sodium caseinate.

[0050] Accordingly, in a preferred embodiment, the aerated fat emulsion comprises: from 35% to 65% by weight of water; from 5% to 25% by weight of sugar; and from 20% to 55% by weight of a fat composition, wherein the fat composition comprises: from 90% to 99% by weight of a lauric fat comprising from 43% to 55% lauric acid (C12:0); said percentages of acids referring to acids bound as acyl groups in glycerides in the fat and being based on the total weight of C8 to C24 fatty acids; and from 1% to 10% by weight of an interesterified fat comprising from 40% to 65% by weight of total stearic acid (C18:0) and arachidic acid (C20:0); from 1% to 8% by weight of palmitic acid (C16:0) and from 0.1% to 1.0% by weight of lauric acid (C12:0); and from 9% to 26% by weight of the combined amounts of StStSt and AStSt triglycerides and a weight ratio of StOSt:StOO from 0.5 to 2.3, based on total triglycerides present in the composition, wherein St is stearic acid, A is arachidic acid and O is oleic acid; and from 48.0 to 67.5 solid fat content at 10°C; and from 20.0 to 65.0 solid fat content at 25°C; and from 20.0 to 55.0 solid fat content at 30°C; and from 15.0 to 50.0 solid fat content at 35°C; and from 10.0 to 40.0 solid fat content at 40°C; measured on unstabilized fat according to ISO 8292-1.

[0051] The aerated fat emulsion according to the invention is preferably whipped cream.

[0052] Accordingly, in a preferred embodiment, the whipped cream comprises: from 35% to 65% by weight of water; from 5% to 25% by weight of sugar; and from 20% to 55% by weight of

a fat composition, wherein the fat composition comprises: from 90% to 99% by weight of a lauric fat comprising from 43% to 55% lauric acid (C12:0); said percentages of acids referring to acids bound as acyl groups in glycerides in the fat and being based on the total weight of C8 to C24 fatty acids; and from 1% to 10% by weight of an interesterified fat comprising from 40% to 65% by weight of total stearic acid (C18:0) and arachidic acid (C20:0); from 1% to 8% by weight of palmitic acid (C16:0) and from 0.1% to 1.0% by weight of lauric acid (C12:0); and from 9% to 26% by weight of the combined amounts of StStSt and AStSt triglycerides and a weight ratio of StOSt:StOO from 0.5 to 2.3, based on total triglycerides present in the composition, wherein St is stearic acid, A is arachidic acid and O is oleic acid; and from 48.0 to 67.5 solid fat content at 10°C; and from 20.0 to 65.0 solid fat content at 25°C; and from 20.0 to 55.0 solid fat content at 30°C; and from 15.0 to 50.0 solid fat content at 35°C; and from 10.0 to 40.0 solid fat content at 40°C; measured on unstabilized fat according to ISO 8292-1.

[0053] The invention also relates to a method of making an aerated fat emulsion comprising the steps of: a) providing a mixture comprising from 10% to 90% by weight of water and from 10% to 90% by weight of a fat composition, wherein the fat composition comprises: from 75% to 99% by weight of a lauric fat comprising from 35% to 65% lauric acid (C12:0); and from 1% to 25% by weight of an interesterified fat comprising from 30% to 70% by weight of total stearic acid (C18:0) and arachidic acid (C20:0); from 1% to 10% by weight of palmitic acid (C16:0) and less than 2% by weight of lauric acid (C12:0); said percentages of acids referring to acids bound as acyl groups in glycerides in the fat and being based on the total weight of C8 to C24 fatty acids; and from 5% to 35% by weight of the combined amounts of StStSt and AStSt triglycerides, based on total triglycerides present in the composition, wherein St is stearic acid and A is arachidic acid; b) pasteurizing and homogenizing the mixture obtained in step a); c) stabilizing the pasteurized and homogenized mixture obtained in step b), preferably for at least 6 hours at from 3°C to 7°C; and d) aerating the stabilized mixture obtained in step c).

[0054] Preferably, the aerated fat emulsion produced in the method of the invention is an aerated fat emulsion according to the invention.

[0055] In a preferred embodiment, a method of making an aerated fat emulsion comprising the step of: a) providing a mixture comprising from 35% to 65% by weight of water; from 5% to 25% by weight of sugar; and from 20% to 55% by weight of a fat composition, wherein the fat composition comprises: from 90% to 99% by weight of a lauric fat comprising from 43% to 55% lauric acid (C12:0); said percentages of acids referring to acids bound as acyl groups in glycerides in the fat and being based on the total weight of C8 to C24 fatty acids; and from 1% to 10% by weight of an interesterified fat comprising from 40% to 65% by weight of total stearic acid (C18:0) and arachidic acid (C20:0); from 1% to 8% by weight of palmitic acid (C16:0) and from 0.1% to 1.0% by weight of lauric acid (C12:0); and from 9% to 26% by weight of the combined amounts of StStSt and AStSt triglycerides and a weight ratio of StOSt:StOO from 0.5 to 2.3, based on total triglycerides present in the composition, wherein St is stearic acid, A is arachidic acid and O is oleic acid; and from 48.0 to 67.5 solid fat content at 10°C; and from 20.0 to 65.0 solid fat content at 25°C; and from 20.0 to 55.0 solid fat content at 30°C; and from 15.0 to 50.0 solid fat content at 35°C; and from 10.0 to 40.0 solid fat content at 40°C;

measured on unstabilized fat according to ISO 8292-1; b) pasteurizing and homogenizing the mixture obtained in step a); c) stabilizing the pasteurized and homogenized mixture obtained in step b) for from 6 to 12 hours at from 3°C to 7°C; and d) aerating the stabilized mixture obtained in step c).

[0056] In step c) of the method according to the invention, the homogenizing is preferably performed in one single stage. The pressure during the homogenizing is preferably at least 100 bar, more preferably from 30 bar to 100 bar and even more preferably from 50 bar to 80 bar.

[0057] In step d) of the method according to the invention, the aerating is preferably performed for at least 1 minute, more preferably from 3 minutes to 7 minutes. Suitable apparatus for aerating, such as a mixer, is well known.

[0058] The invention also relates to the use of an aerated fat emulsion according to the invention in a confectionery product, or a bakery product.

[0059] The invention also relates to a confectionery product, or a bakery product comprising an aerated fat emulsion according to the invention.

[0060] The listing or discussion of an apparently prior-published document in this specification should not necessarily be taken as an acknowledgement that the document is part of the state of the art or is common general knowledge.

[0061] Preferences and options for a given aspect, embodiment, feature or parameter of the invention should, unless the context indicates otherwise, be regarded as having been disclosed in combination with any and all preferences and options for all other aspects, embodiments, features and parameters of the invention.

[0062] The following non-limiting examples illustrate the invention and do not limit its scope in any way. In the examples and throughout this specification, all percentages, parts and ratios are by weight unless indicated otherwise.

Examples

Example 1

[0063] Sal butter is chemically interesterified by using sodium methoxide as catalyst. After chemical interesterification, the interesterified sal is physically refined.

[0064] Shea butter is fractionated by using solvent to produce shea stearin. Shea stearin is

then chemically interesterified by using sodium methoxide as catalyst. After chemical interesterification, the interesterified shea stearin is physically refined.

[0065] The analytical results of interesterified sal butter, interesterified shea stearin, sal butter and shea stearin are shown in Table 1.

Table 1: Fat composition of interesterified sal butter, interesterified shea stearin, sal butter and shea stearin

	Interesterified sal butter	Sal butter	Interesterified shea stearin	Shea stearin
IV FAME	40.5	38.8	32.5	32.3
SAFA	55.9	57.2	65.1	65.5
MUFA	41.2	40.7	32.0	31.6
PUFA	2.8	2.0	2.9	2.9
TRANS	0.5	0.5	0.1	0.1
C12:0	0.3	0.0	0.2	0.1
C14:0	0.2	0.0	0.1	0.1
C16:0	6.9	5.8	3.4	4.0
C18:0	41.1	43.4	59.3	59.3
C18:1	40.9	40.4	31.9	31.5
C18:2	2.3	1.6	2.8	2.9
C18:3	0.4	0.3	0.1	0.1
C20:0	6.5	7.0	1.7	1.7
C20:1	0.3	0.3	0.1	0.0
C20:2	0.1	0.1	0.0	0.0
C22:0	0.5	0.5	0.2	0.1
C24:0	0.2	0.2	0.1	0.1
C18:0+C20:0	47.6	50.4	61	61
CN46	0.3	0.1	0.1	0.1
CN48	1.1	0.2	0.8	0.4
CN50	3.0	1.6	0.7	1.7
CN52	15.6	15.2	10.2	8.9
CN54	65.3	66.0	83.9	84.3
CN56	14.8	16.7	4.4	4.5
PPP	0.6	0.0	0.2	0.0
MOP	0.5	0.0	0.3	0.0
MLP	0.3	0.0	0.1	0.0
PPSt	0.7	0.6	0.4	0.1

	Interesterified sal butter	Sal butter	Interesterified shea stearin	Shea stearin
POP	1.5	1.0	0.0	1.3
PLP	0.4	0.1	0.0	0.3
PStSt	4.0	0.4	4.3	0.4
POSt	7.0	12.1	3.9	6.6
POO	4.4	3.3	1.2	0.6
PLSt	0.3	0.4	0.3	0.5
PLO	0.6	0.2	0.2	0.2
PLL	0.2	0.1	0.0	0.0
StStSt	9.3	0.6	21.8	2.1
StOSt	26.5	47.5	36.9	73.7
StOO	21.8	16.4	18.1	3.6
StLSt	0.8	0.9	2.1	5.4
OOO	7.1	2.7	3.0	0.4
StLO	1.4	0.7	2.7	0.4
OLO	0.9	0.3	0.6	0.1
StLL	0.0	0.1	0.0	0.0
AStSt	3.0	0.0	1.4	0.1
AOSt	5.7	9.1	1.5	3.3
AOO	2.9	2.6	0.4	0.2
ALSt	0.1	0.3	0.0	0.2
StStSt+AStSt	12.3	0.6	23.8	2.2
StOSt/StOO	1.2	2.9	2.0	20.5
N5	56.8	71.1	71.0	89.7
N10	51.0	68.6	67.0	90.9
N15	42.5	59.6	61.4	88.0
N20	37.9	41.0	61.6	80.6
N25	30.0	6.1	61.2	73.4
N30	28.2	1.6	53.2	60.0
N35	21.4	0.5	40.7	6.1
N40	16.1	0.0	33.7	2.6

In the above table:

[0066]

Cx:y refers to a fatty acid having x carbon atoms and y double bonds; levels determined by GC-FAME (ISO 12966-2 and ISO 12966-4)

SAFA refers to saturated fatty acids;

MUFA refers to mono-unsaturated fatty acids;

PUFA refers to poly-unsaturated fatty acids;

IV FAME refers to calculated iodine value according to AOCS Cd 1c-85;

TRANS refers to trans fatty acids: unsaturated fatty acids having a double bond in a trans arrangement;

CNxx refers to a triglyceride having xx carbon atoms (excluding the carbon atoms from the glycerol, as is standard practice); levels determined by GC with pretreatment to remove the diglycerides eventually (AOCS Ce 5-86);

O, P, St, L and A refer to oleic, palmitic, stearic, linoleic and arachidic acids, respectively; Triglyceride compositions: POSt, and other triglycerides were determined by GC (ISO 23275), wherein each GC peak includes triglycerides having the same fatty acids in different positions e.g., POSt is in the same signal peak as PStO and StPO; and

Nx refers to solid fat content determined by NMR on unstabilized fat measured at x°C according to ISO 8292-1.

Example 2

[0067] The whipped cream is produced following the recipe as shown in Table 2.

Table 2: Ingredient list of whipped cream

ingredients	Weight percentage %
Vegetable Fat	34.0
Sherex (E472b and E471)	1.0
Water	48.0
Lactose	2.7
Sugar	12.0
Sodium Caseinate	1.0
Sorbitol	1.0
Creamwhip414 (ME, CMC, Carr, Guar)	0.3

[0068] Creamwhip414 is a blend of stabilizers, being microcrystalline cellulose E460(i), Cellulose gum E466, Carrageenan E407 and Guar E412. This is used to improve the stabilization of the whipped cream, to avoid draining from the foam and hence enhance the storage stability.

[0069] The whipped cream is made according to the following steps. The fat is completely melted and the emulsifier is added in the fat to form the fat phase. The other powdered ingredients are dissolved into lukewarm water. This water phase is heated to above 60°C. The fat phase is added into the water phase, pasteurized and homogenized (single stage homogenization at 70 bar). The cream is stabilized during one night for at least 8 hours at 5°C. The cream is whipped in the Hobart and the overrun and texture are measured.

[0070] The overrun is calculated as follows: (density in g/ml of unwhipped cream / density in g/ml of whipped cream) * 100%.

[0071] The texture is measured by use of the Brookfield TexturePro CT 3-4500, Probe TA5, flat probe 38mm with speed 0.5 mm/s and 5 mm depth. The value (g) is a measure for the force necessary to attain a given deformation.

Example 3

[0072] Two fat compositions Fat A and Fat B are produced by blending coconut oil and interesterified sal butter. Fat A consists of 98% by weight coconut oil and 2% by weight interesterified sal butter. Fat B consists of 96% by weight coconut oil and 4% by weight interesterified sal butter. Additionally, fully hydrogenated palm kernel oil is used as a reference fat (Reference Fat C). 100% coconut oil is also used as a reference fat (Reference Fat D). Further, a comparative fat composition is made by 70% by weight coconut oil and 30% by weight interesterified sal butter (Comparative Fat E).

[0073] The analytical results of coconut oil and fully hydrogenated palm kernel are shown in Table 3.

Table 3: Fat composition of coconut oil and fully hydrogenated palm kernel oil

	Coconut oil	Fully hydrogenated palm kernel oil
TRANS	0	0
C8:0	6.0	3.2
C10:0	5.3	3.3
C12:0	46.5	48.2
C14:0	19.5	16.3
C16:0	10.4	8.5
C18:0	3.1	20.1

	Coconut oil	Fully hydrogenated palm kernel oil
C18:1	7.3	0
C18:2	1.8	0
C18:3	0	0
C20:0	0.1	0.2
CN28	0.6	0.1
CN30	2.7	1.0
CN32	11.5	5.3
CN34	15.9	8.2
CN36	18.8	20.9
CN38	17.2	16.5
CN40	11.3	10.1
CN42	8.2	9.4
CN44	4.8	6.8
CN46	2.7	5.6
CN48	2.4	6.3
CN50	1.9	3.2
CN52	1.3	3.0
CN54	0.8	2.9
CN56	0	0.1

[0074] Fat A, Fat B, Reference Fat C, Reference Fat D and Comparative Fat E are used to produce whipped cream according to Example 2. The whipping time is 5 minutes. The results of overrun and texture are shown in Table 4.

Table 4: Analysis of overrun and texture of whipped creams by using Fat A, Fat B, Reference Fat C, Reference Fat D and Comparative Fat E

Vegetable fat	Overrun %	Texture
Fat A	222	271
Fat B	207	404
Reference Fat C	272	100
Reference Fat D	185	200
Comparative Fat E	259	57

[0075] The results show that the whipped creams made by using Fat A and Fat B not only have the higher overrun thus better air incorporation compared to Reference Fat D but also

have better texture properties compared to Reference Fat C and Comparative Fat E. It is considered that the texture is not acceptable when the texture value is lower than 150.

[0076] Rosettes are also made with the whipped cream. The piping of the whipped cream is evaluated and the shape of rosette is visually evaluated. The results are shown in Table 5.

Table 5: Rosette evaluation of whipped creams by using Fat A, Fat B, Reference Fat C, Reference Fat D and Comparative Fat E

Vegetable fat	Piping during the production of the rosettes	Shape of the rosettes
Fat A	Convenient	Firm
Fat B	Pressured	Stiff
Reference Fat C	Runny (too liquid)	Weak
Reference Fat D	Convenient	Weak
Comparative Fat E	Fast (too liquid)	Weak

[0077] The results show that the process to produce rosettes by whipped creams using Fat A and Fat B is particularly convenient and desirable. Also, the rosettes produced by whipped creams using Fat A and Fat B have a firm and stiff texture which is particularly desired.

Example 4

[0078] A fat composition Fat F is produced by blending coconut oil and interesterified sal butter. Fat F consists of 94% by weight coconut oil and 6% by weight interesterified sal butter. A comparative fat composition is made by blending 94% by weight coconut oil and 6% by weight sal butter (Comparative Fat G).

[0079] Fat F and Comparative Fat G are used to produce whipped cream according to Example 2. The whipping time is 5 minutes. The results of overrun and texture are shown in Table 6.

Table 6: Analysis of overrun and texture of whipped creams by using Fat F and Comparative Fat G

Vegetable fat	Overrun %	Texture
Fat F	226	378
Comparative Fat G	212	344

[0080] The results show that the whipped cream made by using Fat F has a higher overrun and thus better air incorporation compared to Comparative Fat G.

Example 5

[0081] A fat composition Fat H is produced by blending coconut oil and interesterified shea stearin. Fat H consists of 96% by weight coconut oil and 4% by weight interesterified shea stearin. A comparative fat composition is made by 96% by weight coconut oil and 4% by weight shea stearin (Comparative Fat I).

[0082] Fat H and Comparative Fat I are used to produce whipped cream according to Example 2. The whipping time is 5 minutes. The results of overrun and texture are shown in Table 7.
Table 7: Analysis of overrun and texture of whipped creams by using Fat H and Comparative Fat I

Vegetable fat	Overrun %	Texture
Fat H	292	184
Comparative Fat I	213	335

[0083] The results show that the whipped cream made by using Fat H has a higher overrun and thus better air incorporation compared to Comparative Fat I.

REFERENCES CITED IN THE DESCRIPTION

Cited references

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- WO2017055101A1 **[0005]**
- WO2013149816A1 **[0006]**
- GB2437239A **[0007]**
- EP0667104A1 **[0008]**
- EP3466278A1 **[0009]**
- WO2012052471A1 **[0010]**
- WO2016150968A1 **[0011]**

- WO2019020714A1 [0012]
- WO2019185444A1 [0013]

Beluftet fedtemulsion

Patentkrav

1. En beluftet fedtemulsion, der omfatter:
   - fra 10 til 90 vægtprocent vand, og
   - fra 10 til 90 vægtprocent af en fedtsammensætning, hvilken fedtsammensætning omfatter:

   fra 75 til 99 vægtprocent af et laurinfedt, der omfatter fra 35 til 65 vægtprocent laurinsyre (C12:0), hvilken procentdel betegner laurinsyre bundet som acylgrupper i glycerider i fedtstoffet og er baseret på den samlede vægt af C8- til C24-fedtsyrer, og

   fra 1 til 25 vægtprocent af et interesterificeret fedtstof, der omfatter fra 30 til 70 vægtprocent samlet af stearinsyre (C18:0) og arachidinsyre (C20:0), fra 1 til 10 vægtprocent palmitinsyre (C16:0) og mindre end 2 vægtprocent laurinsyre (C12:0), hvilke procentdele af syrer betegner syrer, der er bundet som acylgrupper i glycerider i fedtstoffet og er baseret på den samlede vægt af C8- til C24-fedtsyrer, og fra 5 til 35 vægtprocent af de kombinerede mængder af StStSt- og AstSt-triglycerider baseret på den samlede mængde triglycerider, der er til stede i sammensætningen, hvor St er stearinsyre, og A er arachidinsyre.

2. Den beluftede fedtemulsion ifølge krav 1, der har et overløb på fra 100 % til 400 %, fortrinsvis fra 150 % til 300 %.

3. Den beluftede fedtemulsion ifølge krav 1 eller krav 2, der omfatter:
   fra 20 til 80 vægtprocent vand, fortrinsvis fra 30 til 70 vægtprocent, og
   fra 10 til 70 vægtprocent af fedtsammensætningen, fortrinsvis fra 15 til 65 vægtprocent.

4. Den beluftede fedtemulsion ifølge et hvilket som helst af de foregående krav, hvor fedtsammensætningen omfatter fra 80 til 99 vægtprocent af laurinfedtet, fortrinsvis fra 85 til 99 vægtprocent og især fra 90 til 99 vægtprocent.

5. Den beluftede fedtemulsion ifølge et hvilket som helst af de foregående krav, hvor laurinfedtet i fedtsammensætningen omfatter fra 40 til 60 vægtprocent laurinsyre (C12:0), fortrinsvis fra 42 til 58 vægtprocent.

6. Den beluftede fedtemulsion ifølge et hvilket som helst af de foregående krav, hvor laurinfedtet i fedtsammensætningen er valgt blandt kokosnøddeolie, palmekerneolie, fuldt hydrogeneret kokosnøddeolie, fuldt hydrogeneret palmekerneolie, fraktioner deraf og blandinger deraf, og hvor laurinfedtet fortrinsvis består af kokosnøddeolie.

7. Den beluftede fedtemulsion ifølge et hvilket som helst af de foregående krav, hvor fedtsammensætningen omfatter fra 1 til 20 vægtprocent af det interesterificerede fedtstof, fortrinsvis fra 1 til 15 vægtprocent.

8. Den beluftede fedtemulsion ifølge et hvilket som helst af de foregående krav, hvor det interesterificerede fedtstof i fedtsammensætningen udgør fra 35 til 68 vægtprocent af den samlede mængde stearinsyre (C18:0) og arachidinsyre (C20:0), fortrinsvis fra 40 til 65 vægtprocent, fra 1 til 9 vægtprocent palmitinsyre (C16:0), fortrinsvis fra 1 til 8 vægtprocent, og fra 0,0 til 1,5 vægtprocent laurinsyre (C12:0), fortrinsvis fra 0,1 til 1,0 vægtprocent.

9. Den beluftede fedtemulsion ifølge et hvilket som helst af de foregående krav, hvor det interesterificerede fedtstof i fedtsammensætningen omfatter fra 7 til 30 vægtprocent af de kombinerede mængder af StStSt- og AstSt-triglycerider baseret på de samlede mængder triglycerider, der er til stede i sammensætningen, hvor St er stearinsyre og A er arachidinsyre, fortrinsvis fra 8 til 28 vægtprocent.

10. Den beluftede fedtemulsion ifølge et hvilket som helst af de foregående krav, hvor det interesterificerede fedtstof i fedtsammensætningen har et StOSt:StOO-vægtforhold på mindre end 2,5, fortrinsvis fra 0,5 til 2,3, hvor St er stearinsyre, og O er oliesyre.

11. Den beluftede fedtemulsion ifølge et hvilket som helst af de foregående krav, hvor det interesterificerede fedtstof i fedtsammensætningen har:
fra 45,0 til 68,0 fast fedtindhold ved 10 °C, fortrinsvis fra 48,0 til 67,5, og/eller
fra 15,0 til 70,0 fast fedtindhold ved 25 °C, fortrinsvis fra 20,0 til 65,0, og/eller
fra 15,0 til 59,0 fast fedtindhold ved 30 °C, fortrinsvis fra 20,0 til 55,0, og/eller
fra 10,0 til 55,0 fast fedtindhold ved 35 °C, fortrinsvis fra 15,0 til 50,0, og/eller
fra 5,0 til 45,0 fast fedtindhold ved 40 °C, fortrinsvis fra 10,0 til 40,0,
målt på ikke-stabiliseret fedtstof i henhold til ISO 8292-1.

12. Den beluftede fedtemulsion ifølge et hvilket som helst af de foregående krav, hvor det interesterificerede fedtstof i fedtsammensætningen er valgt blandt interesterificeret sheasmør, interesterificeret sheastearin, interesterificeret salsmør, interesterificeret salstearin, interesterificeret kokumsmør, interesterificeret kokumsmørstearin, interesterificeret kakaosmør, interesterificeret kakaosmørstearin og blandinger deraf, fortrinsvis interesterificeret salsmør, interesterificeret sheastearin og blandinger deraf.

13. Den beluftede fedtemulsion ifølge et hvilket som helst af de foregående krav, der omfatter:
fra 35 til 65 vægtprocent vand, fortrinsvis fra 40 til 55 vægtprocent,
fra 20 til 55 vægtprocent af fedtsammensætningen, fortrinsvis fra 25 til 50 vægtprocent, og
fra 5 til 25 vægtprocent sukker, fortrinsvis fra 10 til 20 vægtprocent.

14. Den beluftede fedtemulsion ifølge et hvilket som helst af de foregående krav, der er flødeskum.

15. En fremgangsmåde til fremstilling af en beluftet fedtemulsion, hvilken fremgangsmåde omfatter følgende trin:

a) tilvejebringelse af en blanding, der omfatter fra 10 til 90 vægtprocent vand og fra 10 til 90 vægtprocent af en fedtsammensætning, hvilken fedtsammensætning omfatter: fra 75 til 99 vægtprocent af et laurinfedt, der omfatter fra 35 til 65 vægtprocent laurinsyre (C12:0), og fra 1 til 25 vægtprocent af et interesterificeret fedtstof, der omfatter fra 30 til 70 vægtprocent samlet af stearinsyre (C18:0) og arachidinsyre (C20:0), fra 1 til 10 vægtprocent palmitinsyre (C16:0) og mindre end 2 vægtprocent laurinsyre (C12:0), hvilke procentdele af syrer betegner syrer, der er bundet som acylgrupper i glycerider i fedtstoffet og er baseret på den samlede vægt af C8- til C24-fedtsyrer, og fra 5 til 35 vægtprocent af de kombinerede mængder af StStSt- og AStSt-triglycerider baseret på den samlede mængde triglycerider, der er til stede i sammensætningen, hvor St er stearinsyre, og A er arachidinsyre,

b) pasteurisering og homogenisering af den i trin a) opnåede blanding,

c) stabilisering af den i trin b) opnåede pasteuriserede og homogeniserede blanding, fortrinsvis i mindst 6 timer ved fra 3 °C til 7 °C, især i fra 8 til 24 timer, og

d) beluftning af den i trin c) opnåede stabiliserede blanding.

16. Anvendelse af en beluftet fedtemulsion ifølge et hvilket som helst af kravene 1 til 14 i et konfektureprodukt eller bagværksprodukt.

17. Et konfektureprodukt eller bagværksprodukt, der omfatter en beluftet fedtemulsion ifølge et hvilket som helst af kravene 1 til 14.