resistant spoilage microorganisms present in creams. Therefore, pasteurised creams still require refrigeration to provide an acceptable shelf-life by inhibiting microbial spoilage.

[0005] Alternatively, UHT heat treatments, such as ≥ 140°C for 2 s, essentially kill all microorganisms present in creams, which greatly enhances the shelf-life of cream at refrigeration temperatures. However, such heat treatments promote Maillard browning. Maillard browning changes the white colour of cream to various shades of tan-to-brown and produces a distinctive cooked, caramelised flavour. The severity of the UHT heat treatment proportionally enhances the extent of colour and flavour changes. Although the UHT heat treatment prevents microbial spoilage, exposing UHT creams to fluctuating temperatures also promotes undesirable physical changes including phase separation, thickening, and/or solidification. Therefore, UHT creams still require continuous refrigeration to remain palatable and functional.

[0006] Unfortunately, many markets cannot provide continuous refrigeration during storage, transportation, and/or display. The UHT creams in these markets frequently are exposed to temperatures ≥ 30°C before re-establishing refrigerated storage. Such temperature fluctuations frequently cause UHT creams and whipping creams to solidify, which creates difficulties in pouring, increases whipping time, reduces overrun, and decreases the ability to retain desired whipped shapes such as rosettes (Hoffmann, 1999, Storage stability of UHT whipping cream, Kieler Milchwirtschaftliche Forschungsberichte 51(2), 125-136). Finally, the low pH, 4.6, of sour or acidic creams promotes casein coagulation during UHT heating to produce casein curd, or thickening, releases free whey, and ruins sour or acidic cream functionality.

[0007] It is an object of the invention to provide improved or alternative cream products.

[0008] Other objects of the invention may become apparent from the following descriptions which are given by way of example only. Reference to external sources of information in this specification include patent specifications and other documents to generally provide a context for discussing the features of the present invention. Unless stated otherwise, reference to such sources of information is not to be construed, in any jurisdiction, as an admission that such information constitutes prior art describing the creams and manufacturing methods of the invention.

SUMMARY ~~OF THE INVENTION~~

[0009] Accordingly, the ~~invention~~ disclosure broadly comprises a cream composition comprising lipid, optionally protein, one or more emulsifiers, one or more thickeners or stabilisers, minerals and optionally lactose. The compositions minimise browning during UHT

treatment, retain natural cream colour, preserve the natural cream flavour and mouthfeel characteristics (creaminess, mouth-coating, smoothness), maintain functionality such as whipping and resist destabilisation when exposed to temperature fluctuations.

[0009a] In one aspect, the disclosure provides a cream composition comprising:

a) about 7.5% to about 65% by weight lipid;

b) about 0% to about 2% by weight protein;

c) about 0.01% to about 1.0% by weight of one or more emulsifiers;

d) about 0.05% to about 3% by weight of one or more thickeners or stabilisers;

e) about 30mM to about 120mM total cations per litre of cream plasma; and

f) about 25mM to about 120mM total anions per litre of cream plasma.

[0010] In one ~~aspect~~example, the ~~invention~~ disclosure provides a cream composition comprising:

a) about 7.5 to about 65% by weight lipid;

b) about 0% to about 2%, preferably about 0.5% to about 1.2% by weight protein per litre of cream plasma;

c) about 0.01% to about 1.0% by weight of one or more emulsifiers;

d) about 0.05% to about 3%, preferably about 0.05% to about 0.3% by weight of one or more thickeners or stabilisers;

e) about 30mM to about 120mM total cations per litre of cream plasma; and

f) about 25mM to about 120mM total anions per litre of cream plasma.

[0011] In another ~~aspect~~example, the ~~invention~~ disclosure provides a cream composition comprising:

a) about 7.5 to 65% by weight lipid;

b) about 0% to about 2%, preferably about 0.5% to about 1.2% by weight protein per litre of cream plasma;

c) about 0.01% to about 1.0% by weight of one or more emulsifiers;

d) about 0.05% to about 3%, preferably about 0.05% to about 0.3% by weight of one or more thickeners or stabilisers;

e) about 5 to about 60mM total divalent cations per litre of cream plasma;

f) about 25 to about 60mM total monovalent cations per litre of cream plasma; and

g) about 25 to about 120mM total anions per litre of cream plasma, including about 5 to about 15mM citrate per litre of cream plasma.

[0012] In a further aspect, the ~~invention~~ disclosure provides a method of preparing a cream composition ~~of the invention~~, the method comprising

a) separating a first dairy liquid to obtain a cream base;

b) optionally blending a lipid source such as a high fat dairy liquid into the cream base to form a lipid enriched dairy liquid;

c) blending allowed dairy or non-dairy ingredients including minerals, one or more emulsifiers and one or more thickeners or stabilisers into the cream base or the lipid enriched dairy liquid;

d) homogenising the cream base or the lipid enriched dairy liquid to form a homogenised dairy liquid including the added allowed dairy or non-dairy ingredients; and

e) heating the homogenised dairy liquid including the added allowed dairy or non-dairy ingredients to obtain a cream composition having i) about 7.5% to about 65% by weight lipid; ii) about 0% to about 2% by weight protein per litre of cream plasma; iii) about 0.01% to about 1.0% by weight of one or more emulsifiers; iv) about 0.05% to about 3% by weight of one or more thickeners or stabilisers; v) about 30mM to about 120mM total cations per litre of cream plasma; and vi) about 25mM to about 120mM total anions per litre of cream plasma.

[0013] In some ~~embodiments~~examples, the method comprises a pasteurisation step at any stage of the process. For example, the first dairy liquid, cream base, lipid enriched dairy liquid, cream base or lipid enriched dairy liquid including the added allowed dairy or non-dairy ingredients, homogenised dairy liquid, or the cream composition may be pasteurised. Preferably, the method comprises pasteurising i) the first dairy liquid prior to step a), or ii) the lipid enriched dairy liquid prior to step c).

[0014] In some ~~embodiments~~examples, the method comprises an additional step of adjusting the pH of the cream base or lipid enriched dairy liquid prior to step d).

[0015] In a further aspect, the ~~invention~~ disclosure provides a method of preparing a cream composition~~ of the invention~~, the method comprising~~:~~

a) providing a dairy liquid permeate or a simulated milk ultrafiltrate as a dairy liquid base;

b) blending allowed dairy or non-dairy ingredients including one or more emulsifiers and one or more thickeners or stabilisers into the dairy liquid base;

c) blending a lipid source such as a high fat dairy liquid into the dairy liquid base including the added dairy or non-dairy ingredients to form a lipid enriched dairy liquid;

d) homogenising the lipid enriched dairy liquid to form a homogenised lipid enriched dairy liquid;

e) heating the homogenised lipid enriched dairy liquid to obtain a cream composition having i) about 7.5% to about 65% by weight lipid; ii) about 0% to about 2% by weight protein per litre of cream plasma; iii) about 0.01% to about 1.0% by weight of one or more emulsifiers; iv) about 0.05% to about 3% by weight of one or more thickeners or stabilisers; and v) about 30mM to about 120mM total cations per litre of cream plasma; and vi) about 25mM to about 120mM total anions per litre of cream plasma.

[0016] In some ~~embodiments~~examples, the method comprises a pasteurisation step at any stage of the process. For example, the dairy liquid base, dairy liquid base including the added allowed dairy or non-dairy ingredients, lipid enriched dairy liquid, homogenised lipid enriched dairy liquid, or the cream composition may be pasteurised. Preferably, the method comprises pasteurising the lipid enriched dairy liquid prior to step d).

[0017] In some ~~embodiments~~examples, the method comprises an additional step of adjusting the pH of the lipid enriched dairy liquid prior to step d).

[0018] The following examples~~embodiments~~ may relate to any of the above examples ~~aspects~~ in any combination.

[0019] In various examples ~~embodiments~~ the cream composition may be a coffee cream, whipping cream, half and half, fermented cream, light cream, whipping cream, heavy cream, dry cream, recombined cream, recombined whipping cream, creamer, sour or acidified cream. Preferably, the cream is a UHT cream, for example a UHT whipping cream.

[0020] In various examples ~~embodiments~~ the composition may comprise about 10% or above by weight lipid, for example about 25% to about 40% by weight lipid. Preferably, the lipid comprising one or more mammalian milk lipids, more preferably one or more bovine milk lipids, selected from the group consisting of cream, high fat cream, reconstituted cream powder, anhydrous milk fat (AMF), ghee, butter, ß-serum powder, whole milk powder (WMP), high fat milk protein concentrate, or any combination of any two or more thereof. Alternatively, or additionally, the lipid comprises one or more refined and/or hydrogenated

vegetable fat sources selected from the group consisting of palm, palm kernel, coconut, soybean, rapeseed, cottonseed, sunflower seed, corn, safflower seed, rice bran oil, sesame oil, olive oil, fractions thereof, or any combination of any two or more thereof. In various examples ~~embodiments~~ the composition may comprise any two or more, or any three or more, or any four or more of these lipid components. Preferably the lipid comprises cream, high fat cream, reconstituted cream powder, anhydrous milk fat (AMF), or any combination of any two or more thereof.

[0021] In various examples ~~embodiments~~ the composition may comprise about 10, 18, 25, 27, 30, 33, 35, 36, or 40% by weight lipid, and useful ranges may be selected between any of these values (for example, from about 25 to about 40, about 25 to about 35, about 25 to about 30, about 27 to about 40, about 30 to about 40, about 33 to about 40, about 35 to about 40, or about 37 to about 40% by weight).

[0022] In various examples ~~embodiments~~ the composition may comprise from about 10 to about 18% by weight lipid (i.e., Half and Half). In other examples ~~embodiments~~ the composition may comprise about 18% or above by weight lipid. In various examples ~~embodiments~~ the composition may comprise from about 18 to about 30% by weight lipid (i.e., FDA Light Cream). In various examples ~~embodiments~~ the composition may comprise from about 30 to about 36% by weight lipid (i.e., FDA Light Whipping Cream). In other examples ~~embodiments~~ the composition may comprise about 36% or above by weight lipid (i.e., FDA Heavy Whipping Cream).

[0023] In various examples ~~embodiments~~ the composition may comprise about 0% to about 2% by weight protein per litre of cream plasma. Suitable protein sources are known to the skilled person and include dairy, egg, plant, and food grade microbial and algal proteins. Preferably, the composition comprises one or more mammalian milk proteins, more preferably one or more bovine milk proteins, wherein the protein comprises or comprises a source of protein selected from the group consisting of milk, skim milk, cream, whole milk, acid whey, sweet whey, whole milk powder (WMP), skim milk powder (SMP), buttermilk powder (BMP), acid whey powder, sweet whey powder, caseinate, sodium caseinate, calcium caseinate, whey protein concentrate (WPC), whey protein isolate (WPI), milk protein isolate (MPI), milk protein concentrate (MPC), modified MPC derivatives, and micellar casein. Alternatively, or additionally, the protein comprises one or more non-dairy sources selected from plant or animal sources such as soy, egg and/or pea protein, or any combination of any two or more thereof. In various examples ~~embodiments~~ the composition may comprise any two or more, or any three or more, or any four or more of these components. Preferably the protein comprises milk, skim milk, cream, whole milk, whole milk powder (WMP), skim milk powder (SMP), buttermilk powder (BMP), caseinate, sodium caseinate,

calcium caseinate, whey protein concentrate (WPC), whey protein isolate (WPI), milk protein isolate (MPI), milk protein concentrate (MPC), modified MPC derivatives, micellar casein, or any combination of any two or more thereof.

[0024] In various examples ~~embodiments~~ the composition may comprise about 0, 0.25, 0.5, 0.75, 1, 1.25, 1.5, 1.75, or 2% by weight protein per litre of cream plasma, and useful ranges may be selected between any of these values (for example, from about 0 to about 1.5, about 0.5 to about 1.5, about 1 to about 2, about 0 to about 0.5% by weight protein per litre of cream plasma. Preferably, the composition comprises about 0 to about 1.2%, more preferably from about 0 to about 0.5%, for example from 0 to about 0.25% or from 0.25 to about 0.5% by weight protein per litre of cream plasma.

[0025] In various examples ~~embodiments~~ the composition may comprise about 0.01% to about 1.0% by weight of one or more emulsifiers selected from the group consisting of protein, phospholipids, including phospholipids from milkfat globule membrane, buttermilk powder, β-serum powder (the dried aqueous phase removed from pasteurised dairy cream during the manufacture of AMF), or an emulsifier listed in Codex Standard 288-1976 for creams such as lecithin, mono and diglycerides, distilled monoglycerides, acid esters of mono-diglycerides including lactic, citric, acetic, diacetyltartaric and tartaric, polysorbates (Tweens), sorbitan esters of fatty acids (SPANS), sucrose esters, polyglycerol esters of fatty acids, propylene glycol esters of fatty acids, sodium or calcium stearoyl lactylate, or any combination of any two or more thereof. In various examples ~~embodiments~~ the composition may comprise any two or more, or any three or more, or any four or more of these components. Preferably the one or more emulsifiers are selected from the group consisting of protein, phospholipids from milkfat globule membrane, buttermilk powder, β-serum powder, lecithin, mono and diglycerides, distilled monoglycerides, acid esters of mono-diglycerides including lactic, citric, acetic, diacetyltartaric and tartaric, polysorbates, sorbitan esters of fatty acids, sucrose esters, polyglycerol esters of fatty acids, propylene glycol esters of fatty acids, sodium or calcium stearoyl lactylate, or any combination of any two or more thereof. More preferably the one or more emulsifiers comprise two or more of lecithin, mono and diglycerides, polysorbates, sucrose esters, and propylene glycol esters of fatty acids.

[0026] In various examples ~~embodiments~~ the composition may comprise about 0.01, 0.025, 0.05, 0.075, 0.1, 0.2, 0.3, 0.4, 0.5, 0.6, 0.7, 0.8, 0.9, or 1.0% by weight of one or more emulsifiers, and useful ranges may be selected between any of these values (for example, from about 0.01 to about 1.0, about 0.025 to about 1.0, about 0.05 to about 1.0, about 0.075 to about 1.0, about 0.1 to about 1.0, about 0.2 to about 1.0, about 0.4 to about 1.0, about 0.5 to about 1.0, or about 0.6 to about 1.0% by weight).

[0027] In various examples ~~embodiments~~ the composition may comprise about 0.05% to about 3%, preferably to about 0.3%, or about 0.05% to about 3% by weight of one or more thickeners or stabilisers selected from the group consisting of, for example, carrageenan, guar gum, locust bean gum, Tara gum, gellan gum, xanthan gum, acacia gum, microcrystalline cellulose (MCC), carboxymethyl cellulose (CMC), cellulose derivatives, propylene glycol alginate, sodium alginate, pectin, gelatin, starch, starch derivatives, citrus fibre, or any combination of any two or more thereof. In various examples ~~embodiments~~ the composition may comprise any two or more, or any three or more, or any four or more of these components. Preferably the one or more thickeners or stabilisers are selected from the group consisting of carrageenan, guar gum, locust bean gum, Tara gum, gellan gum, xanthan gum, acacia gum, microcrystalline cellulose (MCC), carboxymethyl cellulose (CMC), cellulose derivatives, propylene glycol alginate, sodium alginate, pectin, gelatin, starch or starch derivatives, or citrus fibre, or any combination of any two or more thereof. More preferably the one or more thickeners or stabilisers comprise xanthan, carrageenan, and guar gum.

[0028] In various examples ~~embodiments~~ the composition may comprise about 0.05, 0.075, 0.1, 0.15, 0.2, 0.25, 0.3, 0.4, 0.5, 0.6, 0.7, 0.8, 0.9, 1, 1.5, 2, 2.5, or 3% by weight of one or more thickeners or stabilisers, and useful ranges may be selected between any of these values (for example, from about 0.05 to about 5, about 0.05 to about 4, about 0.05 to about 3, about 0.05 to about 2, about 0.05 to about 1, about 0.05 to about 0.9, about 0.05 to about 0.8, about 0.05 to about 0.7, about 0.05 to about 0.6, about 0.05 to about 0.5, about 0.05 to about 0.4, or about 0.05 to about 0.3% by weight).

[0029] In various examples ~~embodiments~~ the monovalent cations in the composition comprise sodium and potassium. Preferably, the composition may comprise 25, 30, 40, 50, or 60mM of monovalent cations per litre of cream plasma, and useful ranges may be selected between any of these values (for example, from about 40 to about 60mM, about 45 to about 55mM, or about 47.5 to about 52.5mM of monovalent cations per litre of cream plasma).

[0030] In various examples ~~embodiments~~ the divalent cations in the composition comprise calcium and magnesium. Preferably, the composition may comprise 5, 8, 10, 15, 20, 30, 40, 50, or 60mM of divalent cations per litre of cream plasma, and useful ranges may be selected between any of these values (for example, from about 8 to about 20mM, about 9 to about 15mM or about 10.5 to about 12.5mM of divalent cations per litre of cream plasma). In various examples~~embodiments~~, for example when acid whey or acid permeate are used as the dairy liquid base, useful ranges of divalent cations may be higher, for example from

about 25 to about 60mM, about 35 to about 50mM or about 40 to about 45mM of divalent cations per litre of cream plasma.

[0031] In various examples ~~embodiments~~ the total cations in the composition include the sum of sodium, potassium, calcium and magnesium. Preferably, the composition may comprise 30, 40, 45, 50, 60, 70, 80, 90, 100, 110 or 120mM of total cations per litre of cream plasma, and useful ranges may be selected between any of these values (for example, from about 45 to about 110mM, about 48 to about 65, about 50 to about 100, about 55 to about 95, about 60 to about 85, or about 75 to about 85mM of total cations per litre of cream plasma.

[0032] In various examples ~~embodiments~~ the total anions in the composition include the sum of phosphate, chloride and citrate. Preferably, the composition may comprise 25, 30, 35, 40, 50, 60, 70, 80, 90, 100 or 120mM of total anions per litre of cream plasma, and useful ranges may be selected between any of these values (for example, from about 25 to about 90mM, about 30 to about 80, about 35 to about 75, or about 50 to about 65mM of total anions per litre of cream plasma.

[0033] In various examples ~~embodiments~~ the composition may comprise 5, 7, 9, 11, 13 or 15mM of citrate per litre of cream plasma, and useful ranges may be selected between any of these values (for example, from about 6.5 to about 13mM, about 7 to about 11mM, about 7 to about 9mM, or about 7.5 to about 8.5 mM of citrate per litre of cream plasma.

[0034] Suitable sources for the identified cations, anions, and citrate may include dairy and non-dairy sources. Dairy sources may include permeate produced by membrane filtration of milk or whey. Membrane filtration includes microfiltration (MF), ultrafiltration (UF), and nanofiltration (NF). Permeate may receive further membrane filtration, ion exchange, and/or electrodialysis processing to fractionate or concentrate the protein, carbohydrate, cations, anions, and/or citrate. Suitable fraction technologies include nanofiltration and ion exchange. The permeate and/or permeate fractions may be further concentrated and/or dried, for example the dairy source may be permeate powder. Dried or powdered permeate may be reconstituted before use. Lactose may also be removed from permeate to provide another suitable source of cations and anions, such as phosphate, chloride and citrate. Suitable non-dairy mineral sources may include prepared simulated milk ultrafiltrate (SMUF) preparations, as described by Jenness and Koops (1962. Preparation and properties of a salt solution which simulates milk ultrafiltrate. Netherlands Milk and Dairy J. 16:153-164)

[0035] In certain examples~~embodiments~~, the composition may further comprise one or more natural or artificial sweeteners. The sweeteners that may be used in the creams of the present ~~invention~~ disclosure include one or more sugars, such as lactose, hydrolysed lactose, fructose, sucrose, galactose, dextrose and/or syrup. Other sweetening carbohydrates and sugar alcohol or combinations with artificial sweeteners may also be used. For example, sugar alcohols, such as xylitol, sorbitol, lactitol, maltitol and isomalt. In various examples ~~embodiments~~ the composition may comprise about 0.001 to about 6% by weight, preferably about 0.05 to about 5%, for example about 1 to about 4.5%, about 1.5 to about 4.5%, about 2 to about 4%, about 3 to about 4%, or about 3.5 to about 4% by weight sweetener.

[0036] In various examples~~embodiments~~, the composition further comprises sweetener at a concentration of 0.3% to 0.9% of Sucrose Equivalent Sweetness. As used herein, 1% (or other given amount) of Sucrose Equivalent Sweetness ("SES") means the amount of sweetener needed to be added to an 250ml glass of water in order to provide the same sweetness as an independent 250ml glass of water containing 1% (or the other given amount) of sucrose. For example, 6.67% of lactose will equal about 1% of SES because lactose is about 6.67 times less sweet than sucrose. Similarly, 0.005% of aspartame will equal about 1% of SES because aspartame is about 200 times sweeter than sucrose.

[0037] Preferably, the sweetener is lactose. In various examples~~embodiments~~, the composition may comprise about 2% to about 6% by weight, preferably about 3 to 5%, for example about 3.5 to about 4.5%, about 3 to about 4%, or about 3.5 to about 4% by weight lactose.

[0038] In other examples~~embodiments~~, the sweetener is fructose. Typically, 0.58% of fructose will equal about 1% of SES because fructose is 1.73 times sweeter than sucrose. In various examples~~embodiments~~, the composition may comprise about 0.17% to about 0.52% by weight fructose. In other examples~~embodiments~~, the sweetener is sorbitol, where 1.67% of sorbitol will equal about 1% of SES because sorbitol is 1.67 times less sweet than sucrose. In various examples~~embodiments~~, the composition may comprise about 0.5% to about 1.5% by weight sorbitol.

[0039] In certain examples~~embodiments~~, the composition may further comprise a buffering or chelating salt, preferably about 0 to about 0.03% by weight, for example about 0.01 to about 0.025% by weight of the buffering or chelating salt. Buffering or chelating salts can be selected from but not limited to, orthophosphates, polyphosphates and citrates, or any combination of any two or more thereof. For example, in certain exemplary examples ~~embodiments~~ the buffering or chelating salt is a polyphosphate salt, such as sodium or potassium polyphosphate.

[0040] In various examples ~~embodiments~~ the composition may exhibit an overrun of at least about 80%, for example at least 85, 90, 95, 100, 110, 120, 130, 140, 150, 160, 170, 180, 190, 200, 210, 220, 230 or 240% when whipped at 4 to 10°C using a bowl and whisk, and useful ranges may be selected between any of these values (for example, from about 90 to about 240, about 100 to about 240, about 120 to about 240, about 140 to about 240, about 160 to about 240, about 160 to about 220, about 180 to about 220, or about 200 to about 220%). In some examples~~embodiments~~, the composition maintains an overrun following whipping of greater than about 150%, for example greater than about 160%, greater than about 170%, greater than about 180%, greater than about 190%, greater than about 200% or greater than about 220%.

[0041] In various examples ~~embodiments~~ the composition may exhibit improved gas canister performance compared to standard creams. In various examples~~embodiments~~, the number of shakes of a standard gas canister containing the composition required to achieve a first good rosette is less than about 20, for example 5, 10, or 15 shakes, and useful ranges may be selected between any of these values (for example 5 to 10 shakes). Preferably, the number of shakes required to achieve a first good rosette is about 10 or less for the first rosette, and in increments of about 5 thereafter.

[0042] In various examples ~~embodiments~~ the composition may produce about 45, about 50, about 55 or about 60 rosettes of acceptable quality (i.e., firm with acceptable edge definition and little or no loss of definition after 15 minutes at ambient temperature) per kilogram of liquid cream, and useful ranges may be selected between any of these values (for example, about 50 to about 60 rosettes per kilogram of liquid cream). In various examples~~embodiments~~, when rosettes or acceptable quality can no longer be produced from the canister, the amount of cream remaining in the canister is less than about 15% of the initial liquid cream volume, preferably less than 10%, more preferably less than 6% of the initial liquid cream volume.

[0043] In various examples ~~embodiments~~ the composition may exhibit a change in apparent viscosity of less than about 50, 55, 60, 65, 70, 75, 80, 85, 90, 95, or 100% measured at a shear rate of 1 s^{-1} at 5°C after holding at 25°C for 24 hours followed by holding at 10°C for 24 hours, and useful ranges may be selected between any of these values (for example, about 50 to about 100, about 50 to about 90, about 50 to about 80, or about 60 to about 100%). Preferably the change is less than about 100% or less than about 50%.

[0044] In various examples ~~embodiments~~ the composition may exhibit a change in apparent viscosity of less than about 50, 55, 60, 65, 70, 75, 80, 85, 90, 95, or 100% measured at a

shear rate of 1 s^{-1} at 5 °C after two, or three or more cycles of holding at 25°C or 30°C for 24 hours followed by holding at 10°C for 24 hours, and useful ranges may be selected between any of these values (for example, about 50 to about 100, about 50 to about 90, about 50 to about 80, or about 60 to about 100%). Preferably the change is less than about 100% or less than about 50%.

[0045] In various examples ~~embodiments~~ the composition may exhibit a change in apparent viscosity of less than about 50, 55, 60, 65, 70, 75, 80, 85, 90, 95, or 100% measured at a shear rate of 1 s^{-1} at 5 °C after one, two, or three or more cycles of holding at 30°C for 24 hours followed by holding at 10°C for 24 hours, and useful ranges may be selected between any of these values (for example, about 50 to about 100, about 50 to about 90, about 50 to about 80, or about 60 to about 100%). Preferably the change is less than about 100% or less than about 50%.

[0046] In various examples ~~embodiments~~ the composition may exhibit a change in storage modulus, G', of less than about 50, 55, 60, 65, 70, 75, 80, 85, 90, 95, or 100% measured using small strain rheology, using a strain of 0.05% and a frequency of oscillation of 0.1Hz at 5°C after one, two, or three or more cycles of holding at 25°C or 30°C (or 32.5°C) for 15 minutes, for example using the method described herein in Example 2, and useful ranges may be selected between any of these values (for example, about 50 to about 100, about 50 to about 90, about 50 to about 80, or about 60 to about 100%). Preferably the change is less than about 100% or less than about 50%.

[0047] In various examples ~~embodiments~~ the composition may exhibit acceptable pourability, where the composition pours from the pack without sticking, or lumping after one, two, or three or more cycles of holding at 25°C for 24 hours followed by holding at 10°C for 24 hours.

[0048] Other ~~aspects~~ examples of the ~~invention~~ disclosure become apparent from the following description, which is given by way of example only, and with reference to the accompanying Figures.

[0049] As used herein the term "and/or" means "and" or "or", or both.

[0050] As used herein "(s)" following a noun means the plural and/or singular forms of the noun.

[0051] It is intended that reference to a range of numbers disclosed herein (for example, 1 to 10) also incorporates reference to all rational numbers within that range (for example, 1, 1.1, 2, 3, 3.9, 4, 5, 6, 6.5, 7, 8, 9 and 10) and also any range of rational numbers within that range (for example, 2 to 8, 1.5 to 5.5 and 3.1 to 4.7) and, therefore,

all sub-ranges of all ranges expressly disclosed herein are hereby expressly disclosed. These are only examples of what is specifically intended and all possible combinations of numerical values between the lowest value and the highest value enumerated are considered expressly stated in this application in a similar manner.

[0052] The term "comprising" as used in this specification means "consisting at least in part of". When interpreting statements in this specification which include that term, the features, prefaced by that term in each statement or claim, all need to be present but other features can also be present. Related terms such as "comprise" and "comprised" are to be interpreted in the same manner.

[0053] This ~~invention~~ disclosure may also be said broadly to consist in the parts, elements and features referred to or indicated in the specification of the application, individually or collectively, and any or all combinations of any two or more of said parts, elements or features, and where specific integers are mentioned herein which have known equivalents in the art to which this disclosure ~~invention~~ relates, such known equivalents are deemed to be incorporated herein as if individually set forth.

DESCRIPTION OF THE FIGURES

[0054] Figure 1 is a flow diagram of one aspect of the manufacturing process for producing UHT creams of the invention from cream obtained from milk. Cream produced by separating milk is combined with optionally allowed dairy and/or allowed non-dairy ingredients for adjusting the fat, protein, carbohydrate, cation, anion and, citrate content.

[0055] Figure 2 is a flow diagram of another aspect of the invention for producing the creams using recombining technology. Initially allowed dairy and/or non-dairy ingredients are combined with other allowed dairy and/or non-dairy ingredients. The blend is then combined with suitable concentrated fat sources to produce UHT creams or cream analogues of the invention with desired fat, protein, carbohydrate, cation, anion and, citrate content.

DETAILED DESCRIPTION OF THE INVENTION

[0056] This application provides cream compositions, such as coffee creams, whipping creams and cream analogues comprising a specific combination of ingredients resulting in a temperature robust, stable cream that can withstand temperature fluctuations while maintaining functionality (such as whipping) and avoiding defects.

[0057] Furthermore, the invention provides creams that retain the natural white colour, natural cream flavour and mouthfeel characteristics, and desired functionality despite temperature cycling, for example during transport or UHT processing. These creams may