

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property
Organization
International Bureau



(43) International Publication Date
8 August 2013 (08.08.2013)

(10) International Publication Number
WO 2013/116593 A1

(51) International Patent Classification:

A23D 7/005 (2006.01) *A21D 2/16* (2006.01)
A23D 7/01 (2006.01) *A21D 2/18* (2006.01)
A23D 7/015 (2006.01)

(21) International Application Number:

PCT/US2013/024265

(22) International Filing Date:

1 February 2013 (01.02.2013)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

13/366,201 3 February 2012 (03.02.2012) US

(71) Applicant: **BUNGE OILS, INC.** [US/US]; 11720 Borman Drive, St. Louis, MO 63146 (US).

(72) Inventors: **NAKHASI, Dilip, K.**; 1646 Longberry Lane, Bourbonnais, IL 60914 (US). **CORBIN, Danielle, N.**; 22836 East Drive, Richton Park, IL 60471 (US).

(74) Agents: **RIEGER, Dale L.** et al.; Jones Day, 222 East 41st Street, New York, NY 10017-6702 (US).

(81) Designated States (*unless otherwise indicated, for every kind of national protection available*): AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) Designated States (*unless otherwise indicated, for every kind of regional protection available*): ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

— with international search report (Art. 21(3))

(54) Title: REDUCED TRANS AND SATURATED FATTY ACID SPREAD COMPOSITIONS

(57) Abstract: Described herein are spread compositions having reduced levels of saturated and trans fats. The compositions comprise water, a base oil, a seeding ester and a cellulose fiber. Also provided are methods of preparing such compositions and use thereof. The seeding ester comprises a blend of diacylglyceride, monoacylglyceride and triacylglyceride.



WO 2013/116593 A1

REDUCED TRANS AND SATURATED FATTY ACID SPREAD COMPOSITIONS RELATED APPLICATIONS

[0001] This application claims benefit of U.S. Patent Application No. 13/366,201, filed on February 3, 2012, which is hereby incorporated by reference herein in its entirety.

FIELD

[0002] Provided herein are spread compositions having reduced levels of saturated and trans fatty acids as compared to the traditional spread compositions. The compositions provided herein comprise a seeding agent, a cellulose fiber, water, and a base oil. Also provided are methods of preparing such compositions and uses thereof.

BACKGROUND

[0003] Recent trends in the field of spread products have been directed to the development of reduced trans fat and reduced saturated fat products which also possess the desired functional properties, including the texture and spreadability. While reduced trans fat and reduced saturated fat spreads are desirable, it has been observed that spreads having less than about 40% fat suffer from severe emulsion instability after prolonged storage at refrigerator temperature. Pools of oil and moisture are observed in such products and it is believed that the fat of the products recrystallize upon storage causing the emulsion instability problem.

[0004] To address this problem, in part, substantial work has been carried out with bulking agents such as powdered and microcrystalline cellulose in the spread products. However, reducing the trans fats and saturated fats adversely affect the organoleptic properties of the products and create undesirable mouthcoating or drying sensation.

[0005] There is a continuing need for spread compositions having reduced levels of saturated fats and trans fats, and acceptable mouthfeel and physical properties for handling and food preparation.

SUMMARY

[0006] In certain embodiments, provided herein are spread compositions with reduced levels of both trans fatty acids and saturated fatty acids, wherein the compositions comprise a seeding agent, a cellulose fiber, a base oil and an aqueous phase.

[0007] In certain embodiments, the spread compositions provided herein comprise about 40-65% aqueous phase, 1-25% seeding agent, 1-15% cellulose fiber, and 10-40 % base oil based on the total weight of the composition. In certain embodiments, the spread compositions provided

herein comprise about 40-60% water, 3-19% seeding agent, 3-10% cellulose fiber, and 15-19% base oil based on the total weight of the composition.

[0008] The seeding agent used herein is a blend of a diacylglyceride (DAG), a monoacylglyceride (MAG), and a triacylglyceride (TAG). In certain embodiments, the seeding agent comprises about 15-55% DAG, 4-15% MAG and 30-80% TAG based on the total weight of the seeding agent.

[0009] In certain embodiments, the base oil used herein comprises triglycerides, fatty acids and fatty acid derivatives of natural or synthetic origin, including, but not limited to high oleic canola, soybean, palm, corn, sunflower, coconut oil, rapeseed, peanut, safflower, high oleic safflower oil, olive, cottonseed, or a mixture thereof.

[0010] In another embodiment, provided herein is a method for preparing the spread compositions described herein. In certain embodiments, the method comprises mixing the base oil and seeding agent to obtain an oil mixture, adding cellulose to the oil mixture to obtain an oil-cellulose mixture, adding water to the oil-cellulose mixture followed by shearing and cooling to provide the spread composition. The order of adding the ingredients can be changed as required by a particular process. In certain embodiments, cooling is carried out with agitation.

[0011] In certain embodiments, the spread compositions so produced have lower levels of saturated fats than the margarine compositions known in the art. In certain embodiment, the compositions provided herein are used in bakery products, e.g., cookies, cakes, pie crusts, breads, icings and other products in place of conventional margarine spreads.

[0012] It is to be understood that both the foregoing general description and the following detailed description are exemplary and explanatory only and are not restrictive.

BRIEF DESCRIPTION OF DRAWINGS

[0013] Figure 1 provides a microscopic image of a sample of Example 42B using a polarized light source.

[0014] Figure 2 provides a microscopic image of a sample of Example 42B using a cross polarized light source.

DETAILED DESCRIPTION

[0015] Provided herein are spread compositions comprising a seeding agent, a cellulose fiber, water, and a base oil. Further provided are methods of making the compositions and uses

of the compositions. The methods and compositions are described in detail in the sections below.

Definitions

[0016] Unless defined otherwise, all technical and scientific terms used herein have the same meaning as is commonly understood by one of ordinary skill in the art. All patents, applications, published applications and other publications are incorporated by reference in their entirety. In the event that there are a plurality of definitions for a term herein, those in this section prevail unless stated otherwise.

[0017] The term “seeding agent” or “specialty ester” as used herein refers to a blend of diglycerides (DAGs), monoglycerides (MAGs) and triglycerides (TAGs) in specific amounts. In certain embodiments, the seeding agent comprises about 15-55% DAGs and 4-15% MAGs and 30-80% TAGs based on the total weight of the seeding agent. The seeding agent can be prepared using a method described herein or any method known to one of skill in the art.

[0018] The term “base oil” as used herein refers to an oil which is substantially liquid at room temperature and has an iodine value of greater than 70, or greater than 90. The base oil can be an unhydrogenated oil or a partially hydrogenated oil, a modified oil or a mixture thereof. Natural and synthetic fats and oils are included in this term.

[0019] The term “oil blend” refers to a blend comprising two or more oils suitable for use in the compositions herein. In one embodiment, the oil blend comprises palm oil and soybean oil. In certain embodiments, the oil blend comprises palm oil, palm stearin, soybean oil, and emulsifiers.

[0020] The term “saturates”, “saturated fat”, and “saturated fatty acids” as used herein refer to C₄ to C₂₆ fatty acids or esters containing no unsaturation.

[0021] The term “trans”, and “trans fatty acids” as used herein refer to fatty acids and/or esters containing double bonds in the trans configuration, generally resulting from the hydrogenation or partial hydrogenation of a fat.

[0022] The term “iodine value” or “IV” as used herein refers to the number of grams of iodine equivalent to halogen adsorbed by a 100 gram sample of fat. The IV is a measure of the unsaturated linkages in a fat.

[0023] As used herein, “cellulose fiber” refers to a fibrous cellulose material obtained from plant sources. The fibrous nature of the material and the existence of capillaries that can take up

oil is an important feature for the cellulose fiber used herein. Exemplary cellulose fibers are obtained from wood pulp, pea and bamboo.

[0024] As used herein, “oil phase” refers to a mixture or solution of one or more base oils, a seeding agent, a cellulose fiber, and one or more additives selected from emulsifiers, salt, preservatives, flavoring agents, coloring agents and other additives known to one of skill in the art.

[0025] As used herein, “aqueous phase” refers to water or an aqueous solution or mixture comprising water, and one or more additives selected from salt, preservatives, flavoring agents, coloring agents and other additives known to one of skill in the art.

[0026] It must be noted that, as used in the specification and the appended claims, the singular forms “a,” “an” and “the” include plural referents unless the context clearly dictates otherwise. Thus, for example, reference to “a vegetable oil” includes mixtures of two or more such vegetable oils, and the like. In one embodiment, reference to “a vegetable oil” includes interesterified and/or genetically modified oils.

[0027] All percent values are given as weight percent unless expressly stated otherwise.

Compositions

[0028] In certain embodiments, provided herein are spread compositions comprising a seeding agent, a cellulose fiber, water, and a base oil. Without being bound to any particular theory, it is believed that in certain embodiments, the cellulose fiber and seeding agent act synergistically to impart the desired crystalline structure to the composition. In certain embodiments, the compositions provided herein have about 15-60% less saturated and trans fatty acids as compared to the margarine compositions known in the art. In certain embodiments, the compositions provided herein have about 25-50% less saturated and trans fatty acids as compared to the margarine compositions known in the art.

[0029] In certain embodiments, the compositions provided herein have about 15-50% less saturated fatty acids as compared to the margarine compositions known in the art. In certain embodiments, the compositions provided herein have about 20-50% less, about 25-50% less, about 25-45% less or about 30-40% less saturated fatty acids as compared to the margarine compositions known in the art. In certain embodiments, the compositions provided herein have about 50%, 45%, 40%, 35%, 32%, 30%, 25%, 20% or 15% less saturated fatty acids as compared to the margarine compositions known in the art.

[0030] In certain embodiments, the compositions provided herein have about 15-50% less trans fatty acids as compared to the margarine compositions known in the art. In certain embodiments, the compositions provided herein have about 20-50% less, about 25-50% less, about 25-45% less or about 25-40% less trans fatty acids as compared to the margarine compositions known in the art. In certain embodiments, the compositions provided herein have about 50%, 45%, 40%, 35%, 32%, 30%, 25%, 20% or 15% less trans fatty acids as compared to the margarine compositions known in the art.

[0031] In certain embodiments, the spread compositions provided herein comprise about 40-65% water, 1-25% seeding agent, 1-15% cellulose fiber, and 10-25% base oil based on the total weight of the composition.

[0032] In certain embodiments, the spread compositions provided herein comprise about 40-65%, 42-60%, 45-58% or 45-55% water based on the total weight of the composition. In certain embodiments, the spread compositions provided herein comprise about 40, 45, 50, 55, or 60% water based on the total weight of the composition.

[0033] The seeding agent used in the compositions herein comprises a blend of a diacylglyceride (DAG), a monoacylglyceride (MAG) and a triacylglyceride (TAG). In certain embodiments, the seeding agent further comprises free fatty acids and fatty acid derivatives.

[0034] In certain embodiments, the acyl portion in the diacylglyceride comprises saturated or unsaturated medium to long chain fatty acids. In certain embodiments, the acyl portion in the diacylglyceride comprises fatty acids selected from lauric acid, myristic acid, palmitic acid, stearic acid, behenic acid, oleic acid, linoleic acid and linolenic acid.

[0035] In certain embodiments, the acyl portion in the monoacylglyceride comprises saturated or unsaturated medium to long chain fatty acids. In certain embodiments, the acyl portion in the monoacylglyceride comprises fatty acids selected from, lauric acid, myristic acid, palmitic acid, stearic acid, behenic acid, oleic acid, linoleic acid and linolenic acid.

[0036] In certain embodiments, the acyl portion in the triacylglyceride comprises saturated or unsaturated medium to long chain fatty acids. In certain embodiments, the acyl portion in the triacylglyceride comprises fatty acids selected from lauric acid, myristic acid, palmitic acid, stearic acid, behenic acid, oleic acid, linoleic acid and linolenic acid.

[0037] In certain embodiments, the seeding agent comprises about 15-55% DAG based on the total weight of the seeding agent and a remaining portion comprising MAG and TGA. In

certain embodiments, the remaining portion comprises TAG, free fatty acids and free fatty acid esters.

[0038] In certain embodiments, the seeding agent comprises about 20-50% DAG based on the total weight of the seeding agent, 4-15% MAG based on the total weight of the seeding agent and remaining portion comprising TAG. In certain embodiments, the seeding agent comprises about 20-50% DAG based on the total weight of the seeding agent, 4-15% MAG based on the total weight of the seeding agent and remaining portion comprising TAGs, free acids and fatty acid derivatives. In certain embodiments, the seeding agent comprises about 20-50% DAG, 4-15% MAG and 30-70% TAG based on the total weight of the seeding agent. In certain embodiments, the seeding agent comprises about 30-35% DAG, 8-10% MAG and 50-60% TAG based on the total weight of the seeding agent. In certain embodiments, the seeding agent comprises about 15-55%, 25-50%, 30-50%, 20-40%, 25-35% or 30-35% DAG based on the total weight of the seeding agent. In certain embodiments, the seeding agent comprises about 25-35% DAG based on the total weight of the seeding agent. In certain embodiments, the seeding agent comprises about 5-10%, 6-10%, 7-10% or 8-10% MAG based on the total weight of the seeding agent. In certain embodiments, the seeding agent comprises about 8-10% MAG based on the total weight of the seeding agent. In certain embodiments, the seeding agent comprises about 35-75%, 35-70%, 40-70%, 45-65% or 45-70% TAG based on the total weight of the seeding agent. In certain embodiments, the seeding agent comprises about 45-70% TAG based on the total weight of the seeding agent. In certain embodiments, the seeding agent further comprises about 1-30% free fatty acids and fatty acid derivatives based on the total weight of the seeding agent. In certain embodiments, the seeding agent comprises about 5-30%, 10-30%, 5-15%, 15-30% or 10-20% free fatty acids and fatty acid derivatives based on the total weight of the seeding agent. In certain embodiments, the seeding agent comprises about 25-40% DAG based on the total weight of the seeding agent, 6-12% MAG based on the total weight of the seeding agent and remaining portion comprising TAG, free fatty acids and free fatty acid esters. In certain embodiments, the seeding agent comprises about 25-40% DAG, 6-12% MAG and 45-65% TAG based on the total weight of the seeding agent. In certain embodiments, the seeding agent comprises about 30-35% DAG based on the total weight of the seeding agent, 8-10% MAG based on the total weight of the seeding agent and remaining portion comprising TAG, free fatty

acids and free fatty acid esters. In certain embodiments, the seeding agent comprises about 30-35% DAG, 8-10% MAG and 45-50% TAG based on the total weight of the seeding agent.

[0039] In certain embodiments, the spread compositions provided herein comprise about 1-25%, 1-20%, 2-20%, 3-20%, 3-19%, 4-17%, 5-17% or 6-20% seeding agent based on the total weight of the composition. In certain embodiments, the spread compositions provided herein comprise about 5, 8, 9, 10, 15, 17, 19 or 20% seeding agent based on the total weight of the composition.

[0040] Any cellulose material having fibrous nature and capillaries that can take up oil can be used in the compositions provided herein. In certain embodiments, the cellulose fibers for use herein are obtained from plant sources, including but not limited to wood pulp, bamboo, pea, citrus fruit and sugar beets. In certain embodiments, the cellulose fibers are obtained from bamboo. In certain embodiments, the cellulose fibers have an average fiber length of about 15-50 micron, 20-50 micron, 20-40 micron, 25-35 micron, or 25-40 micron. In certain embodiments, the cellulose fibers have an average fiber length of about 25, 30 or 35 micron. In certain embodiments, the cellulose fibers have an average fiber thickness of about 0.5-5 micron, 1-5 micron, 1-3 micron, or 1-2 micron. In certain embodiments, the cellulose fibers have an average fiber length of about 1-2 micron. In certain embodiments, the cellulose fiber used is CREAMFIBRE QC 40. In certain embodiments, the cellulose fiber used is Solka-Floc 300 FCC. In certain embodiments, cellulose fibers having a range of average lengths, processed from different source materials and of different levels of purity can be used.

[0041] In certain embodiments, the compositions provided herein comprise the cellulose fiber in an amount from about 1 to about 15% by weight based on the total weight of the composition. In certain embodiments, the amount of the cellulose fiber in the compositions is about 1% - 10%, about 3% - 10%, about 3% - 7%, about 4% - 7% or about 2% - 5% by weight based on the total weight of the composition. In certain embodiments, the amount of the cellulose fiber in the compositions is about 3% - 5% or about 4% - 5% by weight based on the total weight of the composition. In certain embodiments, the amount of the cellulose fiber in the compositions is about 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14 or 15% by weight based on the total weight of the composition. In certain embodiments, the amount of the cellulose fiber in the compositions is about 5% by weight based on the total weight of the composition.

[0042] In certain embodiments, the base oil used herein comprises one or more saturated or unsaturated triglycerides, fatty acids and fatty acid derivatives of natural or synthetic origin. In certain embodiments, base oil is any oil or mixture of oils that is substantially liquid at room temperature and has an iodine value of greater than 70, greater than 80 or greater than 90. In certain embodiments, the base oil has an iodine value of about 70-100, 80-95, 85-95 or 90-95. In certain embodiments, the base oil has an iodine value of about 70, 80, 85, 88, 89, 90, 91, 92, 93 or 95. Examples of fatty acids include without limitation, oleic acid, linoleic acid, linolenic acid, alpha-linolenic acid, arachidonic acid, eicosapentaenoic acid, erucic acid, docosahexaenoic acid, palmitic acid, stearic acid, behenic acid, or combinations thereof. The sources of fatty acids are generally substrates of natural origin. Suitable substrates of natural origin include without limitation, vegetable oils, rapeseed oil, animal fats, corn oil, canola oil, olive oil, cottonseed oil, safflower oil, high oleic safflower oil, palm oil, soybean oil, sunflower oil, peanut oil, coconut oil, or other oils and triglycerides of natural origin, as well as fatty acids and/or fatty acid derivatives obtained therefrom. In certain embodiments, the base oil used herein comprises high oleic canola oil, soybean oil, palm oil, corn oil, sunflower oil, rapeseed oil, peanut oil, safflower oil, high oleic safflower oil, olive oil, cottonseed oil, or a mixture thereof. In certain embodiments, the base oil used herein further comprises an emulsifier. In certain embodiments, the base oil used herein comprises soybean oil, palm oil, or a mixture thereof. In certain embodiments, the base oil used herein comprises a blend of palm oil, palm stearin, soybean oil, and emulsifiers. In certain embodiments, the emulsifier comprises monoglycerides and diglycerides. In certain embodiments, the emulsifier is Estric™ (available from Bunge). In certain embodiments, the base oil used herein comprises a blend of hydrogenated soybean oil and fully hydrogenated cottonseed oil.

[0043] In certain embodiments, the amount of base oil in the composition is about 5-50 % by weight based on the total weight of the composition. In certain embodiments, the amount of base oil in the composition is about 5-40%, 10-40%, 20-40%, 15-35%, or 15-30% by weight based on the total weight of the composition.

[0044] In certain embodiments, the base oil comprises soybean oil, palm oil, corn oil, sunflower oil, rapeseed oil, peanut oil, safflower oil, high oleic safflower oil, olive oil, cottonseed oil, or a mixture thereof, from about 3-20 % by weight based on the total weight of the composition. In certain embodiments, the composition comprises soybean oil from about 3-

15%, 3-12 % or 5-20% by weight based on the total weight of the composition. In certain embodiments, the amount of soybean oil in the composition is about 3, 5, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19 or 20 % by weight based on the total weight of the composition.

[0045] In certain embodiments, the base oil comprises an oil blend comprising palm oil and soybean oil. In certain embodiments, the base oil is an oil blend comprising palm oil, palm stearin, soybean oil, and Estric™ (available from Bunge). In certain embodiments, the amount of the oil blend in the composition is about 15, 17, 19, 23, 25, 27, 36 or 40% by weight based on the total weight of the composition. In certain embodiments, the amount of soybean oil in the oil blend is about 10-30 % by weight based on the total weight of the oil blend. In certain embodiments, the amount of soybean oil in the oil blend is about 10-20 % by weight based on the total weight of the oil blend. In certain embodiments, the amount of soybean oil in the soybean and palm oil blend is about 10, 13, 15, 18, 20, 22, 24, 25, 27 or 30 % by weight based on the total weight of the oil blend. In certain embodiments, the amount of palm oil in the oil blend is about 60-95 % by weight based on the total weight of the oil blend. In certain embodiments, the amount of palm oil in the oil blend is about 60, 65, 69, 70, 75, 77, 80, 82, 84, 86, 88, 90, 92 or 95 % by weight based on the total weight of the oil blend. In certain embodiments, the amount of palm stearin in the oil blend is about 10-25 % by weight based on the total weight of the oil blend. In certain embodiments, the amount of palm stearin in the oil blend is about 10, 12, 15, 17, 20, 23, or 25 % by weight based on the total weight of the oil blend. In certain embodiments, the oil blend further comprises an emulsifier, such as Estrin™, in an amount from about 0.5-3%, 0.5-2%, 0.5-1% or about 1% by weight based on the total weight of the oil blend.

[0046] In certain embodiments, the compositions provided herein further comprise one or more additives. Common additives that can be added to the shortening compositions provided herein include, but are not limited to stabilizers, flavoring agents, emulsifiers, anti-spattering agents, colorants, or antioxidants. Exemplary additives are described, for example, in Campbell *et al.*, *Food Fats and Oils*, 8th Ed., Institute of Shortening and Edible Oils, Washington, D.C.

[0047] In certain embodiments, the compositions further comprise a preservative or an antioxidant. A wide variety of preservatives and antioxidants are suitable for use, including but not limited to butylated hydroxytoluene (BHT), butylated hydroxyanisole (BHA), tertiary butylhydroquinone (TBHQ), ethylenediaminetetracetic acid (EDTA), gallate esters (*i.e.* propyl

gallate, butyl gallate, octyl gallate, dodecyl gallate, etc.), tocopherols, lactic acid, citric acid, citric acid esters (*i.e.* isopropyl citrate, etc.), gum guaiac, nordihydroguaiaretic acid (NDGA), thiodipropionic acid, ascorbic acid, ascorbic acid esters (*i.e.* ascorbyl palmitate, ascorbyl oleate, ascorbyl stearate, etc.) tartaric acid, lecithin, methyl silicone, sodium benzoate, polymeric antioxidant (Anoxomer) plant (or spice and herb) extracts (*i.e.* rosemary, sage, oregano, thyme, marjoram, etc.) and mixtures thereof.

[0048] In certain embodiments, the spread formulations further comprise an emulsifier. A wide variety of emulsifiers are suitable for use, including but not limited to mono- and diglycerides, distilled monoglycerides, polyglycerol esters of C₁₂ to C₂₂ fatty acids, propylene glycol mono and diesters of C₁₂ to C₂₂ fatty acids, sucrose mono- and diesters of C₁₄ to C₂₂ fatty acids.

[0049] In certain embodiments, the spread formulations further comprise additional ingredients, such as salt, coloring and flavoring agents. In certain embodiments the flavoring agents include butter flavoring agents, meat flavoring agents, tallow flavoring agents, olive oil flavoring agents and other natural or synthetic flavoring agents. In certain embodiments, vitamins can be included in the compositions provided herein. In certain embodiments, various other additives can be used in the spread compositions provided that they are edible and aesthetically desirable.

[0050] In certain embodiments, the spread compositions provided herein comprise about 40-55% water, 7-20% seeding agent, 3-6% cellulose fiber, 10-50% base oil, and remaining amount of additives based on the total weight of the composition.

[0051] In certain embodiments, the spread compositions provided herein comprise about 40-55% water, 7-20% seeding agent, 3-6% cellulose fiber, 10-28% oil blend comprising palm and soybean oil, 3-20% soybean oil and remaining amount of additives based on the total weight of the composition.

[0052] In certain embodiments, the spread compositions provided herein comprise about 40-55% water, 7-20% seeding agent, 3-6% cellulose fiber, 10-28% oil blend, 3-20% soybean oil and remaining amount of additives based on the total weight of the composition.

[0053] In certain embodiments, the spread compositions provided herein comprise about 55% water, 8% seeding agent, 5% cellulose fiber, 22% oil blend, 5% soybean oil and remaining amount of additives based on the total weight of the composition.

[0054] In certain embodiments, the spread compositions provided herein comprise about 55% water, 10% seeding agent, 5% cellulose fiber, 18% oil blend, 7% soybean oil and remaining amount of additives based on the total weight of the composition.

[0055] In certain embodiments, the spread compositions provided herein comprise about 45% water, 9% seeding agent, 5% cellulose fiber, 24% oil blend, 12% soybean oil and remaining amount of additives based on the total weight of the composition.

[0056] In certain embodiments, the spread compositions provided herein comprise about 56% water, 15% seeding agent, 5% cellulose fiber, 16% oil blend, 3% soybean oil and remaining amount of additives based on the total weight of the composition.

[0057] In certain embodiments, the spread compositions provided herein comprise about 53% water, 17% seeding agent, 5% cellulose fiber, 12% oil blend, 7% soybean oil and remaining amount of additives based on the total weight of the composition.

[0058] In certain embodiments, the spread compositions provided herein comprise about 53% water, 17% seeding agent, 5% cellulose fiber, 12% oil blend, 7% soybean oil and remaining amount of additives based on the total weight of the composition.

Methods of Preparation

[0059] Starting materials used in preparing the compositions provided herein are either known or can be prepared according to known methods.

[0060] In certain embodiments, the methods of preparation comprise the steps of mixing a seeding agent with a base oil to obtain an oil mixture, mixing cellulose with the oil mixture to obtain an oil-fiber blend, adding an aqueous phase to the oil-fiber blend, mixing to obtain a homogeneous composition, and cooling. In one embodiment, the homogeneous composition is cooled with agitation in an ice cream maker, to promote a crystal structure that imparts the desired physical properties to the composition.

[0061] The order of adding the ingredients and heating the ingredients can be changed as required by a particular process. In certain embodiments, the oil mixture and cellulose fiber are mixed at about 50-80 °C. In certain embodiments, the oil-fiber blend and aqueous phase are

mixed at about 50-80 °C. It is intended that the claims appended hereto shall not be limited by the order of the heating and mixing steps.

[0062] In one embodiment, provided herein is a method for preparing the spread composition, wherein the method comprises a) mixing a seeding agent with a base oil (*e.g.* soybean oil and oil blend comprising palm and soybean oil) to obtain an oil mixture b) blending together the oil mixture and a cellulose fiber to obtain an oil-fiber blend, and c) mixing an aqueous phase in the oil-fiber blend to obtain a homogeneous composition. In certain embodiments, steps a), b) and/or c) are carried out at a temperature of about 50-80 °C, 55-75 °C, 60-75 °C or 60-70 °C. In certain embodiments, the mixing step c) is followed by cooling, optionally with agitation, to obtain a solidified composition. In certain embodiments, the cooling is performed at freezing temperatures. In certain embodiments, the cooling is performed at a temperature of about 25 °C, 20 °C, 15 °C, 10 °C, 5 °C, 0 °C, -5 °C or lower. In certain embodiments, the cooling is performed at a temperature of about 25 °C-10 °C, 25 °C-15 °C, or 22 °C-18 °C. In certain embodiments, the cooling is performed in an ice-cream maker. In certain embodiments, the cooling is performed with agitation to obtain a solidified composition.

[0063] In certain embodiments, a mechanical agitator is used to obtain the mixture in step a), the oil-fiber blend in step b) and/or the homogeneous composition in step c). In one embodiment, in step b), the agitation is carried out till the cellulose fiber disperses into the oil. In certain embodiments, step a) is started at room temperature and the oil is heated up to a temperature of about 45, 50, 53, 55, 57, 59, 61, 63, 65, 67, 70, 73 or 75 °C while mixing. In certain embodiments, cellulose fiber is added to the oil mixture at about 45, 50, 53, 55, 57, 59, 61, 63, 65, 67, 70, 73 or 75 °C. In certain embodiments, the blend is mixed for about 3-15 minutes, or 3-10 minutes.

[0064] In another embodiment, the method comprises a) blending together one or more base oils and a seeding agent to obtain an oil-ester blend, and b) mixing cellulose fiber with the oil-ester blend to obtain an oil phase. In certain embodiments, steps a) and b) are carried out at a temperature of about 40-95 °C, 50-75 °C, 50-70 °C, 60-75 °C or 60-70 °C.

[0065] The mixing of the cellulose fiber and base oils can be accomplished using techniques known in the art.

[0066] The seeding agent can be prepared using techniques known in the art. In one embodiment, the starting raw material (*i.e.* palm, palm stearine, behenic FFA, soy, canola, hear

oil and other various oil and FFA blends) is heated to a temperature of about 120-150°C; about 3-5% by weight glycerin is added while heating is continued. About 0.2% by weight CaOH powder is added at 165°C and reaction continued for about 90 minutes within a temperature range of about 165°C-175°C. The reaction mixture is cooled to about 125°C-130°C, and about 0.375% by weight of 85% phosphoric acid is added with mixing to neutralize. Mixing is continued for about 10 minutes, and about 0.5% by weight each of Trisyl and filter aid are added with mixing. The mixture is filtered after about 10 minutes. In certain embodiments, the filtered material is deodorized for 4 hours using techniques known in the art.

[0067] In one embodiment, the mixture is continuously sparged with nitrogen and agitating at approximately 450-600 rpm throughout the reaction, neutralization and post-treatment process.

[0068] The spread compositions produced herein can be used to produce a variety of foods including, but not limited to, cakes, icings, breads, brownies, pie crusts, croissants, cookies or pastry puffs. With the reduction in total saturated and trans fat content, food products produced with the compositions described herein can provide health benefits.

[0069] The following examples present certain exemplary embodiments and are intended by way of illustration and not by way of limitation. In each of the examples herein, percentages indicate weight percent of the total mixture, unless otherwise indicated.

EXAMPLES

[0070] The following examples are put forth so as to provide those of ordinary skill in the art with a complete disclosure and description of how the compounds, compositions, and methods described and claimed herein are made and evaluated, and are intended to be purely exemplary and are not intended to limit the scope of the claimed subject matter. Unless indicated otherwise, parts are parts by weight, temperature is in °C or is at ambient temperature, and pressure is at or near atmospheric. There are numerous variations and combinations of reaction conditions, *e.g.*, component concentrations, temperatures, pressures and other reaction ranges and conditions that can be used to optimize the product purity and yield obtained from the described process. Only reasonable and routine experimentation will be required to optimize such process conditions.

Examples 1-37

[0071] The compositions of Examples 1-37 described in Table 1 were prepared using the following general procedure:

[0072] The seeding agent used in Examples 1-37 was prepared according to the procedure described in Example 38. The oil blend used in Examples 1-2 contained 87.5% partially hydrogenated soybean oil and 12.5% fully hydrogenated cottonseed oil. The oil blend used in Examples 3-37 contained 69% palm oil, 17% palm stearin, 13% soybean oil, and 1% Estric™ (available from Bunge).

[0073] Various additives used in examples are commercially available, for example, Vitamin A color premix is available from Vitamins Inc., Butter flavor is available from Abelei Inc., and PEG POLYALDO® is available from Lonza.

[0074] The cellulose fiber used in the examples is CREAMFIBRE QC 40.

[0075] The desired amounts of all oil phase ingredients, except cellulose, were weighed and mixed in a beaker. The desired amounts of aqueous phase ingredients were weighed and mixed in a separate beaker. Both the oil and aqueous phases were heated up to about 60°C -70°C. The desired amount of cellulosic fibrous material was added to the fully melted oil phase ingredients being held at 60°C-70°C. The mixture was stirred via a magnetic stirrer for about 2-4 minutes. The aqueous phase was added to the oil phase and stirred for another 2-4 minutes. The mixture containing oil and aqueous phases was poured into a stainless steel beaker and sheared at 4600-5100 rpm for 1-2 minutes.

[0076] The mixture was poured into frozen CUISINART® ICE 21 Ice Cream Maker frozen bowl and churned for 5-15 minutes. Sample were scooped out of bowl and placed in glass jars and allowed to stay at ambient temperature for 24 hours prior to evaluation of any oiling/watering out and spreadability.

Table 1:

Example No.	Oil Phase						Aqueous phase				
	Soybean oil (%)	Seeding agent (%)	Cellulose (%)	Oil blend (%)	PEG Polyaldo® (%)		Water (%)	Salt (%)	EDTA (%)	Vitamin A color premix (%)	Butter flavor (%)
1. ¹	10.00	12.00	5.00	18	-		53.29	1.00	-	-	0.069
2. ²	30.00	10.00	5.00	10	-		42.99	1.00	-	-	0.069
3.	10.00	15.00	10.00	30.00	-		32.00	2.90	0.01	0.02	0.07
4.	10.00	17.00	11.00	22.00	-		37.00	2.90	0.01	0.02	0.07
5.	15.00	10.00	10.00	22.00	-		40.00	2.90	0.01	0.02	0.07
6.	15.00	10.00	7.00	22.00	-		40.00	2.90	0.01	0.02	0.07
7.	15.00	10.00	5.00	22.00	1.00		44.00	2.90	0.01	0.02	0.07
8.	12.00	7.00	5.00	35.00	1.00		37.00	2.90	0.01	0.02	0.07
9.	5.00	7.00	5.00	42.00	1.00		37.00	2.90	0.01	0.02	0.07
10.	0.00	5.00	5.00	49.00	1.00		37.00	2.90	0.01	0.02	0.07
11.	0.00	5.00	5.00	52.00	1.00		34.00	2.90	0.01	0.02	0.07
12.	0.00	5.00	5.00	26.00	1.00		60.00	2.90	0.01	0.02	0.07
13.	17.00	3.00	5.00	25.00	1.00		46.00	2.90	0.01	0.02	0.07
14.	10.00	4.00	6.50	27.00	2.00		47.50	2.90	0.01	0.02	0.07
15.	7.00	5.00	6.50	28.00	2.00		48.50	2.90	0.01	0.02	0.07
16.	3.00	5.00	6.50	28.00	2.00		52.50	2.90	0.01	0.02	0.07

Example No.	Oil Phase						Aqueous phase				
	Soybean oil (%)	Seeding agent (%)	Cellulose (%)	Oil blend (%)	PEG Polyaldo® (%)		Water (%)	Salt (%)	EDTA (%)	Vitamin A color premix (%)	Butter flavor (%)
17.	0.00	5.00	7.00	28.00	2.00		55.00	2.90	0.01	0.02	0.07
18.	5.00	8.00	7.00	22.00	2.00		53.00	2.90	0.01	0.02	0.07
19.	7.00	10.00	7.00	18.00	2.00		53.00	2.90	0.01	0.02	0.07
20.	5.00	8.00	5.00	22.00	2.00		55.00	2.90	0.01	0.02	0.07
21.	7.00	10.00	5.00	18.00	2.00		55.00	2.90	0.01	0.02	0.07
22.	8.00	10.00	5.00	22.00	2.00		50.00	2.90	0.01	0.02	0.07
23.	10.00	6.00	5.00	27.00	2.00		47.00	2.90	0.01	0.02	0.07
24.	3.00	15.00	5.00	16.00	2.00		56.00	2.90	0.01	0.02	0.07
25.	6.00	10.00	5.00	24.00	2.00		50.00	2.90	0.01	0.02	0.07
26.	7.00	6.00	5.00	28.00	2.00		49.00	2.90	0.01	0.02	0.07
27.	5.00	6.00	5.00	30.00	2.00		49.00	2.90	0.01	0.02	0.07
28.	3.00	12.00	5.00	16.00	2.00		59.00	2.90	0.01	0.02	0.07
29.	15.00	8.00	5.00	22.00	2.00		45.00	2.90	0.01	0.02	0.07
30.	3.00	15.00	3.00	16.00	2.00		58.00	2.90	0.01	0.02	0.07
31.	3.00	8.00	5.00	30.00	2.00		49.00	2.90	0.01	0.02	0.07
32.	12.00	9.00	5.00	24.00	2.00		45.00	2.90	0.01	0.02	0.07
33.	5.00	15.00	5.00	14.00	2.00		56.00	2.90	0.01	0.02	0.07
34.	0.00	15.00	5.00	18.00	2.00		57.00	2.90	0.01	0.02	0.07

Example No.	Oil Phase					Aqueous phase				
	Soybean oil (%)	Seeding agent (%)	Cellulose (%)	Oil blend (%)	PEG Polyaldo® (%)	Water (%)	Salt (%)	EDTA (%)	Vitamin A color premix (%)	Butter flavor (%)
35. ³	3.00	15.00	5.00	16.00	2.00	55.86	2.90	0.01	0.02	0.07
36. ³	10.00	19.00	5.00	9.00	2.00	51.648	3.10	0.01	0.02	0.07
37.	7.00	19.00	5.00	12.00	2.00	51.00	3.10	0.01	0.02	0.07

¹ In Example 1, the oil phase also contained distilled mono and diglycerides (0.29%), soybean lecithin (0.20%), vitamin A palmitate (0.0028%), beta-carotene (0.0020%). The aqueous phase contained sodium benzoate (0.100%) and lactic acid (0.05%).

² In Example 2, the oil phase also contained distilled mono and diglycerides (0.29%), soybean lecithin (0.50%), vitamin A palmitate (0.0028%), beta-carotene (0.0020%). The aqueous phase contained sodium benzoate (0.100%) and lactic acid (0.05%).

³ In Examples 35 and 36, the aqueous phase additionally contained sodium benzoate (0.10%) and lactic acid (0.05%).

Example 38

[0077] The seeding agent used in the compositions of Examples 1-37 described in Table 1 was prepared using the following general procedure. The starting raw material used in this particular example was palm oil. Other oils, including, but not limited to palm stearine, behenic FFA, soybean oil, canola oil, hear oil and FFA blends can be used in a similar reaction.

[0078] A 3-neck glass reaction vessel was charged with the starting raw material. The oil was heated to a temperature of 140°C. About 4% by weight glycerin was added and heating was continued till the temperature reached 165°C. The reaction mixture was continuously sparged with nitrogen and agitated at approximately 450-600 rpm throughout the reaction, neutralization and post-treatment process.

[0079] About 0.2% by weight CaOH powder was added at 165°C and reaction continued for 90 minutes within a temperature range of 165°C-175°C. The mixture was cooled to 125°C-130°C and about 0.375% by weight of 85% conc. phosphoric acid was added to neutralize. Mixing was continued for 10 minutes. About 0.5% by weight each of trisyl and filter aid were added; mixing was continued for 10 minutes. The product was recovered by filtration, and filtered material was then deodorized for 4 hours at 226°-232°C and 0.114 -0.870 mbar.

Example 39

[0080] A spread composition similar to the composition of Example 35 was prepared using a blend of commercial TAGs, DAGs and MAGs instead of the seeding agent described in Example 37. The blend of commercial esters was prepared with: 52% Fully hydrogenated palm, 42% TRANCENDIM® and 6% BFP® 65 Palm. The spread composition was prepared using the general procedure as described above for Examples 1-37, and allowed to sit for 24 hours before evaluation.

Example 40

[0081] A comparison of the compositions of Example 35 and 39 indicated that the composition of Example 39 was softer in comparison to compositions made with the seeding agent (Example 35) and had a texture that tended to spread yet lump. The composition with the seeding agent (Example 35) had a smoother creamier texture and appearance.

Example 41

[0082] The following compositions were prepared in a pilot plant on a 10 pound scale using a procedure described for Example 1-35. The oil blend contained 69% palm oil, 17% palm stearin, 13% soybean oil, and 1% Estric™ (available from Bunge).

Example 41A	
<i>Ingredient Name</i>	<i>% in Formula</i>
<i>Oil Phase</i>	
Oil blend	22.0000
Seeding Agent	8.0000
Soybean Oil	5.0000
Cellulose Fiber	5.0000
PGE Polyaldo	2.0000
<i>Aqueous Phase</i>	
Water	54.8600
Salt	2.9000
Sodium Benzoate	0.1000
Butter Flavor	0.0700
Lactic Acid	0.0500
Vitamin A, Color Premix	0.0200

Example 41B	
<i>Ingredient Name</i>	<i>% in Formula</i>
<i>Oil Phase</i>	
Palm and soybean blend	18.0000
Seeding Agent	10.0000
Soybean Oil	7.0000
Cellulose Fiber	5.0000
PGE Polyaldo	2.0000
<i>Aqueous Phase</i>	
Water	54.8600
Salt	2.9000
Sodium Benzoate	0.1000
Butter Flavor	0.0700
Lactic Acid	0.0500
Vitamin A, Color Premix	0.0200

[0083] The samples which were 10 lbs mini cubes were placed into the 70°F and 85°F temperature control rooms in order to examine the shelf life. In both compositions no signs of oiling out were observed in the 70°F environment after 3 months while slight oiling out was observed within the first month in the 85°F environment. Samples were also submitted for microbial analysis. Both of the samples demonstrated microbial stability over the course of three months.

[0084] Croissants, chocolate chip cookies, and sugar cookies were prepared using the pilot plant samples and compared with those prepared using Bunge™ NH 500 Baker's margarine. The fat and saturated fat content of the baked goods are shown in Table 2 below.

Table 2

Bakery Application Nutritional Data								
	Bunge™ NH 500 Baker's margarine		Example 41A			Example 41B		
	Fat	Saturated Fat	Fat	Saturated Fat	Sat. fat Reduction	Fat	Saturated Fat	Sat. fat Reduction
Croissants	13.33%	6.04%	8.44%	4.26%	29.50%	8.88%	4.57%	24.30%
Chocolate Chip Cookies	22.60%	11.19%	13.48%	6.67%	40.40%	13.73%	7.51%	32.90%
Sugar Cookies	21.22%	9.62%	11.22%	5.43%	43.60%	11.83%	5.92%	38.50%

Example 42

[0085] The following compositions were prepared on a 5 pound scale using a procedure described for Example 1-35. The oil blend contained 69% palm oil, 17% palm stearin, 13% soybean oil, and 1% Estrict™ (available from Bunge).

Example 42A	
<i>Ingredient Name</i>	<i>% in Formula</i>
<i>Oil Phase</i>	
Oil blend	24.0000
Soybean Oil	12.0000
Seeding Agent	9.0000
Cellulose Fiber	5.0000
PGE Polyaldo	2.0000
<i>Aqueous Phase</i>	
Water	44.8600
Salt	2.9000
Sodium Benzoate	0.1000
Butter Flavor	0.0700
Lactic Acid	0.0500
Vitamin A, Color Premix	0.0200

Example 42B	
<i>Ingredient Name</i>	<i>% in Formula</i>
<i>Oil Phase</i>	
Oil blend	16.0000
Seeding Agent	15.0000
Cellulose Fiber	5.0000
Soybean Oil	3.0000
PGE Polyaldo	2.0000
<i>Aqueous Phase</i>	
Water	55.8600
Salt	2.9000
Sodium Benzoate	0.1000
Butter Flavor	0.0700
Lactic Acid	0.0500
Vitamin A, Color Premix	0.0200

[0086] Cakes, brownies, croissants, and garlic toast were prepared using these samples, and compared with those prepared using Bunge™ NH 500 Baker's margarine. The fat and saturated fat content of the food products are shown in Table 3 below.

Table 3

Bakery Application Nutritional Data								
	Bunge™ NH 500 Baker's margarine		Example 42A			Example 42B		
	Fat (%)	Sat. Fat (%)	Fat (%)	Saturated Fat (%)	Sat. fat Reduction (%)	Fat (%)	Saturated Fat (%)	Sat. fat Reduction (%)
Cakes	11.64	5.32	6.26	2.96	44.40	4.74	2.94	44.70
Brownies	28.39	12.68	19.74	8.81	30.52	13.81	7.89	37.78
Croissants	23.99	11.05	15.36	7.23	34.60	11.78	6.85	38.00
Garlic Toast	17.88	7.49	12.05	6.41	14.40	12.31	6.51	13.10

Example 43

[0087] Microscopic images of a sample composition of Example 42B were taken with polarized light, and are provided in Figures 1 and 2. The two images show the co-localization of the triglyceride/specialty ester mixture with that of the cellulosic fibrous material within the sample. Figure 1 utilizing a polarized light source shows a very dense well structured crystal matrix. Figure 2 is the same sample utilizing a cross polarized light source in order to show the cellulosic fibrous material. The co-localization points are the bright white spots observed in the same regions on both of the images. Figures 1 and 2 thus show the synergist relationship between the cellulosic fibrous material and the oil within the spread product.

Example 44

[0088] The following composition was prepared using a procedure described for Example 1-35. The oil blend contained 69% palm oil, 17% palm stearin, 13% soybean oil, and 1% Estric™ (available from Bunge).

Example 44	
Ingredient Name	% in Formula
Oil Phase	
Oil Blend	12.0000
Seeding Agent	17.0000
Soybean Oil	7.0000
Cellulose Fiber	5.0000
PGE Polyaldo	2.6480
Aqueous Phase	
Water	53.0000
Salt	3.1000
Sodium Benzoate	0.1000
Butter Flavor	0.0700
EDTA	0.0100
Beta-Carotene	0.0020
Lactic Acid	0.0500
Vitamin A, Color Premix	0.0200

[0089] Cakes, croissants, pie crusts, icings and sugar cookies were prepared using this composition, and compared with those prepared using Vreamay® NH, Bunge™ NH 500 Baker's margarine and Vream® NH. The fat and saturated fat content of the food products are shown in Table 4 below.

Table 4

Bakery Application Nutritional Data									
	Vreamay® NH		Bunge™ 500 NH		Vream® NH		Example 44		
	Fat	Saturated Fat	Fat	Saturated Fat	Fat	Saturated Fat	Fat	Saturated Fat	Sat. fat Reduction
Cakes	14.74%	6.31%	12.24%	5.45%	N/A	N/A	5.92%	3.44%	36.88% - 45.48%
Croissants	N/A	N/A	31.92%	14.30%	N/A	N/A	16.97%	9.56%	33.15%
Pie Crust	N/A	N/A	35.63%	16.09%	41.34%	21.25%	18.02%	10.65%	33.81% - 49.88%
Icings	30.65%	13.32%	26.13%	11.77%	N/A	N/A	13.21%	7.77%	33.98% - 41.67%
Sugar Cookies	N/A	N/A	22.26%	9.92%	26.67%	13.55%	12.15%	6.95%	29.94% - 48.71%

N/A = not available.

[0090] Throughout this application, various publications are referenced. The disclosures of these publications in their entireties are hereby incorporated by reference into this application in order to more fully describe the compounds, compositions and methods described herein.

[0091] Various modifications and variations can be made to the compounds, compositions and methods described herein. Other aspects of the compounds, compositions and methods described herein will be apparent from consideration of the specification and practice of the compounds, compositions and methods disclosed herein. It is intended that the specification and examples be considered as exemplary.

WHAT IS CLAIMED IS:

1. A spread composition comprising about 40-65% water, 1-25% seeding agent, 1-15% cellulose fiber, and 10-40% base oil based on the total weight of the composition, wherein the seeding agent comprises a blend of a diacylglyceride, a monoacylglyceride and a triacylglyceride.
2. The spread composition of claim 1, wherein water is present in about 45-60% based on the total weight of the composition.
3. The spread composition of claim 1 or 2, wherein the seeding agent is present in about 1-20% based on the total weight of the composition.
4. The spread composition of any of claims 1-3, wherein the seeding agent is present in about 3-19% based on the total weight of the composition.
5. The spread composition of any of claims 1-4, wherein the seeding agent comprises about 20-50% diacylglyceride based on the total weight of the seeding agent, and a remaining portion comprising monoacylglyceride, triacylglyceride, and free fatty acids.
6. The spread composition of any of claims 1-5, wherein the seeding agent comprises about 30-35% diacylglyceride based on the total weight of the seeding agent, and a remaining portion comprising monoacylglyceride, triacylglyceride, and free fatty acids.
7. The spread composition of any of claims 1-6, wherein the seeding agent comprises about 20-50% diacylglyceride, about 4-15% monoacylglyceride and a remaining portion comprising triacylglyceride, and free fatty acids.
8. The spread composition of any of claims 1-7, wherein the seeding agent about 35-55% triacylglyceride based on the total weight of the seeding agent.
9. The spread composition of any of claims 1-8, wherein the seeding agent comprises about 30-35% diacylglyceride, about 8-10% monoacylglyceride and about 40-55% triacylglyceride based on the total weight of the seeding agent.
10. The spread composition of any of claims 1-9, wherein the cellulose fiber is present in about 4-10% based on the total weight of the composition.
11. The spread composition of any of claims 1-10, wherein the cellulose fiber has an average fiber length of about 15-50 micron.
12. The spread composition of any of claims 1-11, wherein the cellulose fiber has an average fiber length of about 25-35 micron.

13. The spread composition of any of claims 1-12, wherein the cellulose fiber has an average fiber thickness of about 0.5-5 micron.

14. The spread composition of any of claims 1-13, wherein the cellulose fiber has an average fiber thickness of about 1-2 micron.

15. The spread composition of any of claims 1-14, wherein the cellulose fiber comprises a cellulose fiber from wood pulp, bamboo, pea, citrus fruit or sugar beets.

16. The spread composition of any of claims 1-15, wherein the base oil comprises a vegetable oil, rapeseed oil, animal fat, corn oil, canola oil, olive oil, cottonseed oil, safflower oil, palm oil, soybean oil, sunflower oil, peanut oil, coconut oil, or a mixture thereof.

17. The spread composition of any of claims 1-16, wherein the base oil comprises soybean oil, palm oil or a mixture thereof.

18. The spread composition of any of claims 1-17, wherein the base oil comprises soybean oil and an oil blend.

19. The spread composition of claim 18, wherein the oil blend comprises palm oil, palm stearin, soybean oil and an emulsifier.

20. The spread composition of claim 19, wherein the emulsifier comprises monoacylglycerides and diacylglycerides.

21. The spread composition of any of claims 1-20, wherein the base oil is present in about 10-30% based on the total weight of the composition.

22. The spread composition of claim 1 comprising about 40-55% water, 7-20% seeding agent, 3-6% cellulose fiber, and 10-30% base oil based on the total weight of the composition.

23. The spread composition of claim 18 comprising about 53% water, 17% seeding agent, 5% cellulose fiber, about 12% oil blend and about 7% soybean oil based on the total weight of the composition.

24. A food product comprising the spread composition of any of claims 1-23.

25. An icing comprising the spread composition of any of claims 1-23.

26. The icing of claim 25 comprising about 53% water, about 17% seeding agent, about 5% cellulose fiber, about 12% oil blend and about 7% soybean oil based on the total weight of the composition.

27. A method of preparing a spread composition comprising about 40-65% water, about 1-25% seeding agent, about 1-15% cellulose fiber, and about 10-40% base oil based on the total weight of the composition, the method comprising the steps of

- a) mixing a seeding agent with a base oil to obtain an oil mixture,
- b) blending together the oil mixture and a cellulose fiber to obtain an oil-fiber blend, and
- c) mixing an aqueous phase with the oil-fiber blend to obtain a homogeneous composition.

28. The method of claim 27, wherein steps a), b) or c) are carried out at a temperature of about 50-80 °C.

29. The method of claim 27 or 28 further comprising cooling the homogeneous composition.

30. The method of claim 29, wherein the cooling step is performed at a temperature of about 10-25°C.

1/2

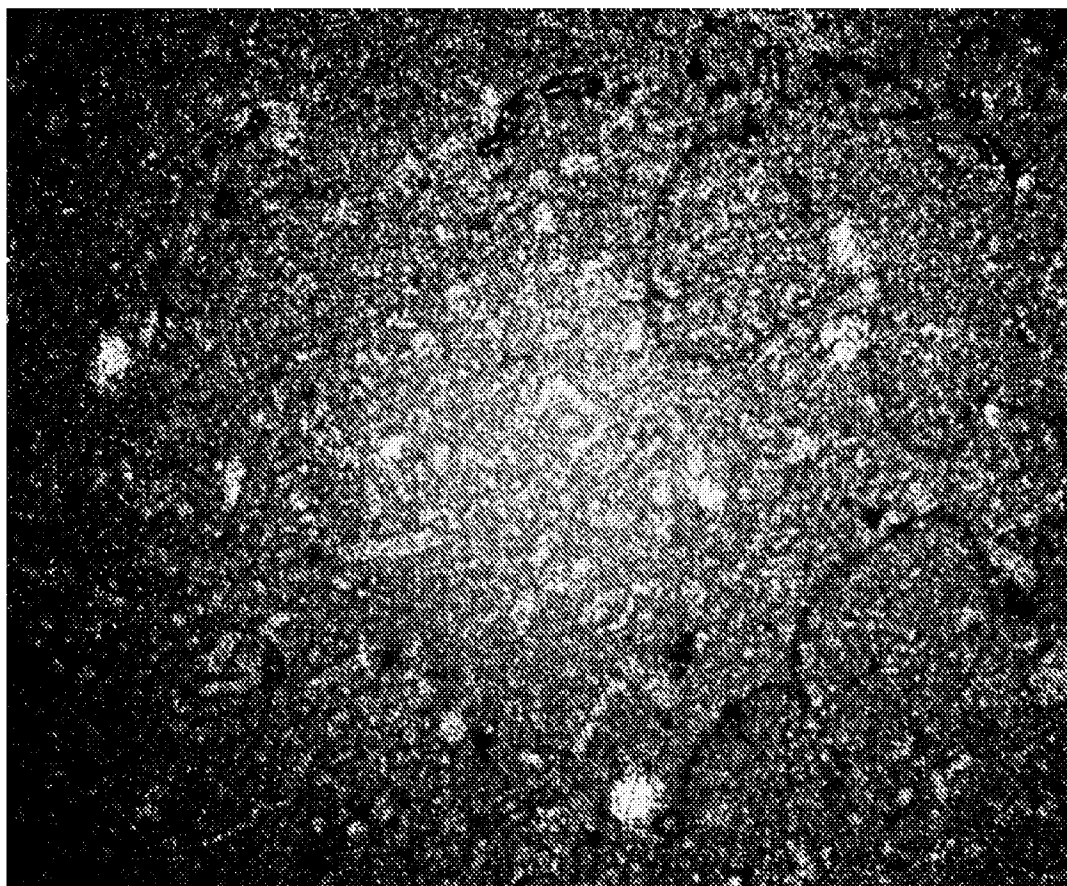


FIGURE 1

2/2

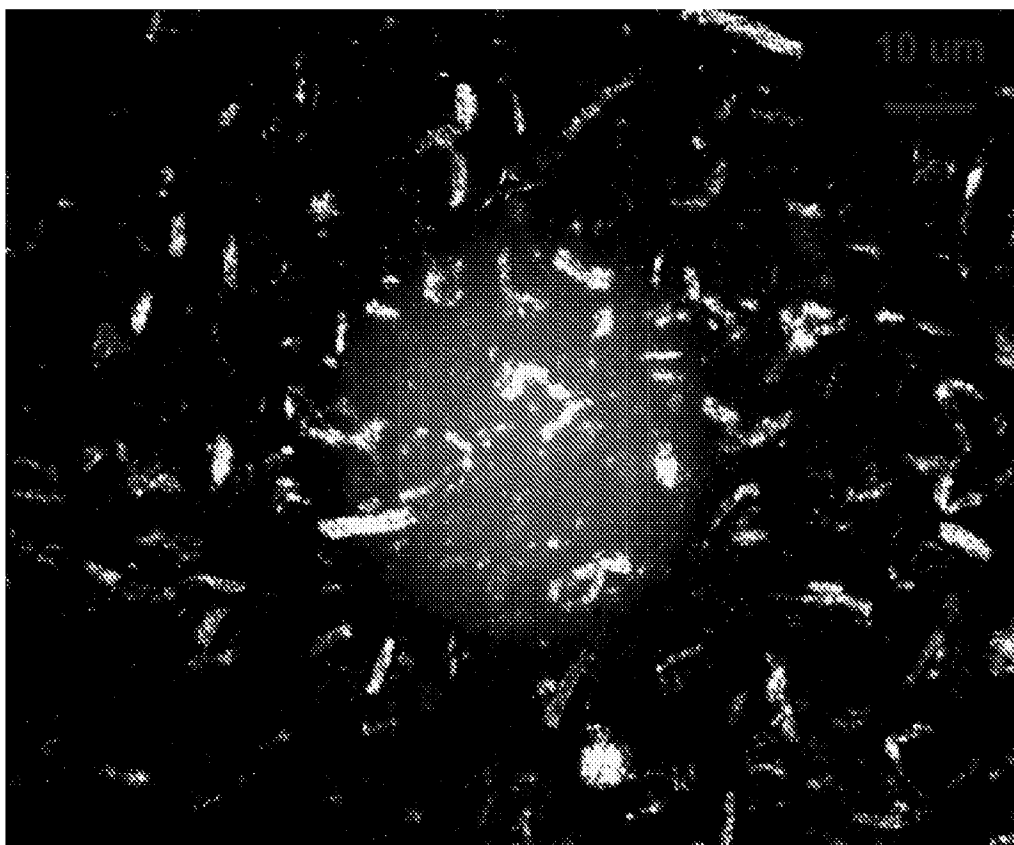


FIGURE 2

INTERNATIONAL SEARCH REPORT

International application No
PCT/US2013/024265

A. CLASSIFICATION OF SUBJECT MATTER INV. A23D7/005 A23D7/01 A23D7/015 A21D2/16 A21D2/18 ADD. A21D13/00		
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) A23D A21D		
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched		
Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) EPO-Internal, WPI Data		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 0 441 495 A2 (PFIZER [US]) 14 August 1991 (1991-08-14) page 4, line 44 - line 54 page 5, line 29 - line 41 page 7, line 18 - line 28 examples	1-25, 27-30
X	US 4 284 655 A (MILLER DONALD E ET AL) 18 August 1981 (1981-08-18) column 3, line 23 - column 4, line 51 column 6, line 65 - column 7, line 37 examples claims	1-30
----- -/--		
<div style="display: flex; justify-content: space-between;"> <input checked="" type="checkbox"/> Further documents are listed in the continuation of Box C. <input checked="" type="checkbox"/> See patent family annex. </div>		
<div style="display: flex;"> <div style="flex: 1;"> <p>* Special categories of cited documents :</p> <p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier application or patent but published on or after the international filing date</p> <p>"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p> </div> <div style="flex: 1;"> <p>"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</p> <p>"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</p> <p>"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</p> <p>"&" document member of the same patent family</p> </div> </div>		
Date of the actual completion of the international search	Date of mailing of the international search report	
17 April 2013	23/04/2013	
Name and mailing address of the ISA/ European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Authorized officer Cardin, Aurélie	

INTERNATIONAL SEARCH REPORT

International application No

PCT/US2013/024265

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 2005/004642 A1 (KERRY GROUP SERVICES LTD [IE]; BOURKE NEIL JOSEPH [NL]) 20 January 2005 (2005-01-20) page 6, line 15 - page 10, line 21 examples	1-10, 15-22,24
X,P	WO 2012/082977 A1 (BUNGE OILS INC [US]; NAKHASI DILIP K [US]; CORBIN DANIELLE N [US]; DAN) 21 June 2012 (2012-06-21) paragraph [0048] - paragraph [0054] example 1 figure 1	1-10, 16-24, 27-30
A	WO 2008/155590 A1 (BIOGREEN AS [DK]; FOEGLEIN FERENC [HU]) 24 December 2008 (2008-12-24) page 5, line 6 - page 6, line 2 page 10, line 4 - line 26; table 3 examples	1,3-9
A	US 2010/260902 A1 (WALTON JOSEPH E [US] ET AL) 14 October 2010 (2010-10-14) paragraph [0036] paragraph [0042] - paragraph [0051] paragraph [0079] - paragraph [0081] examples	1-30
A	US 2010/260916 A1 (MUSTAD VIKKIE A [US] ET AL) 14 October 2010 (2010-10-14) paragraph [0034] paragraph [0039] - paragraph [0050] paragraph [0075] - paragraph [0080] examples	1-30
A	US 2010/260917 A1 (EDENS NEILE K [US] ET AL) 14 October 2010 (2010-10-14) paragraph [0034] paragraph [0039] - paragraph [0050] paragraph [0076] - paragraph [0081] examples	1-30
A	WO 2010/120734 A2 (ABBOTT LAB [US]; WALTON JOSEPH E [US]; WOLF DAVID R [US]; EDENS NEILE) 21 October 2010 (2010-10-21) paragraph [0035] paragraph [0040] - paragraph [0053] paragraph [0069] - paragraph [0071] paragraph [0077] - paragraph [0082] examples	1-30
A	WO 2008/137871 A1 (BUNGE OILS INC [US]; KINCS FRANK R [US]; NARINE SURESH [CA]; TERAN PAM) 13 November 2008 (2008-11-13) examples	1-30
	----- -/--	

INTERNATIONAL SEARCH REPORT

International application No

PCT/US2013/024265

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 3 248 229 A (MORTON PADER ET AL) 26 April 1966 (1966-04-26) column 3, line 25 - line 65 examples -----	1-30
A	US 5 102 680 A (GLASS BRIAN E [US] ET AL) 7 April 1992 (1992-04-07) examples column 10, line 63 - column 11, line 14 column 6, line 11 - line 26 -----	1-30

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/US2013/024265

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 0441495	A2	14-08-1991	AU 640200 B2 19-08-1993
			AU 660812 B2 06-07-1995
			AU 4151993 A 02-09-1993
			AU 7023991 A 08-08-1991
			CA 2035529 A1 06-08-1991
			EP 0441495 A2 14-08-1991
			FI 910534 A 06-08-1991
			IE 910368 A1 14-08-1991
			IL 97093 A 12-04-1994
			JP H0767577 A 14-03-1995
			NO 910421 A 06-08-1991
			PT 96660 A 31-10-1991
			US 5158798 A 27-10-1992
US 4284655	A	18-08-1981	CA 1174898 A1 25-09-1984
			US 4284655 A 18-08-1981
WO 2005004642	A1	20-01-2005	NONE
WO 2012082977	A1	21-06-2012	US 2012156330 A1 21-06-2012
			WO 2012082977 A1 21-06-2012
WO 2008155590	A1	24-12-2008	CA 2690223 A1 24-12-2008
			CN 101742917 A 16-06-2010
			EP 2162008 A1 17-03-2010
			HU 227873 B1 29-05-2012
			JP 2010530236 A 09-09-2010
			US 2010316744 A1 16-12-2010
			WO 2008155590 A1 24-12-2008
US 2010260902	A1	14-10-2010	NONE
US 2010260916	A1	14-10-2010	NONE
US 2010260917	A1	14-10-2010	NONE
WO 2010120734	A2	21-10-2010	AU 2010236678 A1 17-11-2011
			CA 2758889 A1 21-10-2010
			CN 102481010 A 30-05-2012
			CO 6450647 A2 31-05-2012
			EC SP11011395 A 30-11-2011
			EP 2418974 A2 22-02-2012
			JP 2012523839 A 11-10-2012
			PE 08802012 A1 26-08-2012
			SG 175192 A1 29-12-2011
			WO 2010120734 A2 21-10-2010
WO 2008137871	A1	13-11-2008	CA 2685618 A1 13-11-2008
			EP 2144510 A1 20-01-2010
			US 2009130289 A1 21-05-2009
			WO 2008137871 A1 13-11-2008
US 3248229	A	26-04-1966	NL 6403781 A 25-06-1964
			US 3248229 A 26-04-1966
US 5102680	A	07-04-1992	CA 2065202 A1 17-10-1992
			US 5102680 A 07-04-1992