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(54) Title: NUTRITIONAL CREAMER COMPOSITION

(57) Abstract: Provided herein are nutritional creamer compositions comprising a vegetable oil blend, wherein the vegetable oil blend provides a suitable fatty acid profile or saturated fats, polyunsaturated fats, monounsaturated fats, and trans fatty acids. The creamer compositions described herein are useful as a fat source for various nutritional compositions, such as infant formulas, children's nutritional products and adult nutritional compositions. Also provided herein are nutritional compositions comprises the aforementioned creamer compositions.



DESCRIPTION

NUTRITIONAL CREAMER COMPOSITION

TECHNICAL FIELD

[0001] This disclosure relates generally to a nutritional creamer comprising a blend of vegetable oils, which provide a suitable fatty acid profile. The creamer composition disclosed herein is useful as a source of fat for nutritional compositions, such as infant formulas, children's nutritional products and adult nutritional compositions.

BACKGROUND ART

[0002] Nutritional compositions, such as infant formulas, children's nutritional products, and adult nutritional compositions, can provide partial or complete nutrition for infants, children and adults. Such nutritional compositions typically include, among other nutrients, a fat source having an appropriate amount of fat, and more particularly, an appropriate amount of saturated fatty acids, monounsaturated fatty acids, polyunsaturated fatty acids, and trans fatty acids. More particularly, certain fatty acids, such as oleic acid, linoleic acid and α -linolenic acid are generally known to support growth, development and life-long health in humans. Accordingly, there is a need to provide a suitable fat source for a nutritional composition, while maintaining the sensory characteristics of the nutritional composition. A suitable fat source also should be shelf stable and readily incorporated into a nutritional composition.

DISCLOSURE OF THE INVENTION

[0003] The present disclosure provides a nutritional creamer composition, which is useful as a fat source for various nutritional compositions, particularly infant formulas, children's nutritional products and adult nutritional products. The creamer composition comprises certain amounts of saturated fatty acids, polyunsaturated fatty acids, monounsaturated fatty acids and trans fatty acids. More particularly, the creamer composition provides certain amounts of fatty acids, including oleic acid, linoleic acid, α -linolenic acid. In some embodiments, the blend comprises up to about 15% by weight of saturated fatty acids, for example about 3

to about 15% by weight of saturated fatty acids; about 45 to about 75% by weight of monounsaturated fatty acids; about 15 to about 45% by weight of polyunsaturated fatty acids; and up to about 3% by weight of trans fatty acids, for example about 0.1 to about 3% by weight. The creamer blend, in further embodiments, comprises about 45 to about 75% by weight of oleic acid, about 10 to 40% by weight of linoleic acid, and about 1 to about 15% by weight of α -linolenic acid.

[0004] The creamer composition comprises a vegetable oil blend that provides the aforementioned fatty acid profile. For example, in certain embodiments, the creamer comprises a vegetable oil blend of canola oil, soybean or sunflower oil, and a high oleic oil. In some embodiments, the creamer composition comprises a vegetable oil blend comprising about 30 to about 70 % by weight of canola oil, about 10 to about 45 % by weight of soybean oil and about 10 to about 50 % by weight of a high oleic oil, while in other embodiments, the creamer composition comprises a vegetable oil blend comprising about 30 to about 70 % by weight of canola oil, about 10 to about 45 % by weight of sunflower oil and about 10 to about 50 % by weight of a high oleic oil. Preferably, the high oleic oil is selected from the group consisting of high oleic sunflower oil, high oleic corn oil, high oleic soybean oil, high oleic canola oil, high oleic safflower oil, and mixtures thereof.

[0005] In some embodiments, the creamer composition is provided in a powdered form, such as a spray-dried matrix. The creamer composition optionally comprises at least one of a carrier, a stabilizer, an emulsifier, an antioxidant, a processing aid, and mixtures thereof. For instance, in some embodiments, the composition further comprises corn syrup solids, caseinate, monoglycerides, diglycerides, ascorbyl palmitate, lecithin, mixed tocopherols, maltodextrin, lactose, starch, whey protein concentrate, phosphates, citrates and mixtures thereof.

[0006] The creamer compositions disclosed herein are useful for providing a source of fat in various nutritional formulations, including infant formulas, children's nutritional products, such as growing-up milks, and adult nutritional products. For example, a nutritional composition in accordance with the present disclosure comprises a protein source, a carbohydrate source, and a fat source comprising a creamer composition as described herein. Preferably, the nutritional composition comprises up to about 50% by weight of the creamer composition. For instance, in some embodiments, the nutritional composition comprises about 5 to

about 50% by weight of the creamer composition. More preferably, the nutritional composition comprises about 10 to about 40% by weight of the creamer composition, about 15 to about 30% by weight of the creamer composition, and even more preferably, about 18% to about 27% by weight of the creamer composition, or about 20 to about 25% by weight of the creamer composition.

[0007] In certain embodiments, the aforementioned nutritional compositions comprise about 8 to about 19 g of fat, about 50 to about 65 g of carbohydrate, and about 14 to about 25 g of protein per 100 g of the nutritional composition. Furthermore, in certain embodiments, the nutritional compositions comprise about 1 to about 7 g of saturated fats, about 2.5 to about 10 g of monounsaturated fats, about 0.5 to about 10 g of polyunsaturated fats and about 0.1 to 1 g of trans fats per 100 g of the nutritional composition. In some embodiments, the nutritional compositions comprise about 0.5 to about 5 g of palmitic acid, about 0.5 to about 2 g of stearic acid, about 1 to about 10g of oleic acid, about 0.5 to about 8 g of linoleic acid, about 0.1 to about 2 g of α -linolenic acid, and about 25 to about 200 mg of docosahexaenoic acid per 100 g of the nutritional composition.

BEST MODE FOR CARRYING OUT THE INVENTION

[0008] Reference now will be made in detail to the embodiments of the present disclosure, one or more examples of which are set forth herein below. Each example is provided by way of explanation of the nutritional composition of the present disclosure and is not a limitation. In fact, it will be apparent to those skilled in the art that various modifications and variations can be made to the teachings of the present disclosure without departing from the scope or spirit of the disclosure. For instance, features illustrated or described as part of one embodiment, can be used with another embodiment to yield a still further embodiment.

[0009] Thus, it is intended that the present disclosure covers such modifications and variations as come within the scope of the appended claims and their equivalents. Other objects, features and aspects of the present disclosure are disclosed in or are obvious from the following detailed description. It is to be understood by one of ordinary skill in the art that the present discussion is a

description of exemplary embodiments only and is not intended as limiting the broader aspects of the present disclosure.

[0010] “Nutritional composition” means a substance or formulation that satisfies at least a portion of a subject’s nutrient requirements. The terms “nutritional(s)”, “nutritional formula(s)”, “enteral nutritional(s)”, “nutritional composition(s)”, and “nutritional supplement(s)” are used interchangeably throughout the present disclosure to refer to liquids, powders, gels, pastes, solids, concentrates, suspensions, or ready-to-use forms of enteral formulas, oral formulas, formulas for infants, formulas for pediatric subjects, formulas for children, growing-up milks and/or formulas for adults.

[0011] “Infant” means a subject having an age of not more than about one year and includes infants from 0 to 12 months. The term infant includes low birth weight infants, very low birth weight infants, and preterm infants. “Preterm” means an infant born before the end of the 37th week of gestation. The term infant also includes prenatal infants, e.g., infants still *in utero*.

[0012] “Child” or “pediatric subject” means a human subject ranging in age from 12 months to about 13 years. In some embodiments, a child is a subject between the ages of 1 and 12 years old. In other embodiments, the terms “children” or “child” refer to subjects that are about one to about six years old, or about seven to about 12 years old. In other embodiments, the terms “children” or “child” refer to any range of ages between about 12 months and about 13 years.

[0013] “Children’s nutritional product” refers to a composition that satisfies at least a portion of the nutrient requirements of a child. A growing-up milk is an example of a children’s nutritional product.

[0014] “Infant formula” means a composition that satisfies at least a portion of the nutrient requirements of an infant. In the United States, the content of an infant formula is dictated by the federal regulations set forth at 21 C.F.R. Sections 100, 106, and 107. These regulations define macronutrient, vitamin, mineral, and other ingredient levels in an effort to simulate the nutritional and other properties of human breast milk.

[0015] The term “growing-up milk” refers to a broad category of nutritional compositions intended to be used as a part of a diverse diet in order to support the

normal growth and development of a child of the ages of about 1 and about 6 years of age.

[0016] “Milk-based” means comprising at least one component that has been drawn or extracted from the mammary gland of a mammal. In some embodiments, a milk-based nutritional composition comprises components of milk that are derived from domesticated ungulates, ruminants or other mammals or any combination thereof. Moreover, in some embodiments, milk-based means comprising bovine casein, whey, lactose, or any combination thereof. Further, “milk-based nutritional composition” may refer to any composition comprising any milk-derived or milk-based product known in the art.

[0017] “Nutritionally complete” means a composition that may be used as the sole source of nutrition, which would supply essentially all of the required daily amounts of vitamins, minerals, and/or trace elements in combination with proteins, carbohydrates, and lipids. Indeed, “nutritionally complete” describes a nutritional composition that provides adequate amounts of carbohydrates, lipids, essential fatty acids, proteins, essential amino acids, conditionally essential amino acids, vitamins, minerals and energy required to support normal growth and development of a subject.

[0018] Therefore, a nutritional composition that is “nutritionally complete” for a preterm infant will, by definition, provide qualitatively and quantitatively adequate amounts of carbohydrates, lipids, essential fatty acids, proteins, essential amino acids, conditionally essential amino acids, vitamins, minerals, and energy required for growth of the preterm infant.

[0019] A nutritional composition that is “nutritionally complete” for a term infant will, by definition, provide qualitatively and quantitatively adequate amounts of all carbohydrates, lipids, essential fatty acids, proteins, essential amino acids, conditionally essential amino acids, vitamins, minerals, and energy required for growth of the term infant.

[0020] A nutritional composition that is “nutritionally complete” for a child will, by definition, provide qualitatively and quantitatively adequate amounts of all carbohydrates, lipids, essential fatty acids, proteins, essential amino acids, conditionally essential amino acids, vitamins, minerals, and energy required for growth of a child.

[0021] As applied to nutrients, the term “essential” refers to any nutrient that cannot be synthesized by the body in amounts sufficient for normal growth and to maintain health and that, therefore, must be supplied by the diet. The term “conditionally essential” as applied to nutrients means that the nutrient must be supplied by the diet under conditions when adequate amounts of the precursor compound is unavailable to the body for endogenous synthesis to occur.

[0022] “Probiotic” means a microorganism with low or no pathogenicity that exerts a beneficial effect on the health of the host.

[0023] “Prebiotic” means a non-digestible food ingredient that beneficially affects the host by selectively stimulating the growth and/or activity of one or a limited number of beneficial gut bacteria in the digestive tract, selective reduction in gut pathogens, or favorable influence on gut short chain fatty acid profile that can improve the health of the host.

[0024] “ β -glucan” or “beta-glucan” means all β -glucan, including both β -1,3-glucan and β -1,3;1,6-glucan, as each is a specific type of β -glucan. Moreover, β -1,3;1,6-glucan is a type of β -1,3-glucan. Therefore, the term “ β -1,3-glucan” includes β -1,3;1,6-glucan.

[0025] All percentages, parts and ratios as used herein are by weight of the total formulation, unless otherwise specified.

[0026] The creamer compositions and nutritional compositions of the present disclosure may be substantially free of any optional or selected ingredients described herein. In this context, and unless otherwise specified, the term “substantially free” means that the selected composition may contain less than a functional amount of the optional ingredient, typically less than 0.1% by weight, and also, including zero percent by weight of such optional or selected ingredient.

[0027] One aspect of the disclosure relates to a creamer composition for use in nutritional compositions, such as infant formulas, children’s nutritional products, and adult nutritional formulas. More particularly, the disclosure relates to a creamer composition for use in children’s nutritional products, such as growing-up milks. The vegetable oil blend has an advantageous fatty acid profile that helps support the health of individuals consuming nutritional compositions comprising the creamer composition described herein, while at the same time, maintaining good organoleptic properties when used in a nutritional composition. In some

embodiments, the vegetable oil blend comprises up to about 15 % by weight of saturated fatty acids, about 45 to about 75 % by weight of monounsaturated fatty acids, about 15 to about 45 % by weight of polyunsaturated fatty acids, and up to about 3 % by weight of trans fatty acids. In other embodiments, the vegetable oil blend comprises up to about 12% by weight of saturated fatty acids, about 53 to about 67% by weight of monounsaturated fatty acids, about 23 to about 37% by weight of polyunsaturated fatty acids, and up to about 1.5 % by weight of trans fatty acids.

[0028] The vegetable oil blend provides suitable amounts of certain fatty acids, including oleic acid, linoleic acid and α -linolenic acid. More particularly, the vegetable oil blend comprises, in certain embodiments, about 45 to about 70% by weight of oleic acid, about 10 to about 40% by weight of linoleic acid, and about 2 to about 15 % by weight of α -linolenic acid. In other embodiments, the fat blend comprises about 50 to about 70% by weight of oleic acid, about 15 to about 35% by weight of linoleic acid, and about 3 to about 10% by weight of α -linolenic acid. In still other embodiments, the vegetable oil blend comprises the specifications set forth in Table 1:

Table 1: Vegetable oil blend specifications

component	amount (weight %)
Saturated fatty acids	Max 12%
Oleic acid (C18:1)	53% - 67%
Linoleic acid (C18:2cc)	18% - 30%
α -Linolenic acid (C18:3ccc)	5% - 7%
Monounsaturated fatty acids	53% - 67%
Polyunsaturated fatty acids	23% to 37%
Trans-fatty acids	Max 1.5%
Peroxide value	Max 1.0 meq/kg
Free fatty acids (as oleic acid)	Max 0.15%
Moisture	Max 0.05%

[0029] The creamer composition comprises a vegetable oil blend that provides a suitable fatty acid profile. Suitable oils include, without limitation, canola, soybean, safflower, palm, palm kernel, corn, sunflower, coconut, olive oil and high oleic oils. In certain embodiments, the vegetable oil blend comprises canola oil, soybean or sunflower oil, and a high oleic oil. More particularly, in certain embodiments, the vegetable oil blend comprises about 30 to about 70 % by weight of canola oil, about 10 to about 45 % by weight of soybean oil and about 10 to about 50 % by weight of a high oleic oil. In other embodiments, the vegetable oil blend comprises about 30 to about 70 % by weight of canola oil, about 10 to about 45 % by weight of sunflower oil and about 10 to about 50 % by weight of a high oleic oil. The high oleic oil in any of these embodiments can be selected from the group consisting of high oleic sunflower oil, high oleic corn oil, high oleic soybean oil, high oleic canola oil, high oleic safflower oil, and mixtures thereof. Preferably, the high oleic oil comprises high oleic sunflower oil. The high oleic oils useful in the present compositions, in certain embodiments, comprise at least about 70% oleic acid, or more particularly at least about 80% oleic acid.

[0030] Additional ingredients, such as milk proteins, modified starch, potassium or sodium caseinate, mono or diglycerides, palmitate (e.g., ascorbyl palmitate), lecithin, mixed tocopherols, maltodextrin, lactose, starch, whey protein concentrate, phosphates, citrates, and combinations thereof, may be included in the creamer composition as carriers, stabilizers, emulsifiers, antioxidants and processing aids. In some embodiments, the additional ingredients include, without limitation, corn syrup solids, caseinate (potassium or sodium), monoglycerides, diglycerides, ascorbyl palmitate, lecithin and mixed tocopherols.

[0031] The creamer composition may be in a liquid or paste form, or may advantageously be in a powdered form for incorporation into a nutritional compositions. In some embodiments, the creamer composition is provided as a spray-dried matrix. Thus, the powdered creamer composition may advantageously be dry blended with other ingredients to be included in a nutritional composition. The powdered creamer composition preferably has a shelf life of at least 6 months, and more preferably, at least 9 months. In certain embodiments, the creamer has a particles size of 99.5% greater than or equal to U.S. sieve size (USSS) no. 20, and 100% USSS No. 12.

[0032] The creamer composition comprises, in certain embodiments, at least about 40% by weight of fat, preferably at least 50 %, and more preferably at least about 55%. In certain embodiments, the creamer comprises about 40 to about 70% by weight of fat, preferably about 50 to about 60% by weight of fat, and more preferably about 55 to about 58 % by weight of fat.

[0033] The creamer compositions disclosed herein are useful as a fat source in nutritional formulations, including infant formulas, children's nutritional products, such as growing-up milks, and adult nutritional products. An exemplary nutritional composition in accordance with the present disclosure comprises a protein source, a carbohydrate source, and a fat source comprising a creamer composition disclosed herein. Preferably, the nutritional comprises up to about 50% by weight of the creamer composition, for instance about 5 to about 50% by weight of the creamer composition. More preferably, the nutritional composition comprises about 10 to about 40% by weight of the creamer composition, about 15 to about 30% by weight of the creamer composition, and even more preferably, about 18% to about 27% by weight of the creamer composition, or about 20 to about 25% by weight of the creamer composition. An exemplary nutritional composition comprises about 14 to about 25 g of the protein source, about 50 to about 65 g of the carbohydrate source, and about 5 to about 25 g of the fat source per 100 g of the nutritional composition.

[0034] The nutritional composition of the present disclosure comprises, in certain embodiments, the following macronutrient profile: about 1 to about 7 g of saturated fats, about 2.5 to about 10 g of monounsaturated fats, about 0.5 to about 10 g of polyunsaturated fats and about 0.1 to 1 g of trans fats per 100 g of the nutritional composition. Furthermore, the nutritional compositions may comprise, in certain embodiments, about 0.5 to about 5 g of palmitic acid, about 0.5 to about 2 g of stearic acid, about 1 to about 10g of oleic acid, about 0.5 to about 8 g of linoleic acid, about 0.1 to about 2 g of α -linolenic acid, and about 25 to about 200 mg of docosahexaenoic acid per 100 g of the nutritional composition.

[0035] The fatty acid profile of nutritional compositions comprising the creamer described herein comprises, in certain embodiments, about 12 to about 19 g of total fat per 100 g, about 2 to about 5 g of saturated fat per 100 g, about 1 to about 5 g of linoleic acid per 100 g, about 0.5 to about 1 g of α -linolenic acid per 100

g, about 2 to about 5 g of polyunsaturated fatty acids per 100 g, and about 0.2 to about 0.5 g of trans fatty acids per 100g. In particular embodiments, the nutritional composition has the following fatty acid profile: about 15 to about 17 g of total fat per 100g, about 3.7 to about 3.8 g of saturated fat per 100 g, about 2.7 to about 3.3 g of linoleic acid per 100 g, about 0.7 to about 0.8 g of α -linolenic acid per 100 g, about 3.5 to about 4.3 g of polyunsaturated fatty acids per 100 g, and about 0.3 to about 0.4 g of trans fatty acids per 100g.

[0036] The fatty acid profile of a nutritional composition of the present disclosure can further be expressed in terms of percentage of total energy of the composition. For example, a nutritional composition comprising the creamer composition of the present disclosure comprises, in some embodiments, the following fatty acid profile as a percentage of total energy: about 20 to about 40% total fat, 10% or less of saturated fatty acids, 10% or less of polyunsaturated fatty acids, about 4 to about 8% of linoleic acid, about 1 to about 2% α -linolenic acid, and 1% or less of trans fatty acids. In particular embodiments, a children's nutritional product, such as a growing up milk intended for a child of the age of 1 to 3 years comprises about 30 to about 40% total energy from fat, while a nutritional product intended for a child of the age of 4 to 6 years comprises about 20 to about 35% total energy from fat. The improved fatty acid profile of a nutritional composition of the present disclosure compared to that of commercially available growing-up milk products, is provided in Table 2.

Table 2. Fatty acid profile (% total energy)

Macronutrient	Present disclosure	Product 1	Product 2	Product 3	Product 4
Total fat	20-40	33.5	36.1	34.1	31.2
Saturated fatty acids	≤10	17.5	20.1	23.8	14.5
Polyunsaturated fatty acids	≤10	4.4	3.7	0.5	3.7
Linoleic acid	4-8	3.8	3.0	0.2	3.2
α-linolenic acid	1-2	0.5	0.6	0.1	0.5
Trans fatty acids	≤1	<0.1	<0.1	<0.1	<0.1

[0037] The disclosed nutritional composition(s) may be provided in any form known in the art, such as a powder, a gel, a suspension, a paste, a solid, a liquid, a liquid concentrate, a reconstitutable powdered milk substitute or a ready-to-use product. The nutritional composition may, in certain embodiments, comprise a nutritional supplement, children's nutritional product, infant formula, human milk fortifier, growing-up milk or any other nutritional composition designed for a pediatric subject. Nutritional compositions of the present disclosure include, for example, orally-ingestible, health-promoting substances including, for example, foods, beverages, tablets, capsules and powders. Moreover, the nutritional composition of the present disclosure may be standardized to a specific caloric content, it may be provided as a ready-to-use product, or it may be provided in a concentrated form. In some embodiments, the nutritional composition is in powder form with a particle size in the range of 5 μm to 1500 μm, more preferably in the range of 10 μm to 1000 μm, and even more preferably in the range of 50 μm to 300 μm.

[0038] In some embodiments, the disclosure provides a children's nutritional product, more particularly, a growing-up milk designed for children ages 1-3 years and/or 4-6 years, wherein the growing-up milk supports growth and development

and life-long health. In some embodiments, the disclosure provides an infant formula suitable for infants ranging in age from 0 to 12 months, or from 0 to 3 months, 0 to 6 months or 6 to 12 months.

[0039] Suitable fat or lipid sources, in addition to the creamer compositions describe herein, may also be included. Such sources include but are not limited to, animal sources, e.g., milk fat, butter, butter fat, egg yolk lipid; marine sources, such as fish oils, marine oils, single cell oils; vegetable and plant oils, such as corn oil, canola oil, sunflower oil, soybean oil, palm olein oil, coconut oil, high oleic sunflower oil, evening primrose oil, rapeseed oil, olive oil, flaxseed (linseed) oil, cottonseed oil, high oleic safflower oil, palm stearin, palm kernel oil, wheat germ oil; medium chain triglyceride oils and emulsions and esters of fatty acids; and any combinations thereof.

[0040] Carbohydrate sources can be any used in the art, e.g., lactose, glucose, fructose, corn syrup solids, maltodextrins, sucrose, starch, rice syrup solids, and the like. The amount of carbohydrate in the nutritional composition typically can vary from between about 5 g and about 25 g/100 kcal.

[0041] The nutritional composition(s) of the disclosure may also comprise a protein source. The protein source can be any used in the art, e.g., nonfat milk, whey protein, casein, soy protein, hydrolyzed protein, amino acids, and the like. Bovine milk protein sources useful in practicing the present disclosure include, but are not limited to, milk protein powders, milk protein concentrates, milk protein isolates, nonfat milk solids, nonfat milk, nonfat dry milk, whey protein, whey protein isolates, whey protein concentrates, sweet whey, acid whey, casein, acid casein, caseinate (e.g. sodium caseinate, sodium calcium caseinate, calcium caseinate) and any combinations thereof.

[0042] In one embodiment, the proteins of the nutritional composition are provided as intact proteins. In other embodiments, the proteins are provided as a combination of both intact proteins and partially hydrolyzed proteins. In certain other embodiments, the proteins are more completely hydrolyzed. In still other embodiments, the protein source comprises amino acids. In yet another embodiment, the protein source may be supplemented with glutamine-containing peptides.

[0043] In a particular embodiment of the nutritional composition, the whey:casein ratio of the protein source is similar to that found in human breast milk. In an embodiment, the protein source comprises from about 40% to about 80% whey protein and from about 20% to about 60% casein. The amount of protein can typically vary from about 1 g and about 7 g of a protein source per 100 kcal.

[0044] In one embodiment, the nutritional composition may contain one or more probiotics. Any probiotic known in the art may be acceptable in this embodiment. In a particular embodiment, the probiotic may be selected from any *Lactobacillus* species, *Lactobacillus rhamnosus* GG (ATCC number 53103), *Bifidobacterium* species, *Bifidobacterium longum*, and *Bifidobacterium animalis subsp. lactis* BB-12 (DSM No. 10140) or any combination thereof.

[0045] If included in the composition, the amount of the probiotic may vary from about 1×10^4 to about 1×10^{10} colony forming units (cfu) per kg body weight per day. In another embodiment, the amount of the probiotic may vary from about 10^6 to about 10^{10} cfu per kg body weight per day. In still another embodiment, the amount of the probiotic may vary from about 10^7 to about 10^9 cfu per kg body weight per day. In yet another embodiment, the amount of the probiotic may be at least about 10^6 cfu per kg body weight per day.

[0046] In an embodiment, the probiotic(s) may be viable or non-viable. As used herein, the term “viable”, refers to live microorganisms. The term “non-viable” or “non-viable probiotic” means non-living probiotic microorganisms, their cellular components and/or metabolites thereof. Such non-viable probiotics may have been heat-killed or otherwise inactivated, but they retain the ability to favorably influence the health of the host. The probiotics useful in the present disclosure may be naturally-occurring, synthetic or developed through the genetic manipulation of organisms, whether such new source is now known or later developed.

[0047] The nutritional composition may also contain one or more prebiotics in certain embodiments. Such prebiotics may be naturally-occurring, synthetic, or developed through the genetic manipulation of organisms and/or plants, whether such new source is now known or developed later. Prebiotics useful in the present disclosure may include oligosaccharides, polysaccharides, and other prebiotics that contain fructose, xylose, soya, galactose, glucose and mannose.

[0048] More specifically, prebiotics useful in the present disclosure may include polydextrose, polydextrose powder, lactulose, lactosucrose, raffinose, gluco-oligosaccharide, inulin, fructo-oligosaccharide (also called oligofructose), isomalto-oligosaccharide, soybean oligosaccharides, lactosucrose, xylo-oligosaccharide, chito-oligosaccharide, manno-oligosaccharide, aribino-oligosaccharide, siallyl-oligosaccharide, fuco-oligosaccharide, galacto-oligosaccharide, and gentio-oligosaccharides.

[0049] In an embodiment, the total amount of prebiotics present in the nutritional composition may be from about 1.0 g/L to about 10.0 g/L of the composition. At least 20% of the prebiotics can comprise galacto-oligosaccharide, polydextrose or a mixture thereof. The amount of each of galacto-oligosaccharide and/or polydextrose in the nutritional composition may, in an embodiment, be within the range of from about 1.0 g/L to about 4.0 g/L.

[0050] The nutritional composition of the disclosure may contain a source of long chain polyunsaturated fatty acid (LCPUFA) that comprises docosahexaenoic acid. Other suitable LCPUFAs include, but are not limited to, α -linoleic acid, γ -linoleic acid, linoleic acid, linolenic acid, eicosapentaenoic acid (EPA) and arachidonic acid (ARA).

[0051] In an embodiment, especially if the nutritional composition is an infant formula, the nutritional composition is supplemented with both DHA and ARA. In this embodiment, the weight ratio of ARA:DHA may be between about 1:3 and about 9:1. In a particular embodiment, the ratio of ARA:DHA is from about 1:2 to about 4:1.

[0052] The nutritional composition may be supplemented with oils containing DHA and/or ARA using standard techniques known in the art. For example, DHA and ARA may be added to the composition by replacing an equivalent amount of an oil, such as high oleic sunflower oil, normally present in the composition. As another example, the oils containing DHA and ARA may be added to the composition by replacing an equivalent amount of the rest of the overall fat blend normally present in the composition without DHA and ARA. In certain embodiments, the formulation comprises DHA.

[0053] If included, the source of DHA and/or ARA may be any source known in the art such as marine oil, fish oil, single cell oil, egg yolk lipid, and brain lipid.

In some embodiments, the DHA and ARA are sourced from single cell Martek oils, DHASCO® and ARASCO®, or variations thereof. The DHA and ARA can be in natural form, provided that the remainder of the LCPUFA source does not result in any substantial deleterious effect on the subject. Alternatively, the DHA and ARA can be used in refined form.

[0054] In an embodiment, sources of DHA and ARA are single cell oils as taught in U.S. Pat. Nos. 5,374,657; 5,550,156; and 5,397,591, the disclosures of which are incorporated herein in their entirety by reference. Nevertheless, the present disclosure is not limited to only such oils.

[0055] The nutritional composition may also comprise a source of β -glucan. Glucans are polysaccharides, specifically polymers of glucose, which are naturally occurring and may be found in cell walls of bacteria, yeast, fungi, and plants. Beta glucans (β -glucans) are themselves a diverse subset of glucose polymers, which are made up of chains of glucose monomers linked together via beta-type glycosidic bonds to form complex carbohydrates.

[0056] β -1,3-glucans are naturally occurring polysaccharides, with or without β -1,6-glucose side chains that are found in the cell walls of a variety of plants, yeasts, fungi and bacteria. (Stone BA, Clarke AE. Chemistry and Biology of (1-3)-Beta-Glucans. London:Portland Press Ltd; 1993.) β -1,3;1,6-glucans are those containing glucose units with (1,3) links having side chains attached at the (1,6) position(s). β -1,3;1,6 glucans are a heterogeneous group of glucose polymers that share structural commonalities, including a backbone of straight chain glucose units linked by a β -1,3 bond with β -1,6-linked glucose branches extending from this backbone. While this is the basic structure for the presently described class of β -glucans, some variations may exist. The chemical structure of β -1,3-glucan depends on the source of the β -1,3-glucan. Moreover, various physiochemical parameters, such as solubility, primary structure, molecular weight, and branching, play a role in biological activities of β -1,3-glucans. (Yadomae T., Structure and biological activities of fungal beta-1,3-glucans. Yakugaku Zasshi. 2000;120:413-431.) For example, certain yeast β -glucans have additional regions of β (1,3) branching extending from the β (1,6) branches, which add further complexity to their respective structures.

[0057] β -glucans derived from baker's yeast, *Saccharomyces cerevisiae*, are made up of chains of D-glucose molecules connected at the 1 and 3 positions, having side chains of glucose attached at the 1 and 6 positions. Yeast-derived β -glucan is an insoluble, fiber-like, complex sugar having the general structure of a linear chain of glucose units with a β -1,3 backbone interspersed with β -1,6 side chains that are generally 6-8 glucose units in length. More specifically, β -glucan derived from baker's yeast is poly-(1,6)- β -D-glucopyranosyl-(1,3)- β -D-glucopyranose.

[0058] Furthermore, β -glucans are well tolerated and do not produce or cause excess gas, abdominal distension, bloating or diarrhea in pediatric subjects. Addition of β -glucan to a nutritional composition for a pediatric subject, such as an infant formula, a growing-up milk or another children's nutritional product, will improve the subject's immune response by increasing resistance against invading pathogens and therefore maintaining or improving overall health.

[0059] In an embodiment, the nutritional composition(s) of the present disclosure comprises choline. Choline is a nutrient that is essential for normal function of cells. It is a precursor for membrane phospholipids, and it accelerates the synthesis and release of acetylcholine, a neurotransmitter involved in memory storage. Moreover, though not wishing to be bound by this or any other theory, it is believed that dietary choline and docosahexaenoic acid (DHA) act synergistically to promote the biosynthesis of phosphatidylcholine and thus help promote synaptogenesis in human subjects. Additionally, choline and DHA may exhibit the synergistic effect of promoting dendritic spine formation, which is important in the maintenance of established synaptic connections. In some embodiments, the nutritional composition(s) of the present disclosure includes about 40 mg choline per serving to about 100 mg per 8 oz. serving.

[0060] In an embodiment, the nutritional composition comprises a source of iron. In an embodiment, the source of iron is ferric pyrophosphate, ferric orthophosphate, ferrous fumarate or a mixture thereof and the source of iron may be encapsulated in some embodiments.

[0061] One or more vitamins and/or minerals may also be added in to the nutritional composition in amounts sufficient to supply the daily nutritional requirements of a subject. It is to be understood by one of ordinary skill in the art that vitamin and mineral requirements will vary, for example, based on the age of

the child. For instance, an infant may have different vitamin and mineral requirements than a child between the ages of one and thirteen years. Thus, the embodiments are not intended to limit the nutritional composition to a particular age group but, rather, to provide a range of acceptable vitamin and mineral components.

[0062] In embodiments providing a nutritional composition for a child, the composition may optionally include, but is not limited to, one or more of the following vitamins or derivations thereof: vitamin B₁ (thiamin, thiamin pyrophosphate, TPP, thiamin triphosphate, TTP, thiamin hydrochloride, thiamin mononitrate), vitamin B₂ (riboflavin, flavin mononucleotide, FMN, flavin adenine dinucleotide, FAD, lactoflavin, ovoflavin), vitamin B₃ (niacin, nicotinic acid, nicotinamide, niacinamide, nicotinamide adenine dinucleotide, NAD, nicotinic acid mononucleotide, NicMN, pyridine-3-carboxylic acid), vitamin B₃-precursor tryptophan, vitamin B₆ (pyridoxine, pyridoxal, pyridoxamine, pyridoxine hydrochloride), pantothenic acid (pantothenate, panthenol), folate (folic acid, folacin, pteroylglutamic acid), vitamin B₁₂ (cobalamin, methylcobalamin, deoxyadenosylcobalamin, cyanocobalamin, hydroxycobalamin, adenosylcobalamin), biotin, vitamin C (ascorbic acid), vitamin A (retinol, retinyl acetate, retinyl palmitate, retinyl esters with other long-chain fatty acids, retinal, retinoic acid, retinol esters), vitamin D (calciferol, cholecalciferol, vitamin D₃, 1,25,-dihydroxyvitamin D), vitamin E (α-tocopherol, α-tocopherol acetate, α-tocopherol succinate, α-tocopherol nicotinate, α-tocopherol), vitamin K (vitamin K₁, phylloquinone, naphthoquinone, vitamin K₂, menaquinone-7, vitamin K₃, menaquinone-4, menadione, menaquinone-8, menaquinone-8H, menaquinone-9, menaquinone-9H, menaquinone-10, menaquinone-11, menaquinone-12, menaquinone-13), choline, inositol, β-carotene and any combinations thereof.

[0063] In embodiments providing a children's nutritional product, such as a growing-up milk, the composition may optionally include, but is not limited to, one or more of the following minerals or derivations thereof: boron, calcium, calcium acetate, calcium gluconate, calcium chloride, calcium lactate, calcium phosphate, calcium sulfate, chloride, chromium, chromium chloride, chromium picolonate, copper, copper sulfate, copper gluconate, cupric sulfate, fluoride, iron, carbonyl iron, ferric iron, ferrous fumarate, ferric orthophosphate, iron trituration, polysaccharide

iron, iodide, iodine, magnesium, magnesium carbonate, magnesium hydroxide, magnesium oxide, magnesium stearate, magnesium sulfate, manganese, molybdenum, phosphorus, potassium, potassium phosphate, potassium iodide, potassium chloride, potassium acetate, selenium, sulfur, sodium, docusate sodium, sodium chloride, sodium selenate, sodium molybdate, zinc, zinc oxide, zinc sulfate and mixtures thereof. Non-limiting exemplary derivatives of mineral compounds include salts, alkaline salts, esters and chelates of any mineral compound.

[0064] The minerals can be added to growing-up milks or to other children's nutritional compositions in the form of salts such as calcium phosphate, calcium glycerol phosphate, sodium citrate, potassium chloride, potassium phosphate, magnesium phosphate, ferrous sulfate, zinc sulfate, cupric sulfate, manganese sulfate, and sodium selenite. Additional vitamins and minerals can be added as known within the art.

[0065] In an embodiment, the children's nutritional composition may contain between about 10 and about 50% of the maximum dietary recommendation for any given country, or between about 10 and about 50% of the average dietary recommendation for a group of countries, per serving of vitamins A, C, and E, zinc, iron, iodine, selenium, and choline. In another embodiment, the children's nutritional composition may supply about 10 – 30% of the maximum dietary recommendation for any given country, or about 10 – 30% of the average dietary recommendation for a group of countries, per serving of B-vitamins. In yet another embodiment, the levels of vitamin D, calcium, magnesium, phosphorus, and potassium in the children's nutritional product may correspond with the average levels found in milk. In other embodiments, other nutrients in the children's nutritional composition may be present at about 20% of the maximum dietary recommendation for any given country, or about 20% of the average dietary recommendation for a group of countries, per serving.

[0066] The children's nutritional composition of the present disclosure may optionally include one or more of the following flavoring agents, including, but not limited to, flavored extracts, volatile oils, cocoa or chocolate flavorings, peanut butter flavoring, cookie crumbs, vanilla or any commercially available flavoring. Examples of useful flavorings include, but are not limited to, pure anise extract, imitation banana extract, imitation cherry extract, chocolate extract, pure lemon

extract, pure orange extract, pure peppermint extract, honey, imitation pineapple extract, imitation rum extract, imitation strawberry extract, or vanilla extract; or volatile oils, such as balm oil, bay oil, bergamot oil, cedarwood oil, cherry oil, cinnamon oil, clove oil, or peppermint oil; peanut butter, chocolate flavoring, vanilla cookie crumb, butterscotch, toffee, and mixtures thereof. The amounts of flavoring agent can vary greatly depending upon the flavoring agent used. The type and amount of flavoring agent can be selected as is known in the art.

[0067] The nutritional compositions of the present disclosure may optionally include one or more emulsifiers that may be added for stability of the final product. Examples of suitable emulsifiers include, but are not limited to, lecithin (*e.g.*, from egg or soy), alpha lactalbumin and/or mono- and di-glycerides, and mixtures thereof. Other emulsifiers are readily apparent to the skilled artisan and selection of suitable emulsifier(s) will depend, in part, upon the formulation and final product.

[0068] The nutritional compositions of the present disclosure may optionally include one or more preservatives that may also be added to extend product shelf life. Suitable preservatives include, but are not limited to, potassium sorbate, sodium sorbate, potassium benzoate, sodium benzoate, calcium disodium EDTA, and mixtures thereof.

[0069] The nutritional compositions of the present disclosure may optionally include one or more stabilizers. Suitable stabilizers for use in practicing the nutritional composition of the present disclosure include, but are not limited to, gum arabic, gum ghatti, gum karaya, gum tragacanth, agar, furcellaran, guar gum, gellan gum, locust bean gum, pectin, low methoxyl pectin, gelatin, microcrystalline cellulose, CMC (sodium carboxymethylcellulose), methylcellulose hydroxypropyl methyl cellulose, hydroxypropyl cellulose, DATEM (diacetyl tartaric acid esters of mono- and diglycerides), dextran, carrageenans, and mixtures thereof.

[0070] The nutritional compositions of the disclosure may provide minimal, partial or total nutritional support. The compositions may be nutritional supplements or meal replacements. The compositions may, but need not, be nutritionally complete. In an embodiment, the nutritional composition of the disclosure is nutritionally complete and contains suitable types and amounts of lipid, carbohydrate, protein, vitamins and minerals. The amount of lipid or fat

typically can vary from about 2 to about 7 g/100 kcal. The amount of protein typically can vary from about 1 to about 5 g/100 kcal. The amount of carbohydrate typically can vary from about 8 to about 14 g/100 kcal.

[0071] In some embodiments, the nutritional composition of the present disclosure is a growing-up milk. Growing-up milks are fortified milk-based beverages intended for children over 1 year of age (typically from 1-6 years of age). Growing-up milks are designed with the intent to serve as a complement to a diverse diet to provide additional insurance that a child achieves continual, daily intake of all essential vitamins and minerals, macronutrients plus additional functional dietary components, such as non-essential nutrients that have purported health-promoting properties.

[0072] The exact composition of an infant formula or a growing-up milk or other nutritional composition according to the present disclosure can vary from market-to-market, depending on local regulations and dietary intake information of the population of interest. In some embodiments, nutritional compositions according to the disclosure consist of a milk protein source, such as whole or skim milk, plus added sugar and sweeteners to achieve desired sensory properties, and added vitamins and minerals. The fat composition is typically derived from the milk raw materials. Total protein can be targeted to match that of human milk, cow milk or a lower value. Total carbohydrate is usually targeted to provide as little added sugar, such as sucrose or fructose, as possible to achieve an acceptable taste. Typically, Vitamin A, calcium and Vitamin D are added at levels to match the nutrient contribution of regional cow milk. Otherwise, in some embodiments, vitamins and minerals can be added at levels that provide approximately 20% of the dietary reference intake (DRI) or 20% of the Daily Value (DV) per serving. Moreover, nutrient values can vary between markets depending on the identified nutritional needs of the intended population, raw material contributions and regional regulations.

[0073] All references to singular characteristics or limitations of the present disclosure shall include the corresponding plural characteristic or limitation, and vice versa, unless otherwise specified or clearly implied to the contrary by the context in which the reference is made.

[0074] All combinations of method or process steps as used herein can be performed in any order, unless otherwise specified or clearly implied to the contrary by the context in which the referenced combination is made.

[0075] The methods and compositions of the present disclosure, including components thereof, can comprise, consist of, or consist essentially of the essential elements and limitations of the embodiments described herein, as well as any additional or optional ingredients, components or limitations described herein or otherwise useful in nutritional compositions.

[0076] As used herein, the term “about” should be construed to refer to both of the numbers specified in any range. Any reference to a range should be considered as providing support for any subset within that range.

[0077] Examples are provided to illustrate some embodiments of the nutritional composition of the present disclosure but should not be interpreted as any limitation thereon. Other embodiments within the scope of the claims herein will be apparent to one skilled in the art from the consideration of the specification or practice of the nutritional composition or methods disclosed herein. It is intended that the specification, together with the example, be considered to be exemplary only, with the scope and spirit of the disclosure being indicated by the claims which follow the examples.

EXAMPLES

[0078] An example of a children’s nutritional composition comprising the creamer composition described herein, such as a fortified milk-based growing-up milk, comprises a protein source, a carbohydrate source, a fat source comprising the creamer composition described herein, and additional ingredients, such as fructooligosaccharide, inulin, DHA, beta-glucan and various vitamins, minerals and other micronutrients. More particularly, a growing-up milk in accordance with the present disclosure comprises the ingredients listed in Table 3:

Table 3. Exemplary growing-up milk ingredients

Quantity (Kg)	Ingredient
48.00	Milk buttermilk powder
28.12	Corn syrup solids
18.00	Nutritional creamer composition
2.10	Oligofructose
2.10	Inulin
0.50	Calcium carbonate
0.58	Marine oil powder (DHA)
0.19	Vitamin premix with taurine and iodide
0.27	Iron trituration
0.04	Choline bitartrate
0.05	Minerals
0.03	Baker's yeast beta glucan

[0079] An exemplary growing milk comprising a nutritional creamer has the nutritional profile summarized in Table 4:

Table 4. Nutritional profile of a growing-up milk

Nutrient	Amount per 100 g
Calories	440
Total fat	16.5 g
Saturated fat	3.8 g
Linoleic acid	3.0 g
α -linolenic acid	0.8 g
Polyunsaturated fatty acids	3.8 g
Trans fatty acids	0.3 g
Protein	16.4 g
Carbohydrate	59.7 g
Total sugars	35.9 g

[0080] All references cited in this specification, including without limitation, all papers, publications, patents, patent applications, presentations, texts, reports, manuscripts, brochures, books, internet postings, journal articles, periodicals, and the like, are hereby incorporated by reference into this specification in their entireties. The discussion of the references herein is intended merely to summarize the assertions made by their authors and no admission is made that any reference constitutes prior art. Applicants reserve the right to challenge the accuracy and pertinence of the cited references.

[0081] Although embodiments of the disclosure have been described using specific terms, devices, and methods, such description is for illustrative purposes only. The words used are words of description rather than of limitation. It is to be understood that changes and variations may be made by those of ordinary skill in the art without departing from the spirit or the scope of the present disclosure, which is set forth in the following claims. In addition, it should be understood that aspects of the various embodiments may be interchanged in whole or in part. For example, while methods for the production of a commercially sterile liquid nutritional supplement made according to those methods have been exemplified, other uses are contemplated. Therefore, the spirit and scope of the appended claims should not be limited to the description of the versions contained therein.

CLAIMS

What is claimed is:

1. A creamer composition, comprising: a vegetable oil blend comprising up to about 15 % by weight of saturated fatty acids, about 45 to about 75 % by weight of monounsaturated fatty acids, about 15 to about 45 % by weight of polyunsaturated fatty acids, and up to about 3 % by weight of trans fatty acids.
2. The creamer composition of claim 1, wherein the vegetable oil blend comprises about 45 to about 75% by weight of oleic acid, about 10 to about 40% by weight of linoleic acid, and about 1 to about 15% by weight of α -linolenic acid.
3. The creamer composition of claim 1, wherein the vegetable oil blend comprises about 30 to about 70 % by weight of canola oil, about 10 to about 45 % by weight of soybean oil and about 10 to about 50 % by weight of a high oleic oil.
4. The creamer composition of claim 1, wherein the vegetable oil blend comprises about 30 to about 70 % by weight of canola oil, about 10 to about 45 % by weight of sunflower oil and about 10 to about 50 % by weight of a high oleic oil.
5. The creamer composition of claim 3, wherein the high oleic oil is selected from the group consisting of high oleic sunflower oil, high oleic corn oil, high oleic soybean oil, high oleic canola oil, high oleic safflower oil, and mixtures thereof.
6. The creamer composition of claim 3, wherein the high oleic oil comprises high oleic sunflower oil.
7. The creamer composition of claim 1, which is a powdered creamer.
8. The creamer composition of claim 7, wherein the powdered creamer comprises a spray-dried matrix.
9. The creamer composition of claim 1, further comprising an additional ingredient selected from the group consisting of a carrier, a stabilizer, an emulsifier, an antioxidant, a processing aid, and mixture thereof.
10. The creamer composition of claim 9, wherein the additional ingredient is selected from the group consisting of milk proteins, modified starch, potassium or sodium caseinate, mono or diglycerides, ascorbyl palmitate, lecithin, mixed tocopherols, maltodextrin, lactose, starch, whey protein concentrate, phosphates, citrates, and mixtures thereof.
11. The creamer composition of claim 1, wherein the creamer composition comprises about 40 to about 70% by weight of fat.

12. The creamer composition of claim 1, for use in a nutritional composition.
13. The creamer composition of claim 12, wherein the nutritional composition is a children's nutritional product.
14. The creamer composition of claim 12, wherein the nutritional composition is a growing-up milk.
15. The creamer composition of claim 12, wherein the nutritional composition is an infant formula.
16. A nutritional composition comprising:
 - a protein source,
 - a carbohydrate source, and
 - a lipid source, wherein the lipid source comprises the creamer composition of claim 1.
17. The nutritional composition of claim 16, comprising up to about 50% by weight of the creamer composition.
18. The nutritional composition of claim 16, comprising
 - about 8 to about 20 g of the fat source,
 - about 50 to about 65 g of the carbohydrate source, and
 - about 14 to about 25 g of the protein sourceper 100 g of the nutritional composition.
19. The nutritional composition of claim 16, comprising:
 - about 1 to about 7 g of saturated fats
 - about 2.5 to about 10 g of monounsaturated fats
 - about 0.5 to about 10 g of polyunsaturated fats and
 - about 0.1 to about 1 g of trans fatsper 100 g of the nutritional composition.
20. The nutritional composition of claim 16, comprising
 - about 0.5 to about 5 g of palmitic acid,
 - about 0.5 to about 2 g of stearic acid,
 - about 1 to about 10 g of oleic acid,
 - about 0.5 to about 8 g of linoleic acid
 - about 0.1 to about 2 g α -linolenic acid,
 - and about 25 to about 200 mg of docosaheptaenoic acidper 100 g of the nutritional composition.

21. The nutritional composition of claim 16, wherein about 4 to about 8% of the total energy of the composition comes from linoleic acid, about 1 to about 2% of the total energy of the composition comes from α -linolenic acid, about 10% or less of the total energy of the composition comes from polyunsaturated fatty acids, about 10% or less of the total energy comes from saturated fatty acids, and about 1% or less of the energy comes from trans fatty acids.

23. The nutritional composition of claim 16, which is a growing-up milk.

INTERNATIONAL SEARCH REPORT

International application No

PCT/US2013/049057

A. CLASSIFICATION OF SUBJECT MATTER

INV. A23D9/00 A23D7/00 A23C11/00 A23L1/30
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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 A23C A23L

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

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

EPO-Internal, BIOSIS, COMPENDEX, FSTA, 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 0 937 408 A2 (NESTLE SA [CH]) 25 August 1999 (1999-08-25) paragraphs [0009] - [0020]; examples 1-23 -----	1-23
X	WO 2009/111516 A2 (PERLMAN DANIEL [US]) 11 September 2009 (2009-09-11) page 33 the whole document -----	1-23
X	WO 94/02166 A1 (ABBOTT LAB [US]) 3 February 1994 (1994-02-03) pages 19-27 -----	1-6, 9-17,23
A	NL 1 001 372 C2 (FRIESLAND BRANDS BV [NL]) 12 September 1996 (1996-09-12) the whole document -----	1-23



Further documents are listed in the continuation of Box C.



See patent family annex.

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"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)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

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权利要求书2页 说明书13页

(54) 发明名称
营养奶精组合物

(57) 摘要

本文提供了包含植物油掺合物的营养奶精组合物,其中所述植物油掺合物提供合适的脂肪酸分布或饱和脂肪、多不饱和脂肪、单不饱和脂肪和反式脂肪酸。本文描述的奶精组合物可用作多种营养组合物(诸如婴儿配方、儿童营养产品和成年人营养组合物)的脂肪源。本文还提供了包含前述奶精组合物的营养组合物。

1. 一种奶精组合物,其包含:含有至多约 15 重量%的饱和脂肪酸、约 45 至约 75 重量%的单不饱和脂肪酸、约 15 至约 45 重量%的多不饱和脂肪酸和至多约 3 重量%的反式脂肪酸的植物油掺合物。

2. 权利要求 1 所述的奶精组合物,其中所述植物油掺合物包含约 45 至约 75 重量%的油酸、约 10 至约 40 重量%的亚油酸和约 1 至约 15 重量%的 α -亚麻酸。

3. 权利要求 1 所述的奶精组合物,其中所述植物油掺合物包含约 30 至约 70 重量%的芥花油、约 10 至约 45 重量%的大豆油和约 10 至约 50 重量%的高油酸油。

4. 权利要求 1 所述的奶精组合物,其中所述植物油掺合物包含约 30 至约 70 重量%的芥花油、约 10 至约 45 重量%的向日葵油和约 10 至约 50 重量%的高油酸油。

5. 权利要求 3 所述的奶精组合物,其中所述高油酸油选自高油酸向日葵油、高油酸玉米油、高油酸大豆油、高油酸芥花油、高油酸红花油、及其混合物。

6. 权利要求 3 所述的奶精组合物,其中所述高油酸油包含高油酸向日葵油。

7. 权利要求 1 所述的奶精组合物,所述奶精组合物是粉末状奶精。

8. 权利要求 7 所述的奶精组合物,其中所述粉末状奶精包含喷雾干燥的基质。

9. 权利要求 1 所述的奶精组合物,所述奶精组合物进一步包含选自以下的其它成分:载体、稳定剂、乳化剂、抗氧化剂、加工助剂和它们的混合物。

10. 权利要求 9 所述的奶精组合物,其中所述其它成分选自:乳蛋白、变性淀粉、酪蛋白酸钾或酪蛋白酸钠、甘油单酯或甘油二酯、抗坏血酸棕榈酸酯、卵磷脂、混合的生育酚、麦芽糊精、乳糖、淀粉、乳清蛋白浓缩物、磷酸盐、柠檬酸盐、及其混合物。

11. 权利要求 1 所述的奶精组合物,其中所述奶精组合物包含约 40 至约 70 重量%的脂肪。

12. 用在营养组合物中的权利要求 1 所述的奶精组合物。

13. 权利要求 12 所述的奶精组合物,其中所述营养组合物是儿童营养产品。

14. 权利要求 12 所述的奶精组合物,其中所述营养组合物是成长期乳品。

15. 权利要求 12 所述的奶精组合物,其中所述营养组合物是婴儿配方。

16. 一种营养组合物,其包含:

蛋白源,

碳水化合物源,和

脂质源,其中所述脂质源包含权利要求 1 所述的奶精组合物。

17. 权利要求 16 所述的营养组合物,所述营养组合物包含至多约 50 重量%的奶精组合物。

18. 权利要求 16 所述的营养组合物,所述营养组合物包含:每 100 g 营养组合物,

约 8 至约 20 g 脂肪源,

约 50 至约 65 g 碳水化合物源,和

约 14 至约 25 g 蛋白源。

19. 权利要求 16 所述的营养组合物,所述营养组合物包含:每 100 g 营养组合物,

约 1 至约 7 g 饱和脂肪

约 2.5 至约 10 g 单不饱和脂肪

约 0.5 至约 10 g 多不饱和脂肪和

约 0.1 至约 1 g 反式脂肪。

20. 权利要求 16 所述的营养组合物,所述营养组合物包含:每 100 g 营养组合物,

约 0.5 至约 5 g 棕榈酸,

约 0.5 至约 2 g 硬脂酸,

约 1 至约 10 g 油酸,

约 0.5 至约 8 g 亚油酸

约 0.1 至约 2 g α -亚麻酸,

和约 25 至约 200 mg 二十二碳六烯酸。

21. 权利要求 16 所述的营养组合物,其中所述组合物的总能量的约 4 至约 8% 来自亚油酸,所述组合物的总能量的约 1 至约 2% 来自 α -亚麻酸,所述组合物的总能量的约 10% 或更少来自多不饱和脂肪酸,所述总能量的约 10% 或更少来自饱和脂肪酸,且所述能量的约 1% 或更少来自反式脂肪酸。

23. 权利要求 16 所述的营养组合物,其为成长期乳品。

营养奶精组合物

技术领域

[0001] 本公开内容一般地涉及营养奶精 (creamer), 其包含提供合适的脂肪酸分布的植物油掺合物。本文中公开的奶精组合物可用作营养组合物 (诸如婴儿配方、儿童营养产品和成年人营养组合物) 的脂肪的来源。

背景技术

[0002] 营养组合物 (诸如婴儿配方、儿童营养产品和成年人营养组合物) 可以为婴儿、儿童和成年人提供部分或完全营养。除了其它营养物以外, 这样的营养组合物通常包括具有适当量的脂肪的脂肪源, 更具体地, 适当量的饱和脂肪酸、单不饱和脂肪酸、多不饱和脂肪酸和反式脂肪酸。更具体地, 通常已知某些脂肪酸 (诸如油酸、亚油酸和 α -亚麻酸) 会支持人类的生长、发育和终生健康。因此, 需要为营养组合物提供合适的脂肪源, 同时维持营养组合物的感觉特征。合适的脂肪源还应当是货架稳定的且容易掺入营养组合物中。

发明内容

[0003] 本公开内容提供了一种营养奶精组合物, 其可用作多种营养组合物 (特别是婴儿配方、儿童营养产品和成年人营养产品) 的脂肪源。所述奶精组合物包含特定量的饱和脂肪酸、多不饱和脂肪酸、单不饱和脂肪酸和反式脂肪酸。更具体地, 所述奶精组合物提供特定量的脂肪酸, 包括油酸、亚油酸、 α -亚麻酸。在某些实施方案中, 所述掺合物包含至多约 15 重量 % 的饱和脂肪酸, 例如约 3 至约 15 重量 % 的饱和脂肪酸; 约 45 至约 75 重量 % 的单不饱和脂肪酸; 约 15 至约 45 重量 % 的多不饱和脂肪酸; 和至多约 3 重量 % 的反式脂肪酸, 例如约 0.1 至约 3 重量 %。在其它实施方案中, 所述奶精掺合物包含约 45 至约 75 重量 % 的油酸、约 10-40 重量 % 的亚油酸和约 1 至约 15 重量 % 的 α -亚麻酸。

[0004] 所述奶精组合物包含提供前述脂肪酸分布的植物油掺合物。例如, 在某些实施方案中, 所述奶精包含芥花油、大豆油或向日葵油和高油酸油的植物油掺合物。在某些实施方案中, 所述奶精组合物包含含有约 30 至约 70 重量 % 的芥花油、约 10 至约 45 重量 % 的大豆油和约 10 至约 50 重量 % 的高油酸油的植物油掺合物, 而在其它实施方案中, 所述奶精组合物包含含有约 30 至约 70 重量 % 的芥花油、约 10 至约 45 重量 % 的向日葵油和约 10 至约 50 重量 % 的高油酸油的植物油掺合物。优选地, 所述高油酸油选自高油酸向日葵油、高油酸玉米油、高油酸大豆油、高油酸芥花油、高油酸红花油、及其混合物。

[0005] 在某些实施方案中, 以粉末形式 (诸如喷雾干燥的基质) 提供奶精组合物。所述奶精组合物任选地包含以下的至少一种: 载体、稳定剂、乳化剂、抗氧化剂、加工助剂、及其混合物。例如, 在某些实施方案中, 所述组合物进一步包含玉米糖浆固体、酪蛋白酸盐、甘油单酯、甘油二酯、抗坏血酸棕榈酸酯、卵磷脂、混合的生育酚、麦芽糊精、乳糖、淀粉、乳清蛋白浓缩物、磷酸盐、柠檬酸盐及其混合物。

[0006] 本文中公开的奶精组合物可用于提供在不同营养制剂 (包括婴儿配方、儿童营养产品 (诸如成长期乳品) 和成年人营养产品) 中的脂肪的来源。例如, 根据本公开内容的营

养组合物包含蛋白源、碳水化合物源和脂肪源(其包含如本文中所述的奶精组合物)。优选地,所述营养组合物包含至多约 50 重量 % 的奶精组合物。例如,在某些实施方案中,所述营养组合物包含约 5 至约 50 重量 % 的奶精组合物。更优选地,所述营养组合物包含约 10 至约 40 重量 % 的奶精组合物,约 15 至约 30 重量 % 的奶精组合物,且甚至更优选地,约 18% 至约 27 重量 % 的奶精组合物,或约 20 至约 25 重量 % 的奶精组合物。

[0007] 在某些实施方案中,前述营养组合物包含:每 100 g 营养组合物,约 8 至约 19 g 脂肪、约 50 至约 65 g 碳水化合物和约 14 至约 25 g 蛋白。此外,在某些实施方案中,所述营养组合物包含:每 100 g 营养组合物,约 1 至约 7 g 饱和脂肪、约 2.5 至约 10 g 单不饱和脂肪、约 0.5 至约 10 g 多不饱和脂肪和约 0.1-1 g 反式脂肪。在某些实施方案中,所述营养组合物包含:每 100 g 营养组合物,约 0.5 至约 5 g 棕榈酸、约 0.5 至约 2 g 硬脂酸、约 1 至约 10g 油酸、约 0.5 至约 8 g 亚油酸、约 0.1 至约 2 g α -亚麻酸和约 25 至约 200 mg 二十二碳六烯酸。

具体实施方式

[0008] 现在将详细地提及本公开内容的实施方案,其一个或多个实施例阐述在下文中。每个实施例以解释本公开内容的营养组合物的方式提供,且不是限制。实际上,本领域技术人员显而易见,可以对本公开内容的教导做出多种修改和变化,而不脱离本公开内容的范围或精神。例如,作为一个实施方案的一部分来举例说明或描述的特征可以与另一个实施方案一起使用,以产生再一个其它的实施方案。

[0009] 因而,本公开内容意图涵盖落入所附权利要求和它们的等同方案的范围内的这样的修改和变化。本公开内容的其它目的、特征和方面公开在下述详细描述中,或者从下述详细描述中显而易见。本领域普通技术人员应当理解,本文的讨论仅仅是示例性实施方案的描述,且无意限制本公开内容的更宽方面。

[0010] “营养组合物”是指满足受试者的营养需求的至少一部分的物质或制剂。术语“营养物(一种或多种)”、“营养配方(一种或多种)”、“肠内营养物(一种或多种)”、“营养组合物(一种或多种)”和“营养补剂(一种或多种)”在本公开内容的通篇中互换使用,表示液体、粉末、凝胶、糊状物、固体、浓缩物、混悬液或即用形式的肠内配方、口服配方、用于婴儿的配方、用于儿科受试者的配方、用于儿童的配方、成长期乳品和 / 或用于成年人的配方。

[0011] “婴儿”是指其年龄不大于约 1 岁的受试者,并且包括 0-12 个月的婴儿。术语婴儿包括低出生体重的婴儿、极低出生体重的婴儿和早产儿。“早产儿”是指在孕期第 37 周结束前出生的婴儿。术语婴儿还包括出生前婴儿,例如仍在子宫内的婴儿。

[0012] “儿童”或“儿科受试者”是指年龄从 12 个月至约 13 岁的人受试者。在某些实施方案中,儿童是年龄在 1 岁至 12 岁龄之间的受试者。在其它实施方案中,术语“儿童们”或“儿童”表示在约 1 岁至约 6 岁龄之间、或者在约 7 岁至约 12 岁龄之间的受试者。在其它实施方案中,术语“儿童们”或“儿童”表示在约 12 个月至约 13 岁之间的任意年龄范围。

[0013] “儿童营养产品”表示满足儿童的营养需求的至少一部分的组合物。成长期乳品是儿童营养产品的一个例子。

[0014] “婴儿配方”是指满足婴儿的营养需求的至少一部分的组合物。在美国,婴儿配方

的内容由美国联邦法规第 21 章 (21 C.F.R.) 第 100、106 和 107 节阐述的联邦法规所规定。这些法规定义了大量营养物质、维生素、矿物质和其它成分的水平,以尽力模拟人母乳的营养和其它特性。

[0015] 术语“成长期乳品”表示广泛类别的营养组合物,其意图用作多样化膳食的一部分以便支持约 1 岁至约 6 岁龄的儿童的正常生长和发育。

[0016] “基于乳的”是指包含已经取自或提取自哺乳动物的乳腺的至少一种组分。在某些实施方案中,基于乳的营养组合物包含源自家养的有蹄类动物、反刍类动物或其它哺乳动物的乳的组分或它们的任意组合。另外,在某些实施方案中,基于乳的是指包含牛酪蛋白、乳清、乳糖或它们的任意组合。此外,“基于乳的营养组合物”可以表示包含本领域已知的任何源自乳的或基于乳的产品的任何组合物。

[0017] “在营养上完整的”是指可用作唯一营养来源的组合物,其将提供基本上所有的所需日常量的维生素、矿物质和 / 或微量元素以及蛋白质、碳水化合物和脂质。实际上,“在营养上完整的”描述了这样的营养组合物:其提供支持受试者的正常生长和发育所需的足够量的碳水化合物、脂质、必需脂肪酸、蛋白、必需氨基酸、条件必需氨基酸、维生素、矿物质和能量。

[0018] 因此,根据定义,用于早产儿的“在营养上完整的”的营养组合物将在质量上和数量上提供足够量的早产儿生长所需的碳水化合物、脂质、必需脂肪酸、蛋白、必需氨基酸、条件必需氨基酸、维生素、矿物质和能量。

[0019] 根据定义,用于足月儿的“在营养上完整的”的营养组合物将在质量上和数量上提供足够量的足月儿生长所需的所有碳水化合物、脂质、必需脂肪酸、蛋白、必需氨基酸、条件必需氨基酸、维生素、矿物质和能量。

[0020] 根据定义,用于儿童的“在营养上完整的”的营养组合物将在质量上和数量上提供足够量的儿童生长所需的所有碳水化合物、脂质、必需脂肪酸、蛋白、必需氨基酸、条件必需氨基酸、维生素、矿物质和能量。

[0021] 在应用于营养物质时,术语“必需的”表示身体不能以足够用于正常生长和维持健康的量合成并且因此必须通过膳食补给的任何营养物质。应用于营养物的术语“条件必需的”是指,在身体不可获得足够量的前体化合物以进行内源合成的条件下,所述营养物质必须通过膳食补给。

[0022] “益生菌”是指对宿主的健康发挥有益作用的低或无致病性的微生物。

[0023] “益生元”是指不可消化的食物成分,其如下有益地影响宿主:选择性地刺激消化道中的一种或有限数目的有益肠道细菌的生长和 / 或活性,选择性地减少肠道病原体,或有利地影响可改善宿主的健康的肠道短链脂肪酸分布。

[0024] “ β -葡聚糖”或“beta-葡聚糖”是指所有 β -葡聚糖,包括 β -1,3-葡聚糖和 β -1,3;1,6-葡聚糖,每种作为 β -葡聚糖的特定类型。另外, β -1,3;1,6-葡聚糖是 β -1,3-葡聚糖的一种类型。因此,术语“ β -1,3-葡聚糖”包括 β -1,3;1,6-葡聚糖。

[0025] 除非另外指出,本文中使用的所有百分比、份数和比例均按总制剂的重量计。

[0026] 本公开内容的奶精组合物和营养组合物可以基本上不含有本文所述的任何任选的或选择的成分。在本上下文中,并且除非另外指出,术语“基本上不含有”是指,选择的组合物可以含有小于功能量的任选成分,通常小于 0.1 重量%,并且还包含 0 重量%的这样的

任选的或选择的成分。

[0027] 本公开内容的一个方面涉及一种奶精组合物，其用在营养组合物如婴儿配方、儿童营养产品和成年人营养配方中。更具体地，本公开内容涉及一种奶精组合物，其用在儿童营养产品如成长期乳品中。所述植物油掺合物具有有利的脂肪酸分布，其帮助支持食用包含本文描述的奶精组合物的营养组合物的个体的健康，并与此同时，当用在营养组合物中时维持良好的感官特性。在某些实施方案中，所述植物油掺合物包含至多约 15 重量 % 的饱和脂肪酸、约 45 至约 75 重量 % 的单不饱和脂肪酸、约 15 至约 45 重量 % 的多不饱和脂肪酸和至多约 3 重量 % 的反式脂肪酸。在其它实施方案中，所述植物油掺合物包含至多约 12 重量 % 的饱和脂肪酸、约 53 至约 67 重量 % 的单不饱和脂肪酸、约 23 至约 37 重量 % 的多不饱和脂肪酸和至多约 1.5 重量 % 的反式脂肪酸。

[0028] 所述植物油掺合物提供合适量的某些脂肪酸，包括油酸、亚油酸和 α -亚麻酸。更具体地，在某些实施方案中，所述植物油掺合物包含约 45 至约 70 重量 % 的油酸、约 10 至约 40 重量 % 的亚油酸和约 2 至约 15 重量 % 的 α -亚麻酸。在其它实施方案中，所述脂肪掺合物包含约 50 至约 70 重量 % 的油酸、约 15 至约 35 重量 % 的亚油酸和约 3 至约 10 重量 % 的 α -亚麻酸。在其它实施方案中，所述植物油掺合物包含在表 1 中阐述的清单：

表 1：植物油掺合物清单

组分	量（重量 %）
饱和脂肪酸	最大 12%
油酸 (C18:1)	53%- 67%
亚油酸 (C18:2cc)	18%- 30%
α -亚麻酸 (C18:3ccc)	5%- 7%
单不饱和脂肪酸	53%- 67%
多不饱和脂肪酸	23%-37%
反式-脂肪酸	最大 1.5%
过氧化物值	最大 1.0 meq/kg
游离脂肪酸（作为油酸）	最大 0.15%
水分	最大 0.05%

[0029] 所述奶精组合物包含提供合适的脂肪酸分布的植物油掺合物。合适的油包括、但不限于芥花油、大豆油、红花油、棕榈油、棕榈仁油、玉米油、向日葵油、椰子油、橄榄油和高油酸油。在某些实施方案中，所述植物油掺合物包含芥花油、大豆油或向日葵油和高油酸油。更具体地，在某些实施方案中，所述植物油掺合物包含约 30 至约 70 重量 % 的芥花油、约 10 至约 45 重量 % 的大豆油和约 10 至约 50 重量 % 的高油酸油。在其它实施方案中，所述植物油掺合物包含约 30 至约 70 重量 % 的芥花油、约 10 至约 45 重量 % 的向日葵油和约 10 至约 50 重量 % 的高油酸油。在这些实施方案中的任一个中的高油酸油可以选自高油酸向日葵油、高油酸玉米油、高油酸大豆油、高油酸芥花油、高油酸红花油、及其混合物。优选地，所述高油酸油包含高油酸向日葵油。在某些实施方案中，在本组合物中有用的高油酸油包含至少约 70% 油酸，或更具体地，至少约 80% 油酸。

[0030] 在奶精组合物中可以包括其它成分，诸如乳蛋白、变性淀粉、酪蛋白酸钾或酪蛋白酸钠、甘油单酯或甘油二酯、棕榈酸酯（例如，抗坏血酸棕榈酸酯）、卵磷脂、混合的生育酚、麦芽糊精、乳糖、淀粉、乳清蛋白浓缩物、磷酸盐、柠檬酸盐和它们的组合，作为载体、稳定剂、乳化剂、抗氧化剂和加工助剂。在某些实施方案中，所述其它成分包括、但不限于玉米糖浆固体、酪蛋白酸盐（酪蛋白酸钾或酪蛋白酸钠）、甘油单酯、甘油二酯、抗坏血酸棕榈酸

酯、卵磷脂和混合的生育酚。

[0031] 所述奶精组合物可以呈液体或糊状物形式,或可以有利地呈用于掺入营养组合物中的粉末形式。在某些实施方案中,将所述奶精组合物提供为喷雾干燥的基质。因而,粉末状奶精组合物可以有利地与要包含在营养组合物中的其它成分干燥掺合。粉末状奶精组合物优选地具有至少 6 个月的贮存期限,且更优选至少 9 个月。在某些实施方案中,所述奶精具有 99.5% 大于或等于美国筛眼孔径 (USSS) no. 20 且 100%USSS No. 12 的颗粒尺寸。

[0032] 在某些实施方案中,所述奶精组合物包含至少约 40 重量 % 的脂肪,优选至少 50%,更优选至少约 55%。在某些实施方案中,所述奶精包含约 40 至约 70 重量 % 的脂肪,优选约 50 至约 60 重量 % 的脂肪,更优选约 55 至约 58 重量 % 的脂肪。

[0033] 本文中公开的奶精组合物可用作营养制剂中的脂肪源,所述营养制剂包括婴儿配方、儿童营养产品(诸如成长期乳品)和成年人营养产品。根据本公开内容的一种示例性的营养组合物包含蛋白源、碳水化合物源和脂肪源(其包含本文中公开的奶精组合物)。优选地,所述营养组合物包含至多约 50 重量 % 的奶精组合物,例如约 5 至约 50 重量 % 的奶精组合物。更优选地,所述营养组合物包含约 10 至约 40 重量 % 的奶精组合物,约 15 至约 30 重量 % 的奶精组合物,且甚至更优选地,约 18 重量 % 至约 27 重量 % 的奶精组合物,或约 20 至约 25 重量 % 的奶精组合物。一种示例性的营养组合物包含:每 100 g 营养组合物,约 14 至约 25 g 蛋白源、约 50 至约 65 g 碳水化合物源和约 5 至约 25 g 脂肪源。

[0034] 在某些实施方案中,本公开内容的营养组合物包含下述大量营养物分布: 每 100 g 营养组合物,约 1 至约 7 g 饱和脂肪、约 2.5 至约 10 g 单不饱和脂肪、约 0.5 至约 10 g 多不饱和脂肪和约 0.1-1 g 反式脂肪。此外,在某些实施方案中,所述营养组合物可以包含: 每 100 g 营养组合物,约 0.5 至约 5 g 棕榈酸、约 0.5 至约 2 g 硬脂酸、约 1 至约 10g 油酸、约 0.5 至约 8 g 亚油酸、约 0.1 至约 2 g α -亚麻酸和约 25 至约 200 mg 二十二碳六烯酸。

[0035] 在某些实施方案中,包含本文描述的奶精的营养组合物的脂肪酸分布包含:约 12 至约 19 g 总脂肪/100 g、约 2 至约 5 g 饱和脂肪/100 g、约 1 至约 5 g 亚油酸/100 g、约 0.5 至约 1 g α -亚麻酸/100 g、约 2 至约 5 g 多不饱和脂肪酸/100 g 和约 0.2 至约 0.5 g 反式脂肪酸/100 g。在特定实施方案中,所述营养组合物具有下述脂肪酸分布: 约 15 至约 17 g 总脂肪/100 g、约 3.7 至约 3.8 g 饱和脂肪/100 g、约 2.7 至约 3.3 g 亚油酸/100 g、约 0.7 至约 0.8 g α -亚麻酸/100 g、约 3.5 至约 4.3 g 多不饱和脂肪酸/100 g 和约 0.3 至约 0.4 g 反式脂肪酸/100 g。

[0036] 本公开内容的营养组合物的脂肪酸分布可以进一步以组合物的总能量的百分比的方式来表示。例如,在某些实施方案中,包含本公开内容的奶精组合物的营养组合物包含下述脂肪酸分布(作为总能量的百分比):约 20 至约 40% 总脂肪、10% 或更少的饱和脂肪酸、10% 或更少的多不饱和脂肪酸、约 4 至约 8% 亚油酸、约 1 至约 2% α -亚麻酸和 1% 或更少的反式脂肪酸。在特定实施方案中,儿童营养产品(诸如意图用于 1-3 岁龄儿童的成长期乳品)包含约 30 至约 40% 的来自脂肪的总能量,而意图用于 4-6 岁龄儿童的营养产品包含约 20 至约 35% 的来自脂肪的总能量。在表 2 中提供了与商购可得的成长期乳品产品的脂肪酸分布相比较而言的本公开内容的营养组合物的改进的脂肪酸分布。

[0037] 表 2. 脂肪酸分布 (% 总能量)

大量营养物	本公开内容	产品 1	产品 2	产品 3	产品 4
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总脂肪	20-40	33.5	36.1	34.1	31.2
饱和脂肪酸	≤ 10	17.5	20.1	23.8	14.5
多不饱和脂肪酸	≤ 10	4.4	3.7	0.5	3.7
亚油酸	4-8	3.8	3.0	0.2	3.2
α-亚麻酸	1-2	0.5	0.6	0.1	0.5
反式脂肪酸	≤ 1	<0.1	<0.1	<0.1	<0.1

[0038] 所公开的营养组合物(一种或多种)可以以本领域已知的任何形式提供,所述形式例如粉末、凝胶、混悬液、糊状物、固体、液体、液体浓缩物、可复溶的粉末状乳替代物或即用产品。在某些实施方案中,所述营养组合物可以包含营养补剂、儿童营养产品、婴儿配方、人乳强化剂、成长期乳品,或为儿科受试者设计的任何其它营养组合物。本公开内容的营养组合物包括例如,可口服摄入的促进健康的物质,包括、例如食品、饮料、片剂、胶囊和粉末。另外,本公开内容的营养组合物可标准化至具体的含热量,它可以作为即用产品提供,或者它可以以浓缩的形式提供。在某些实施方案中,所述营养组合物呈具有以下颗粒尺寸的粉末形式:在 5 μm 至 1500 μm 的范围内,更优选地在 10 μm 至 1000 μm 的范围内,并且甚至更优选地在 50 μm 至 300 μm 的范围内。

[0039] 在某些实施方案中,本公开内容提供了一种儿童营养产品,更具体地是为 1-3 岁龄和 / 或 4-6 岁龄的儿童设计的成长期乳品,其中所述成长期乳品支持生长和发育和终生健康。在某些实施方案中,本公开内容提供了一种婴儿配方,其适合用于在 0-12 个月或 0-3 个月、0-6 个月或 6-12 个月的年龄范围内的婴儿。

[0040] 除了本文中描述的奶精组合物以外,还可以包括合适的脂肪或脂质来源。这样的来源包括、但不限于:动物来源,例如,乳脂肪、黄油、乳脂、蛋黄脂质;海洋来源,例如鱼油、海洋生物油、单细胞油;蔬菜油和植物油,例如玉米油、芥花油、向日葵油、大豆油、棕榈油油精、椰子油、高油酸向日葵油、月见草油、油菜籽油、橄榄油、亚麻籽(亚麻仁)油、棉籽油、高油酸红花油、棕榈硬脂、棕榈仁油、小麦胚芽油;中链甘油三酯油和脂肪酸的乳液和酯类;及它们的任意组合。

[0041] 碳水化合物源可以是本领域中使用的任何种类,例如,乳糖、葡萄糖、果糖、玉米糖浆固体、麦芽糊精、蔗糖、淀粉、大米糖浆固体等。所述营养组合物中的碳水化合物的量通常可以在约 5 g 至约 25 g/100 kcal 之间变化。

[0042] 本公开内容的营养组合物(一种或多种)还可以包含蛋白源。所述蛋白源可以是本领域中使用的任何种类,例如,脱脂乳、乳清蛋白、酪蛋白、大豆蛋白、水解蛋白、氨基酸等。可用于实施本公开内容的牛乳蛋白源包括、但不限于,乳蛋白粉、乳蛋白浓缩物、乳蛋白分离物、脱脂乳固体、脱脂乳、脱脂奶粉、乳清蛋白、乳清蛋白分离物、乳清蛋白浓缩物、甜乳清、酸乳清、酪蛋白、酸酪蛋白、酪蛋白酸盐(例如酪蛋白酸钠、酪蛋白酸钙钠、酪蛋白酸钙),及它们的任意组合。

[0043] 在一个实施方案中,所述营养组合物中的蛋白作为完整蛋白提供。在其它实施方案中,所述蛋白作为完整蛋白和部分水解蛋白二者的组合提供。在某些其它实施方案中,所述蛋白更完全地水解。在其它实施方案中,所述蛋白源包含氨基酸。在另一个实施方案中,所述蛋白源可以补充有含谷氨酰胺的肽。

[0044] 在所述营养组合物中的一个特定实施方案中,所述蛋白源的乳清:酪蛋白比例与在人母乳中所见类似。在一个实施方案中,所述蛋白源包含约 40% 至约 80% 乳清蛋白和约 20%

至约 60% 酪蛋白。所述蛋白的量通常可以在约 1 g 至约 7 g 蛋白源 /100 kcal 之间变化。

[0045] 在一个实施方案中,所述营养组合物可以含有一种或多种益生菌。在此实施方案中,本领域已知的任何益生菌都可以是可接受的。在一个特定实施方案中,所述益生菌可以选自任何乳杆菌属(*Lactobacillus*)种、鼠李糖乳杆菌 GG (*Lactobacillus rhamnosus* GG) (ATCC 号 53103)、双歧杆菌属(*Bifidobacterium*)种、长双歧杆菌(*Bifidobacterium longum*)和动物双歧杆菌乳酸亚种 BB-12 (*Bifidobacterium animalis subsp. lactis* BB-12) (DSM 号 10140) 或它们的任意组合。

[0046] 如果被包括在组合物内,所述益生菌的量可以从每天每 kg 体重约 1×10^4 至约 1×10^{10} 个菌落形成单位 (cfu) 变化。在另一个实施方案中,所述益生菌的量可以从每天每 kg 体重约 10^6 至约 10^{10} cfu 变化。在另一个实施方案中,所述益生菌的量可以从每天每 kg 体重约 10^7 至约 10^9 cfu 变化。在另一个实施方案中,所述益生菌的量可以是每天每 kg 体重至少约 10^6 cfu。

[0047] 在一个实施方案中,所述益生菌(一种或多种)可以是存活的或非存活的。本文中使用的术语“存活的”表示活的微生物。术语“非存活的”或“非存活的益生菌”是指非活体的益生微生物、它们的细胞组分和 / 或其代谢产物。这样的非存活的益生菌可以已经加热灭活或以其它方式灭活,但是它们保留有利地影响宿主健康的能力。在本公开内容中有用的益生菌可以是天然存在的、合成的或通过对生物体进行基因操作而开发出来的,不论这样的新来源是现在已知的还是在以后开发的。

[0048] 在某些实施方案中,所述营养组合物还可以含有一种或更多种益生元。这样的益生元可以是天然存在的、合成的或通过对生物体和 / 或植物进行基因操作而开发出来的,不论这样的新来源是现在已知的还是在以后开发的。在本公开内容中有用的益生元可以包括寡糖、多糖和含有果糖、木糖、大豆、半乳糖、葡萄糖和甘露糖的其它益生元。

[0049] 更具体地,在本公开内容中有用的益生元可以包括聚葡萄糖、聚葡萄糖粉末、乳果糖、低聚乳果糖 (lactosucrose)、棉子糖、低聚葡萄糖、菊糖、低聚果糖(也称为寡果糖)、低聚异麦芽糖、大豆低聚糖、低聚乳果糖、低聚木糖、壳低聚糖、低聚甘露糖、低聚阿拉伯糖、唾液酸寡糖、低聚岩藻糖、低聚半乳糖和低聚龙胆糖。

[0050] 在一个实施方案中,所述营养组合物中存在的益生元的总量可以是约 1.0 g/L 至约 10.0 g/L 的组合物。至少 20% 的所述益生元可以包含低聚半乳糖、聚葡萄糖或其混合物。在一个实施方案中,所述营养组合物中每种低聚半乳糖和 / 或聚葡萄糖的量可在从约 1.0 g/L 至约 4.0 g/L 的范围内。

[0051] 本公开内容的营养组合物可以含有包含二十二碳六烯酸的长链多不饱和脂肪酸 (LCPUFA) 的来源。其它合适的 LCPUFA 包括、但不限于: α -亚油酸、 γ -亚油酸、亚油酸、亚麻酸、二十碳五烯酸 (EPA) 和花生四烯酸 (ARA)。

[0052] 在一个实施方案中,特别是如果所述营养组合物为婴儿配方,则所述营养组合物补充有 DHA 和 ARA 二者。在该实施方案中,ARA:DHA 的重量比可以在约 1:3 至约 9:1 之间。在一个特定实施方案中,ARA:DHA 的比例为约 1:2 至约 4:1。

[0053] 使用本领域已知的标准技术,可以给所述营养组合物补充含有 DHA 和 / 或 ARA 的油。例如,通过替代等量的通常存在于所述组合物中的油(例如高油酸向日葵油),可以向所述组合物中加入 DHA 和 ARA。作为另一个例子,通过替代等量的通常存在于不含 DHA 和 ARA

的组合物中的其余总脂肪掺合物,可以向所述组合物中加入含有 DHA 和 ARA 的油。在某些实施方案中,所述制剂包含 DHA。

[0054] 如果包括 DHA 和 / 或 ARA 的来源,则所述来源可以为本领域已知的任何来源,例如海洋生物油、鱼油、单细胞油、蛋黄脂质和脑脂质。在某些实施方案中,DHA 和 ARA 来源于单细胞 Martek 油、DHASCO®和 ARASCO®,或其变体。DHA 和 ARA 可以呈天然形式,前提条件是,其余的 LCPUFA 来源不对所述受试者产生任何实质的有害作用。可替换地,DHA 和 ARA 可以以经精炼的形式使用。

[0055] 在一个实施方案中,DHA 和 ARA 的来源为单细胞油,如美国专利号 5,374,657、5,550,156 和 5,397,591 中所教导的,这些专利的公开内容通过引用整体并入本文。尽管如此,本公开内容不仅仅限于这样的油。

[0056] 所述营养组合物还可以包含 β -葡聚糖的来源。葡聚糖为多糖,具体而言,为葡萄糖的聚合物,其是天然存在的并且可见于细菌、酵母、真菌和植物的细胞壁中。 β -葡聚糖(β -glucans)自身为葡萄糖聚合物的多样化子集,其由通过 β -型糖苷键连接在一起以形成复杂的碳水化合物的葡萄糖单体的链构成。

[0057] β -1,3-葡聚糖为具有或不具有 β -1,6-葡萄糖侧链的天然存在的多糖,其见于多种植物、酵母、真菌和细菌的细胞壁中(Stone BA, Clarke AE. Chemistry and Biology of (1-3)-Beta-Glucans. London:Portland Press Ltd; 1993)。 β -1,3;1,6-葡聚糖为含有具有(1,3)连接的葡萄糖单元、具有在(1,6)位(一个或多个)连接的侧链的那些葡聚糖。 β -1,3;1,6-葡聚糖为由不同种类的葡萄糖聚合物组成的组,所述葡萄糖聚合物具有结构共性,包括通过 β -1,3 键连接的直链葡萄糖单元的骨架,以及从该骨架伸出的 β -1,6 连接的葡萄糖分支。尽管这是目前描述的 β -葡聚糖种类的基本结构,但是可存在一些变体。 β -1,3-葡聚糖的化学结构依赖于 β -1,3-葡聚糖的来源。另外,各种生理化学参数,例如可溶性、一级结构、分子量和分支,在 β -1,3-葡聚糖的生物活性中起作用(Yadomae T., Structure and biological activities of fungal beta-1,3-glucans. Yakugaku Zasshi. 2000;120:413-431)。例如,某些酵母 β -葡聚糖具有从 β (1,6)分支伸出的 β (1,3)分支的额外区域,这进一步增加它们各自结构的复杂性。

[0058] 来源自面包酵母——酿酒酵母(*Saccharomyces cerevisiae*)的 β -葡聚糖由在 1 和 3 位连接的 D-葡萄糖分子的链构成,具有在 1 和 6 位连接的葡萄糖侧链。酵母来源的 β -葡聚糖为不溶性的、纤维状的复杂糖,具有葡萄糖单元的线性链的基本结构,其具有散布有长度通常为 6-8 个葡萄糖单元的 β -1,6 侧链的 β -1,3 骨架。更具体地,来源自面包酵母的 β -葡聚糖为聚-(1,6)- β -D-吡喃葡萄糖基-(1,3)- β -D-吡喃型葡萄糖。

[0059] 此外, β -葡聚糖被良好地耐受并且不会在儿科受试者中产生或引起过多气体、腹部膨胀、胃气胀或腹泻。在用于儿科受试者的营养组合物(例如婴儿配方、成长期乳品或另一种儿童营养产品)中加入 β -葡聚糖,将通过增强对入侵病原体的抵抗力而改善所述受试者的免疫应答,并因此维持或改善整体健康。

[0060] 在一个实施方案中,本公开内容的营养组合物(一种或多种)包含胆碱。胆碱是对细胞的正常功能而言至关重要的营养物。它是膜磷脂的前体,并且加速乙酰胆碱(一种参与记忆储存的神经递质)的合成和释放。另外,尽管不希望受此理论或任何其它理论束缚,据信饮食胆碱和二十二碳六烯酸(DHA)协同地作用以促进磷脂酰胆碱的生物合成并且因此

帮助促进人受试者中的突触发生。此外,胆碱和 DHA 可以表现出促进树突棘形成(这在维持已建立的突触连接中是重要的)的协同作用。在某些实施方案中,本公开内容的营养组合物(一种或多种)包括约 40 mg 胆碱 / 份至约 100 mg / 每 8 盎司份。

[0061] 在一个实施方案中,所述营养组合物包含铁源。在一个实施方案中,所述铁源为焦磷酸铁、正磷酸铁、富马酸亚铁或其混合物,并且在某些实施方案中,所述铁源可以是包封的。

[0062] 还可以以足以供给受试者的每日营养需求的量,在所述营养组合物中加入一种或更多种维生素和 / 或矿物质。本领域普通技术人员应当理解,所述维生素和矿物质需求将例如基于儿童的年龄而变化。例如,婴儿可以具有不同于在 1-13 岁龄之间的儿童的维生素和矿物质需求。因此,所述实施方案无意将所述营养组合物限于特定年龄组,而是相反,提供可接受的维生素和矿物质组分的范围。

[0063] 在提供用于儿童的营养组合物的实施方案中,所述组合物可以任选地包括、但不限于下列维生素或其衍生物中的一种或更多种:维生素 B₁ (硫胺素、焦磷酸硫胺素、TPP、三磷酸硫胺素、TTP、盐酸硫胺素、单硝酸硫胺素)、维生素 B₂ (核黄素、黄素单核苷酸、FMN、黄素腺嘌呤二核苷酸、FAD、乳黄素、卵黄素)、维生素 B₃ (烟碱酸、烟酸、烟酰胺、尼克酰胺、烟酰胺腺嘌呤二核苷酸、NAD、烟酸单核苷酸、NicMN、吡啶-3-甲酸)、维生素 B₃ 前体色氨酸、维生素 B₆ (吡哆醇、吡哆醛、吡哆胺、盐酸吡哆醇)、泛酸 (泛酸盐、泛醇)、叶酸盐 (叶酸、叶酸类似物、蝶酰谷氨酸)、维生素 B₁₂ (钴胺素、甲钴胺、脱氧腺苷钴胺素、氰钴胺、羟基钴胺素、腺苷钴胺素)、生物素、维生素 C (抗坏血酸)、维生素 A (视黄醇、乙酸视黄酯、棕榈酸视黄酯、与其它长链脂肪酸成的视黄酯、视黄醛、视黄酸、视黄醇酯)、维生素 D (麦角钙化醇、胆骨化醇、维生素 D₃、1, 25, - 二羟基维生素 D)、维生素 E (α - 生育酚、α - 生育酚乙酸酯、α - 生育酚琥珀酸酯、α - 生育酚烟酸酯、α - 生育酚)、维生素 K (维生素 K₁、叶绿醌、萘醌、维生素 K₂、甲基萘醌-7、维生素 K₃、甲基萘醌-4、甲萘醌、甲基萘醌-8、甲基萘醌-8H、甲基萘醌-9、甲基萘醌-9H、甲基萘醌-10、甲基萘醌-11、甲基萘醌-12、甲基萘醌-13)、胆碱、肌醇、β - 胡萝卜素及它们的任意组合。

[0064] 在提供儿童营养产品(例如成长期乳品)的实施方案中,所述组合物可以任选地包括、但不限于以下矿物质或其衍生物中的一种或更多种:硼、钙、乙酸钙、葡萄糖酸钙、氯化钙、乳酸钙、磷酸钙、硫酸钙、氯化物、铬、氯化铬、吡啶甲酸铬、铜、硫酸铜、葡萄糖酸铜、硫酸铜、氟化物、铁、羰基铁、三价铁、富马酸亚铁、正磷酸铁、铁研碎物、多糖铁、碘化物、碘、镁、碳酸镁、氢氧化镁、氧化镁、硬脂酸镁、硫酸镁、锰、钼、磷、钾、磷酸钾、碘化钾、氯化钾、乙酸钾、硒、硫、钠、多库酯钠、氯化钠、硒酸钠、钼酸钠、锌、氧化锌、硫酸锌及其混合物。矿物质化合物的非限制性示例性衍生物包括任何矿物质化合物的盐、碱性盐、酯和螯合物。

[0065] 所述矿物质可以以盐的形式加入到成长期乳品或其它儿童营养组合物中,所述盐例如磷酸钙、甘油磷酸钙、柠檬酸钠、氯化钾、磷酸钾、磷酸镁、硫酸亚铁、硫酸锌、硫酸铜、硫酸锰和亚硒酸钠。如本领域已知的,可以加入额外的维生素和矿物质。

[0066] 在一个实施方案中,所述儿童营养组合物每份可以含有任何给定国家的最高饮食建议量的约 10 至约 50% 之间、或者一组国家的平均饮食建议量的约 10 至约 50% 之间的维生素 A、C 和 E、锌、铁、碘、硒和胆碱。在另一个实施方案中,所述儿童营养组合物每份可提供任何给定国家的最高饮食建议量的约 10-30%、或一组国家的平均饮食建议量的约 10-30% 的 B

族维生素。在另一个实施方案中,所述儿童营养产品中的维生素 D、钙、镁、磷和钾的水平可以对应于见于乳的平均水平。在其它实施方案中,每份所述儿童营养组合物中的其它营养物可以以任何给定国家的最高饮食建议量的约 20%、或以一组国家的平均饮食建议量的约 20% 存在。

[0067] 本公开内容的儿童营养组合物可以任选地包括一种或更多种以下调味剂,包括、但不限于调味的提取物、挥发油、可可或巧克力调味剂、花生酱调味剂、曲奇碎屑、香草或任何商购可得的调味剂。有用的调味剂的例子包括、但不限于纯茴香提取物、人造香蕉提取物、人造樱桃提取物、巧克力提取物、纯柠檬提取物、纯桔子提取物、纯薄荷提取物、蜂蜜、人造菠萝提取物、人造朗姆酒提取物、人造草莓提取物或香草提取物;或挥发油,例如香蜂叶油、月桂油、香柠檬油、香柏油、樱桃油、肉桂油、丁香油或薄荷油;花生酱、巧克力调味剂、香草曲奇碎屑、奶油糖、太妃糖,及其混合物。调味剂的量可以很大程度地依赖于所用的调味剂而变化。如本领域已知的,可以选择调味剂的种类和量。

[0068] 本公开内容的营养组合物可以任选地包括可以为最终产品的稳定性而添加的一种或更多种乳化剂。合适的乳化剂的例子包括、但不限于卵磷脂(例如来自蛋或大豆)、 α 乳清蛋白和/或单-和二-甘油酯,及其混合物。其它乳化剂是技术人员容易明白的,并且合适的乳化剂(一种或多种)的选择将部分地依赖于制剂和最终产品。

[0069] 本公开内容的营养组合物可以任选地包括一种或更多种也可以为延长产品贮存期限而添加的防腐剂。合适的防腐剂包括、但不限于山梨酸钾、山梨酸钠、苯甲酸钾、苯甲酸钠、乙二胺四乙酸二钠钙、及其混合物。

[0070] 本公开内容的营养组合物可以任选地包括一种或更多种稳定剂。用于实施本公开内容的营养组合物的合适的稳定剂包括、但不限于阿拉伯树胶、印度树胶、刺梧桐树胶、黄芪胶、琼脂、红藻胶、瓜尔胶、结冷胶、槐豆胶、果胶、低甲氧基果胶、明胶、微晶纤维素、CMC(羧甲基纤维素钠)、甲基纤维素羟丙基甲基纤维素、羟丙基纤维素、DATEM(单和二甘油酯的双乙酰酒石酸酯)、葡聚糖、角叉菜胶、及其混合物。

[0071] 本公开内容的营养组合物可以提供最低、部分或全部营养支持。所述组合物可以是营养补剂或膳食替代品。所述组合物可以是,但不一定是,在营养上完整的。在一个实施方案中,本公开内容的营养组合物是在营养上完整的,并且含有合适类型和量的脂质、碳水化合物、蛋白、维生素和矿物质。脂质或脂肪的量通常可以从约 2 至约 7 g/100 kcal 变化。蛋白质的量通常可以从约 1 至约 5 g/100 kcal 变化。碳水化合物的量通常可以从约 8 至约 14 g/100 kcal 变化。

[0072] 在某些实施方案中,本公开内容的营养组合物为成长期乳品。成长期乳品为意图用于超过 1 岁龄(通常 1-6 岁龄)的儿童的生长强化的基于乳的饮料。成长期乳品的设计目的是充当多样化膳食的补剂,以提供以下额外保证:儿童实现持续的每日摄取所有必需维生素和矿物质、大量营养物,和额外的功能性饮食组分,例如据称具有促进健康特性的非必需营养物。

[0073] 根据本公开内容的婴儿配方或成长期乳品或其它营养组合物的确切组成可以随市场不同而变化,取决于地方规定和目标人群的饮食摄取信息。在某些实施方案中,根据本公开内容的营养组合物由乳蛋白源(例如全脂或脱脂乳)组成,并添加糖和甜味剂以达到期望的感觉特性,还添加维生素和矿物质。所述脂肪组合物通常源自于乳原料。总蛋白可以

目标是与人乳、牛乳或较低的值匹配。总碳水化合物通常目标为提供尽可能少的添加糖,例如蔗糖或果糖,而达到可接受的口味。通常,以匹配当地牛乳的营养贡献的水平添加维生素 A、钙和维生素 D。另外,在某些实施方案中,可以以每份提供饮食参考摄入量 (DRI) 的约 20% 或每日摄入量 (DV) 的 20% 的水平添加维生素和矿物质。此外,营养值可以随市场而不同,依赖于鉴别的目标人群的营养需求、原料贡献和地区规定。

[0074] 除非提及的上下文另外指出或清楚地表明与此相反,否则对于本公开内容的单数特征或限定的所有提及应包括对应的复数特征或限定,且反之亦然。

[0075] 除非提及的组合的上下文另外指出或清楚地表明与此相反,否则本文中使用的的方法或方法步骤的所有组合可以按任何顺序进行。

[0076] 本公开内容的方法和组合物(包括其组分)可以包括,由下述组成或基本上由下述组成:本文描述的实施方案的基本要素和限定,以及本文描述的或以其它方式可用于营养组合物中的任何其它或任选成分、组分或限定。

[0077] 本文中使用的术语“约”应该解释为提及在任何范围中指定的两个数字。对一个范围的任何提及应该被视作为该范围内的任何子集提供支持。

[0078] 提供实施例来举例说明本公开内容的营养组合物的一些实施方案,但不应该被解释为对其的任何限制。考虑到本文中公开的营养组合物或方法的详细说明或实践,在本文权利要求范围内的其它实施方案对本领域技术人员而言将会是显而易见的。意图将本说明书连同实施例视作仅仅是示例性的,且本公开内容的范围和精神由在实施例之后的权利要求书指定。

实施例

[0079] 包含本文描述的奶精组合物的儿童营养组合物的一个实施例(诸如强化的基于乳的成长期乳品)包含:蛋白源、碳水化合物源、脂肪源(其包含本文描述的奶精组合物),和其它成分,诸如低聚果糖、菊糖、DHA、 β -葡聚糖和多种维生素、矿物质和其它微量营养物。更具体地,根据本公开内容的成长期乳品包含在表 3 中列出的成分:

表 3. 示例性的成长期乳品成分

量 (Kg)	成分
48.00	乳酪乳粉
28.12	玉米糖浆固体
18.00	营养奶精组合物
2.10	低聚果糖
2.10	菊糖
0.50	碳酸钙
0.58	海洋生物油粉末(DHA)
0.19	含有牛磺酸和碘化物的维生素预混物
0.27	铁研碎物
0.04	重酒石酸胆碱
0.05	矿物质
0.03	面包酵母β葡聚糖

[0080] 包含营养奶精的一种示例性成长期乳品具有在表 4 中总结的营养分布：

表 4. 成长期乳品的营养分布

营养物	量/100 g
卡路里	440
总脂肪	16.5 g
饱和脂肪	3.8 g
亚油酸	3.0 g
α-亚麻酸	0.8 g
多不饱和脂肪酸	3.8 g
反式脂肪酸	0.3 g
蛋白	16.4 g
碳水化合物	59.7 g
总糖	35.9 g

[0081] 在本说明书中引用的所有参考文献(包括、但不限于所有论文、出版物、专利、专利申请、呈文、课本、报告、手稿、宣传材料、书籍、因特网帖子、刊物文章、期刊等)特此通过引用整体并入本说明书中。本文中对参考文献的讨论仅仅意图概括其作者作出的主张并且不承认任何参考文献构成现有技术。申请人保留质疑所引用的参考文献的准确性和相关性的权利。

[0082] 尽管已经使用具体术语、装置和方法描述了本公开内容的实施方案,但是这样的描述仅仅是为了例示的目的。使用的词语是描述性词语而非限制性词语。应当理解,本领

域普通技术人员可以做出改变和变化,而不脱离在下述权利要求书中阐明的本公开内容的精神或范围。另外,应当理解,各个实施方案的方面可以完全地或部分地互换。例如,在已经举例说明根据那些方法制备的商用无菌液体营养补剂的生产方法的同时,还预见到其它用途。因此,所附权利要求书的精神和范围不应该被限定于在其中包含的版本的描述。