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(54) Title: POWDERED, COLD-WATER SOLUBLE/DISPERSIBLE COMPOSITION

(57) Abstract: The invention relates to a powdered composition having a total oil content of 15-55 wt.% and further comprising, based on the total weight of the powdered, cold-water soluble/dispersible composition, 35-80 wt.% of carbohydrate; 1.5-15 wt.% of protein; 0.1-5 wt% of stabilizer; and 0-2 wt.% of non-proteinaceous emulsifier; wherein the total oil content consists essentially of a blend of virgin coconut oil and an edible high oleic oil in a ratio in the range 1:1 to 1:15, the edible high oleic oil being selected from the group consisting of high oleic sunflower oil, ultra-high oleic sunflower oil, high oleic rapeseed oil, ultra-high oleic rapeseed oil, high oleic palm oil, high oleic soybean oil, high oleic stearin sunflower oil, and combinations thereof. The invention furthermore relates to a method for producing such a composition and to its use.

Powdered, cold-water soluble/dispersible composition

The invention relates to a powdered composition for use in a food product, in particular a powdered beverage mix for producing cold beverages.

Powdered creamers, dairy as well as non-dairy, are well known in the art and widely used for many years. Typical ingredients for creamers are skimmed milk, (milk) proteins, lipids, carbohydrates, stabilizers, emulsifiers, free flowing agents and modified starches.

Creamers are suitably produced by spray drying oil-in-water emulsions, containing (a part of) the above-mentioned components, and may include entrapped gas in order to enable foam formation. Such gas may be entrapped in the creamer by injecting gas in the emulsion just before the emulsion is passing the nozzle of the spray-dryer.

Usually, powdered creamers are quickly dispersed/dissolved in hot beverages like coffee and tea. They are used because of their whitening capacity and provide taste and mouthfeel. Further, powdered creamers may be used to generate a foam layer on the hot beverage, either by generating foam using (high) pressure e.g. in a suitable machine, or by releasing entrapped gas during dispersing / dissolving of the foaming creamer.

When using traditional powdered creamers in cold beverages, in particular at ambient temperature, such as a temperature of about 25°C, or less, the powdered creamers are not or hardly dispersible or soluble. Such traditional creamers with entrapped gas only release a small amount of gas under such cold conditions, thereby only creating a thin and unequal foam layer with undissolved powder and lumps of fat; if any foam is formed at all. Consequently, traditional powdered creamers are not suitable for use in cold beverages.

A possible solution to solve the problem of producing a powdered cold water dispersible creamer involves the use of specific oils. When using edible oil with a melting point below 20°C, preferably below 15°C, even more preferably below 0°C, a powdered cold water dispersible creamer can be developed. Evidently, creamers based on oils with a higher melting point, such as coconut oils, are not cold soluble/dispersible.

EP-A 923 301 describes an agglomerated powdered creamer based on a protein, a sweetener, and a low melting edible oil, such as triglycerides with a high content of oleic acid. According to the examples, the agglomerated particles, based on high oleic sunflower oil coated with lecithin, are cold-soluble.

However, for cold beverages like cold coffee-, tea-, and chocolate drinks, the taste of the powdered creamer is very important. In addition to the initial taste, also the stability of sensory attributes and the sensory characteristics over time are very important, which correlate with the shelf life of the final powdered creamer or final food product containing the creamer.

Traditional edible oils like soybean oil, rapeseed oil, and sunflower oil do not have a bland initial taste and are moreover very sensitive towards oxidation; such oxidation leading to adverse taste effects. The high oleic sunflower oil and high oleic canola oil, as mentioned in EP-A-928 301, are described to be not well suitable for this application, either (see EP 1 791 438).

The present invention is based on the finding that a powdered composition comprising, *int. al.,* a specific vegetable oil blend, is soluble/dispersible in cold water while being soluble/dispersible in hot water as well. In addition, the composition has very good functional and sensory characteristics in both cold and hot applications. This makes the composition surprisingly versatile. In addition, the composition has good shelf stability.

More particularly, the invention relates to a powdered composition having a total oil content of 15-60 wt.%, preferably 15-60 wt.%, and further comprising, based on the total weight of the powdered composition:

- 35-80 wt.% of carbohydrate;
- 1.5-15 wt.% of protein;
- 0.1-5 wt% of stabilizer; and
- 0-2 wt.% of non-proteinaceous emulsifier;

wherein the total oil content consists essentially of a blend of virgin coconut oil and edible high oleic oil in a ratio of between 1:1 and 1:15, the edible high oleic oil being selected from the group consisting of high oleic sunflower oil, ultra-high oleic sunflower oil, high oleic rapeseed oil, ultra-high oleic rapeseed oil, high oleic palm oil, high oleic soybean oil, high oleic stearin sunflower oil, and combinations thereof.

In another aspect, the invention relates to a method for producing a powdered composition according to the invention, comprising the steps of

(i) preparing an aqueous mixture of carbohydrate, protein, stabilizer, and optionally non-proteinaceous emulsifier;
(ii) mixing oil with the aqueous mixture as obtained in step (i) to obtain a pre-emulsion;
(iii) homogenizing the pre-emulsion to obtain an emulsion;
(iv) optionally injecting gas into the emulsion; and
(v) spray-drying the emulsion,

thereby forming the powdered composition.

In yet another aspect, the invention relates to a food product comprising the powdered composition, said food product preferably being a powdered beverage mix. The invention further relates to the use of the powdered composition as a foamer or creamer.

The composition of the invention is well soluble or dispersible in cold water and has proven to have surprisingly good taste. Said composition has good foaming properties, such as foam height and foam stability. What is more, the composition also shows good stability and good sensory characteristics when dissolved or dispersed in hot water. Finally, the composition has a long shelf life, which makes it also highly preferred from a sustainability point of view.

In a preferred embodiment, the powdered composition according to the invention is foamable, which means that it is able to form a foam. More preferably, the composition is able to form, after 1 minute, a foam with a volume of at least 30 mL when subjected to the foam booster test and/or the Dolce Gusto® test described below.

The powdered composition according to the present invention is preferably cold soluble/dispersible. In the context of this invention, a composition is considered cold-soluble/dispersible if it can be dissolved or dispersed in cold water or a cold aqueous liquid in a sufficient amount to form a foam on the liquid after dissolving/dispersing. More particularly, a composition is considered cold-soluble/dispersible if it is dissolvable/dispersible in water at a temperature of 20°C in an amount of at least 10 g/L, more preferably in an amount of at least 25 g/L, and most preferably at least 40 g/L. The dissolution time under stirring should preferably be less than 60 sec.
Within this specification, a condition is considered "cold" if the temperature is 25°C or below, preferably in the range 2-25°C, more preferably in the range 4-20°C.
The term "hot" is used to describe a condition wherein the temperature is higher than 60°C, more in particular temperatures within the range of 70-100 °C.

"Shelf-life" means the period of time the product can be stored at 21°C without developing an objectionable organoleptic characteristic, such as objectionable aroma, appearance, taste, consistency, and/or mouthfeel, and with no or hardly any adverse effect on cold-water solubility or dispersibility. "Good shelf-stability" according to the present invention means that a product does not have objectionable organoleptic characteristics as defined above, and no or hardly any deterioration in cold-water solubility / dispersibility characteristics, when stored at 21°C for at least 12 months, preferably for at least 15 months, and most preferably for at least 18 months.

As mentioned above, the total oil content of the powdered composition of the invention is in the range 15-60 wt.%, preferably 15-55 wt.%, more preferably 20-50 wt.%, and most preferably 25-48 wt.% (weight percentage being based on the total weight of the powdered composition). The oil consists essentially of a specific blend of virgin coconut oil and an edible high oleic oil. In other words, the composition is essentially free of any other oil.

High oleic oils are defined as containing at least 80% oleic acid (C18:1) moieties, based on total fatty acid moieties; ultra-high oleic oils are defined as containing at least 90% oleic acid moieties, based on total fatty acid moieties. Due to these high proportions of monounsaturated fats, specifically oleic acid (C18:1), these oils are considered healthy fats and healthier alternatives for saturated fats such as MCT oils. Some oils, such as olive oil, are naturally high in oleic acid; other high-oleic oils are obtainable through biotechnology, genetic modification, etc. The edible high oleic oil as used according to the invention is selected from the group consisting of high oleic sunflower oil, ultra-high oleic sunflower oil, high oleic rapeseed oil, ultra-high oleic rapeseed oil, high oleic palm oil, high oleic soybean oil, high oleic stearin sunflower oil, and combinations thereof. These oils have the advantage that they are liquid between 4-20°C, are less prone towards oxidation compared to other unsaturated oils, have a relatively neutral taste (in contrast to, for instance, olive oil), and have good availability (in contrast to, for instance, safflower oil).

Preferably, the edible high oleic oil is high oleic sunflower oil or ultra-high oleic sunflower oil. High oleic sunflower oil is most preferred as it has good stability, a relatively neutral taste, and is readily available.

The blend of virgin coconut oil and edible high oleic oil as described above gives rise to a powdered composition having a balanced taste profile with a pleasant slight hint of coconut, a creamy mouthfeel, and sufficient “body”. In the blend, the virgin coconut oil and the edible high oleic oil are used in a weight ratio of between 1:1 and 1:15, preferably in the range 1:1 to 1:12. In one embodiment, said ratio may be in the range 1:1 to 1:9, more preferably 1:4 to 1:9, and most preferably in the range 1:5 to 1:9. In another embodiment, the ratio may be in the range 1:4 to 1:12, preferably 1:5-1:12, most preferably 1:7 to 1:12.

The blend of virgin coconut oil and edible high oleic oil preferably comprises between 5 and 25 wt%, more preferably between 7 and 20 wt%, even more preferably between 7 and 15 wt%, and most preferably between 7 and 10 wt% of virgin coconut oil.

The term “virgin coconut oil” (VCO) is meant to denote a pure and unrefined oil that is extracted from the coconut meat without using any chemical processing or heat exposure. This in contrast to refined coconut oil (generally referred to as “coconut oil”), which has gone through various processing steps, including deodorization and bleaching, thereby losing its coconut flavor and aroma. Refining also results in removal of antioxidants like polyphenols, which removal negatively affects the shelf life of the oil and products containing such oil.

Virgin coconut oil is sometimes also denoted as “extra virgin coconut oil”. The oil has a milky appearance and a mild coconut aroma and taste.

There are two main methods of producing virgin coconut oil known in industry:

1. Virgin coconut oil derived from expeller-pressing the oil from dried coconut. In this method, fresh coconut meat is dried first, and the oil is subsequently pressed out of the coconut.
2. Virgin coconut oil derived through a "wet-milling" process. With this method, the oil is extracted from fresh coconut meat without drying first. "Coconut milk" is expressed first by pressing it out of the wet coconut meat. The oil is then further separated from the water. Methods which can be used to separate the oil from the water include boiling, fermentation, refrigeration, enzymatic treatment, and mechanical centrifugation.

The virgin coconut oil content of the powdered composition of the invention, based on the weight of said powdered composition, is preferably in the range 2.5-6.0 wt.%.
The edible high oleic oil content of the powdered composition of the invention, based on the weight of said powdered composition, is preferably in the range 20-50 wt.%, more preferably 25-45 wt.%.

The powdered composition of the invention comprises 35-80 wt.% of carbohydrates (weight percentage being based on the total weight of the powdered composition). Preferably, said composition comprises 40-70 wt% of carbohydrates, most preferably 45-60 wt% of carbohydrates. The carbohydrate is preferably selected from the group consisting of glucose; glucose syrup; fructose; sucrose; lactose; mannose; maltose; sorbitol; mannitol; maltitol; lactitol; erythritol; xylitol; maltodextrin; starch hydrolysis products; gums; modified starches such as nOSA-modified starch; modified celluloses; fibres, such as galacto-oligosaccharide (GOS), inulin, oligofructose (FOS); and combinations thereof. More preferably, the carbohydrate is glucose syrup or maltodextrin. Most preferably, the carbohydrate is glycose syrup.

The powdered composition of the invention comprises 1.5-15 wt.% of protein (weight percentage being based on the total weight of the powdered composition). Preferably, said composition comprises 2-13 wt%, even more preferably 2.5-12 wt%, and most preferably 2.5-7 wt.% of protein. The protein is preferably selected from the group consisting of dairy proteins (e.g. micellar casein, caseinate, and/or whey protein) or plant proteins (e.g. legume protein). Suitable sources of dairy proteins are skim milks solids, whey protein concentrates or isolates, micellar casein isolates, milk protein concentrate, and caseinates/caseins. Suitable legume proteins are faba protein, pea protein, lupin protein, hydrolysates of said proteins, and combinations thereof. Most preferably, the protein is selected from the group consisting of micellar casein, caseinates, whey proteins, and combinations thereof.

The powdered composition of the invention comprises 0.1-5 wt.% of stabilizer, preferably 0.2-3 wt%, and most preferably 0.4-2 wt% of stabilizer (weight percentage being based on the total weight of the powdered composition). As the skilled person will understand, the stabilizer is typically used in quantities in the upper part of the 0.1-5 wt.% range in case of a high oil content, whereas much lower quantities of stabilizer are typically used in compositions comprising lower amounts of oil. The weight ratio oil/stabilizer is preferably around 10/1.

The stabilizer is preferably selected from the group consisting of phosphates, e.g. monopotassium phosphate (KH_2PO_4), monosodium phosphate (NaH_2PO_4), dipotassium phosphate (K_2HPO_4), disodium phosphate (Na_2HPO_4), tetra sodium diphosphate, tetra potassium diphosphate, pentasodium triphosphate, pentapotassium triphosphate, sodium polyphosphate, potassium polyphosphate, sodium hexametaphosphate ($Na_6[(PO_3)_6]$), potassium hexametaphosphate, sodium potassium hexametaphosphate, and combinations thereof. Most preferably, the stabilizer is dipotassium phosphate.

The powdered composition of the invention optionally comprises a non-proteinaceous emulsifier in an amount of 0-2 wt.% (weight percentage being based on the total weight of the powdered composition). Preferably, the composition comprises a non-proteinaceous emulsifier in an amount of between 0.2-1.8 wt.%, and most preferably in an amount of 0.4-1.7 wt.% (weight percentage being based on the total weight of the powdered composition). Said non-proteinaceous emulsifier is preferably selected from the group consisting of mono- and diglycerides of glycerol, DATEM (diacetyl tartaric acid ester of mono- and diglycerides, also E472e), CITREM (citric acid ester of mono- and diglycerides, also E472c), SSL (sodium stearoyl lactylate, also E481), and sucrose esters of fatty acids (E473).

The powdered composition may further comprise a free flowing agent, in which case said free flowing agent is preferably selected from the group consisting of silicon dioxide (E551), tricalcium phosphate, calcium carbonate, milk minerals, and combinations thereof. Preferably, the foamable composition comprises one or more free flowing agents in amounts of 0.1-1.5 wt.%, based on the powdered composition.

In one embodiment, the powdered composition has a poured bulk density of 300-600 g/L. In this embodiment, the powdered composition may act as a creamer.
In another embodiment, the powdered composition has a poured bulk density of 120-300 g/l. In this embodiment, the powdered composition may act as a foamer.

In this specification, poured bulk density is determined by measuring the volume that a given weight of the powder occupies when poured through a funnel into a stationary graduated cylinder of 500 ml with a diameter of 10 cm. Poured bulk density is expressed as g/L.

In another aspect, the invention relates to a method for producing the powdered composition according to the invention, comprising the steps of

(i) preparing an aqueous mixture of the carbohydrate, the protein, the stabilizer, and optionally the non-proteinaceous emulsifier;
(ii) mixing the oil with the aqueous mixture as obtained in step (i) to obtain a pre-emulsion;
(iii) homogenizing the pre-emulsion to obtain an emulsion;
(iv) optionally injecting gas into the emulsion; and
(v) spray-drying the emulsion,

thereby forming the powdered composition.

Preferably, the emulsion as obtained in step (iii) has a dry matter content between 55-75 wt.%, more preferably between 58-70 wt.% (weight percentages being based on the total weight of the emulsion).

Preferably, steps (i)-(iv) are performed at a temperature in the range 50-70°C.

Preferably, in step (iii), homogenization is carried out as a two-stage homogenization, preferably with a first stage pressure in the range 150-250 bar, and preferably with a second stage pressure in the range 0-30 bar.

The spray-drying step (v) is carried out according to industrial practice known in the art. It is preferred that the spray-drying is executed at an inlet temperature (T[in]) between 140-200°C. Preferably, the outlet temperature (T[out]) is between 65-95°C.

In an embodiment, the method of the invention comprises a gas injection step (step iv), to obtain a foamable creamer with high foaming power upon dissolution or dispersion into a liquid. This can be achieved by performing step (iv), i.e. by injecting a gas into the emulsion of step (iii) prior to subjecting the emulsion to spray-drying step (v). The gas that is injected is gaseous at room temperature and is preferably selected from the group consisting of air, nitrogen, carbon dioxide, and combinations thereof. The gas may be injected into the emulsion using any suitable method as known in the art. Preferably, the gas is injected at a temperature in the range 65-90°C, more preferably 75-85°C.

When step (iv) is performed, the produced powdered composition typically has a poured bulk density of 120-300 g/l. The entrapped gas entrapped lowers the density. When step (iv) is not performed, the composition which is produced typically has a poured bulk density of 300-600 g/L.

The ingredients as used in steps (i) and (ii) of method of the invention, i.e. carbohydrate, protein, non-proteinaceous emulsifier, stabilizer, and oil, are as described above for the powdered composition according to the invention. The respective paragraphs, as well as all information on their amounts, preferred, more preferred, and most preferred embodiments apply *mutatis mutandis* to the method according to the invention.

In yet another aspect, the invention relates to a food product comprising the powdered composition, said food product preferably being a powdered beverage mix, more preferably a powdered instant beverage mix suitable for preparing a hot or cold beverage.
In one embodiment, said powdered beverage mix is selected from the group consisting of a mix for preparing ice coffee, a mix for preparing (cold) coffee flavored beverages, a mix for preparing ice tea, mix for preparing (cold) chocolate drinks, a mix for preparing (cold) fruit beverages, a mix for preparing (cold) sport beverages, a mix for preparing (cold) energy beverages, a mix for preparing (cold) healthy drinks, a mix for preparing (cold) diary beverages, a mix for preparing (cold) soups, a mix for preparing (cold) sauces, a mix for preparing (cold) alcohol containing beverages, and a mix for preparing milkshakes.

In a preferred embodiment, the food product comprising the powdered composition may further comprise a foaming ingredient. Examples of such a foaming ingredient are described in WO2006/023564 and WO2023/041641. Such a foaming ingredient is also referred to in the art as foam booster. Such an ingredient typically releases at least 3 mL gas per gram of said ingredient upon dissolving it in a liquid (preferably being water of 20°C, at atmospheric pressure).

Finally, the invention relates to the use of the powdered composition as a foamer or creamer. Preferably, the powdered creamer is used in amounts of 1-10 grams, more preferably 5 grams, per 150 ml (brewed) coffee, tea, cocoa, and the like.

In another embodiment, the powdered composition of the invention may be used in a sealed capsule suitable for in-home brewing machines, such as used in Dolce Gusto® or Tassimo® machines. The beverages prepared with the composition of the present invention using such machines show similar characteristics as the dairy based beverages in terms of foam type, texture, sensory properties, stability, and whitening of beverage liquids.
In another embodiment, the powdered composition is used in latte macchiato or cappuccino.
In yet another embodiment, the powdered composition is used in cold beverages such as iced lattes or iced teas, cold fruit-based or fruit-flavoured beverages with foam on top and/or finely dispersed within the cold beverage (e.g. a fruit smoothie).

EXAMPLES

Method descriptions

Sensory test

A dry mix was made by mixing 1.5 grams of instant coffee (DE Moccona Roodmerk), 4 grams of sugar, 3.5 grams of skim milk powder (FrieslandCampina). Next to that, a standardized amount of creamer was added, resulting in a total fat content of 1.1 wt.%, with the weight percent being based on the total weight of the prepared beverage. To this dry mix powder, 150 mL of either cold (20°C) or hot (90°C) water was added followed by manual stirring for 20 seconds with a standard coffee spoon. A sensory score was given after tasting with a small taste panel. The rating of the scores ranged from very good with a score of 5 to bad with a score of 1. Scores are described and defined as: 5, no off taste and very neutral (creamy and balanced); 4, close to neutral (creamy and balanced); 3, very slight off taste (creamy); 2, some off taste and disliked (not creamy nor balanced); 1, extreme off taste and disliked (neither creamy nor balanced). A score of 4 and higher was marked as acceptable.

Foam test – foam booster

In a tall form beaker glass (250 mL, diameter 55 mm), a dry mix was prepared by mixing 1.5 grams of instant coffee (DE Moccona Roodmerk), 4 grams of sugar, 3.5 grams of skim milk powder (FrieslandCampina), and 1.8 grams of Foam Booster (Vana Cappa B01; FrieslandCampina). Next to that, a standardized amount of creamer was added, resulting in a total fat content of 1.1 wt.% (weight percentage being based on the total weight of the prepared beverage). To this dry mix powder, 150 mL of either cold (20°C) or hot (90°C) water was added, followed by manual stirring for 20 seconds with a standard coffee spoon. The amount of foam was determined by measuring the foam height in mL generated foam at t=1 minute and t=10 minutes.

Foam test – Dolce Gusto®

12 Grams of creamer powder were weighed in a capsule. Subsequently, the capsule was sealed. The capsule was placed in the capsule holder of the Dolce Gusto® machine, and the water tank of the Dolce Gusto® machine was filled with tap water of 20°C. The water volume that runs through the capsule was pre-set at 140 mL (4 stripes) and the button that starts either the cold or the hot beverage preparation was pressed. The foamed liquid was collected in a tall beaker glass (250 mL, diameter 55 mm) and the foam height in mL generated foam was determined at t=1 minutes and t=10 minutes.

Cold solubility test

A dry mix was made by mixing 1 gram of instant coffee and 5 grams of creamer. To this dry mix, 150 mL of cold water (5°C) was added, followed by manual stirring for 20 seconds with a standard coffee spoon. The surface of the beverage was screened for insoluble powder particles and the solubility was scored, ranging from 1 for insolubility (many particles on the surface) to 5 for complete solubility (no particles on the surface).

Example 1

A mixture of 71 kg glucose syrup (Roquette DE 28-30) and 2.0 kg sodium caseinate (FrieslandCampina) was dissolved in 35 kg water at 60°C. To this mixture, 0.7 kg sodium stearoyl-2-lactylate (Danisco) and 1.8 kg dipotassium phosphate (Merck) were added. Finally, 20 kg high oleic sunflower oil (Walter Rau) and 4.4 kg virgin coconut oil (Bioriginal) were added to the mixture. The final mixture was then heated until a final temperature of 60°C was reached. The final mixture was homogenized at 180 bar first stage and 30 bar second stage with a high pressure homogenizer at a temperature of around 60°C. The product was then pasteurized at a temperature of 82°C to 85°C for at least 30 seconds in a scraped surface heater that was placed in-line upfront the high pressure pump. The high pressure pump was used to feed the high pressure nozzle that was used to atomize this liquid emulsion into the spray-dryer chamber of a Filtermat spray-drier. Drying inlet temperatures of about 150°C and outlet temperatures in the range of 85-95°C were used to arrive at powders with a moisture content in the range 2.0-4.0%. The powder density that was obtained ranged typically from 300 to 600 grams/L, determined as poured bulk density. The creamer was subjected to the sensory and foam tests described above. The results can be found in Table 2.

Example 2

Example 1 was repeated, except that the protein content was increased from 1.8 to 11.4 wt.%, while lowering the carbohydrate and oil contents. In addition, no emulsifier was used. A complete overview of the recipe can be found in Table 1. Functionality tests were executed for the obtained powder. The results can be found in Table 2.

Example 3

Example 1 was repeated, except that the oil content was increased from 24.4 wt.% to 49.7 wt.%, while at the same time increasing the stabilizer and protein contents and lowering the carbohydrate content. The high oleic sunflower oil / virgin coconut oil ratio remained equal. The recipe can be found in Table 1. Functionality tests (Table 2) and cold solubility tests (Table 3) were executed for the obtained powder.

Example 4

Example 3 was repeated, except that the virgin coconut oil ratio : high oleic sunflower oil was changed towards 1.0:4.0. The recipe can be found in Table 1. The obtained powder was tested for cold solubility (Table 3).

Example 5

Example 3 was repeated, except that the virgin coconut oil : high oleic sunflower oil ratio changed towards 1.0 : 8.0. The recipe can be found in Table 1. The obtained powder was tested for cold solubility (Table 3).

Example 6

Example 3 was repeated, except that the virgin coconut oil : high oleic sunflower oil ratio changed towards 1.0 : 1.0. The recipe can be found in Table 1. The obtained powder was tested for cold solubility (Table 3).

Example 7

Example 1 was repeated, except that medium chain triglyceride oil was used instead of the blend of high oleic sunflower oil and virgin coconut oil. A detailed overview of the recipe can be found in Table 1. The obtained powder was tested for functionality, like sensory, foam performance, and cold solubility (Table 2 and 3).

Example 8

Example 1 was repeated, except that the blend of high oleic sunflower oil and virgin coconut oil was completely replaced by high oleic sunflower oil. The recipe can be found in Table 1. Functionality tests (Table 2) and cold solubility tests (Table 3) were executed for the obtained powder. Compared to Example 1, the sensory score decreased from 4 to 3 in the cold application test and from 5 to 4 in the hot application test.

Example 9

Example 2 was repeated, except that the blend of high oleic sunflower oil and virgin coconut oil was replaced by medium chain triglyceride oil. The recipe can be found in Table 1. Functionality tests were executed for the obtained powder. The results can be found in Table 2.

Example 10

Example 3 was repeated, except that the blend of high oleic sunflower oil and virgin coconut oil was completely replaced by fully hydrogenated coconut oil. The complete overview of this recipe can be found in Table 1. Sensory and foam performance were evaluated for the obtained powder (Table 2). Undissolved lumps of powder were observed in the cold sensory and foam tests, indicating that the powder was not cold soluble.

Example 11

Example 10 was repeated, except that virgin coconut oil was used instead of fully hydrogenated coconut oil. Like in Example 10, undissolved lumps of powder were observed in the cold sensory and foam tests, indicating that powder was not cold soluble.

Table 1 - Overview of the composition of the product examples obtained (wt. % on product). All examples contain approximately 2% moisture.

		According to the invention						Comparative			
Example		**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Fat	Hydrogenated coconut oil	-	-	-	-	-	-	-	-	-	49.7
	MCT oil*	-	-	-	-	-	-	24.4		21.5	-
	HOSOL**	20.0	17.6	40.8	39.8	44.2	24.8	-	24.4	-	-
	VCO***	4.4	3.9	8.9	9.9	5.5	24.8	-	-	-	-
	VCO : HOSOL	1.0 : 4.5	1.0 : 4.5	1.0 : 4.5	1.0 : 4.0	1.0 : 8.0	1.0 : 1.0	-	-	-	-
Carbohydrate		68.3	59.8	39.3	39.3	39.3	39.3	68.3	68.3	59.8	39.3
Protein [1]	Na caseinate	1.8	-	4.2	4.2	4.2	4.2	1.8	1.8		4.2
	SMP	-	11.4	-	-	-	-	-	-	11.4	-
Stabilizer	K_2PO_4	1.8	1.8	2.2	2.2	2.2	2.2	1.8	1.8	1.8	2.2
	$Na_6[(PO_3)_6]$	-	-	2.2	2.2	2.2	2.2	-	-	-	2.2
Emulsifier	SSL	0.7	-	0.7	0.7	0.7	0.7	0.7	0.7	-	0.7

* Medium chain triglycerides oil **High oleic sunflower oil ***Virgin coconut oil

[1] Protein content obtained for each of the examples by using the various raw material sources of protein: viz. sodium caseinate and skim milk powder (SMP).

Table 2 - Overview of results of the functionality evaluation of both sensory and foam height in time for all examples.

Example	Temp. (°C)	Time (min)	**According to the invention**			**Comparative**			
			1	2	3	7	8	9	10
Sensory (-)	20	-	4 body, very slight coco-nut taste	4 very slight coco-nut taste	4 slight coco-nut taste	5 neutral, balan-ced	3 slight devia-ting taste	5 neutral, balan-ced	Inso-luble
	90	-	5 balan-ced, body	5 balan-ced, body	5 balan-ced, body	5 neutral, balan-ced	3 slight off-taste	5 neutral, balan-ced	4 neutral, creamy
Foam performan-ce – Foam booster (mL)	20	1	40	36	33	45	35	43	n.d.
		10	30	26	19	20	17	38	n.d.
	90	1	65	43	60	50	50	33	65
		10	40	26	40	30	30	24	50
Foam performan-ce – Dolce Gusto® (mL)	20	1	45	38	52	47	40	47	Inso-luble
		10	24	31	36	12	31	38	
	90	1	66	69	73	59	57	57	62
		10	12	45	38	0	17	36	38

Table 3 - Overview of results of the cold solubility (5 °C) in coffee application.

Example	**According to the invention**				**Comparative**	
	3	**4**	**5**	**6**	**7**	**8**
Solubility	5	5	5	2	5	5

CLAIMS

1. A powdered composition having a total oil content of 15-60 wt.%, preferably 15-55 wt.%, and further comprising, based on the total weight of the powdered composition:
   - 35-80 wt.% of carbohydrate;
   - 1.5-15 wt.% of protein;
   - 0.1-5 wt% of stabilizer; and
   - 0-2 wt.% of non-proteinaceous emulsifier;

   wherein the total oil content consists essentially of a blend of virgin coconut oil and edible high oleic oil in a ratio in the range 1:1 to 1:15, preferably 1:1 to 1:12; the edible high oleic oil being selected from the group consisting of high oleic sunflower oil, ultra-high oleic sunflower oil, high oleic rapeseed oil, ultra-high oleic rapeseed oil, high oleic palm oil, high oleic soybean oil, high oleic stearin sunflower oil, and combinations thereof.

2. Powdered composition according to claim 1, wherein the edible high oleic oil is high oleic sunflower oil or ultra-high oleic sunflower oil.

3. Powdered composition according to claim 1 or 2 wherein said composition is foamable.

4. Powdered composition according to any one of the preceding claims, wherein the oil consists essentially of a blend of virgin coconut oil and an edible high oleic oil in a ratio in the range 1:1 to 1:9, preferably 1:4 to 1:9, and most preferably 1:5 to 1:9.

5. Powdered composition according to any one of claims 1-3, wherein the oil consists essentially of a blend of virgin coconut oil and an edible high oleic oil in a ratio in the range 1:4 to 1:12, preferably 1:5-1:12, most preferably 1:7 to 1:12.

6. Powdered composition according to any one of the preceding claims, wherein the carbohydrate is selected from the group consisting of glucose; glucose syrup; fructose; sucrose; lactose; mannose; maltose; sorbitol; mannitol; maltitol; lactitol; erythritol; xylitol; maltodextrin; starch hydrolysis products; gums; modified starches such as nOSA-modified starch; modified celluloses; fibres, such as galacto-oligosaccharide (GOS), inulin, oligofructose (FOS); and combinations thereof.

7. Powdered composition according to any one of the preceding claims, wherein the protein is selected from the group consisting of dairy proteins and plant proteins,

preferably selected from whey protein, micellar casein, caseinate, legume protein, and combinations thereof.

8. Powdered composition according to any one of the preceding claims, wherein the non-proteinaceous emulsifier is selected from the group consisting of mono- and diglycerides of glycerol, diacetyl tartaric acid ester of mono- and diglycerides (DATEM), citric acid ester of mono- and diglycerides (CITREM), sodium stearoyl lactylate (SSL), sucrose esters of fatty acids, and combinations thereof.

9. Powdered composition according to any one of the preceding claims wherein the stabilizer is selected from the group consisting of monopotassium phosphate, monosodium phosphate, dipotassium phosphate, disodium phosphate, tetra sodium diphosphate, tetra potassium diphosphate, pentasodium triphosphate, pentapotassium triphosphate, sodium polyphosphate, potassium polyphosphate, sodium hexametaphosphate, potassium hexametaphosphate, and sodium potassium hexametaphosphate, and combinations thereof.

10. Powdered composition according to any one of the preceding claims having a poured bulk density of 300-600 g/L.

11. Powdered composition according to any one of claims 1-9, further comprising entrapped gas and preferably having a poured bulk density of 120-300 g/L.

12. A method for producing a powdered composition according to any one of the preceding claims, comprising the steps of

(i) preparing an aqueous mixture of carbohydrate, protein, stabilizer, and optionally non-proteinaceous emulsifier;
(ii) mixing oil with the aqueous mixture as obtained in step (i) to obtain a pre-emulsion;
(iii) homogenizing the pre-emulsion to obtain an emulsion;
(iv) optionally pasteurizing the aqueous mixture,
(v) optionally injecting gas into the emulsion; and
(vi) spray-drying the emulsion,

thereby forming the powdered composition.

13. Powdered beverage mix comprising the powdered composition according to any one of claim 1-11, said beverage mix preferably being a powdered instant beverage mix for preparing a hot or cold beverage, more preferably being selected from the group

consisting of a mix for preparing ice coffee, a mix for preparing hot or cold coffee flavored beverages, a mix for preparing ice tea, mix for preparing hot or cold chocolate drinks, a mix for preparing hot or cold fruit beverages, a mix for preparing hot or cold sport beverages, a mix for preparing hot or cold energy beverages, a mix for preparing hot or cold healthy drinks, a mix for preparing hot or cold diary beverages, a mix for preparing hot or cold soups, a mix for preparing hot or cold sauces, a mix for preparing hot or cold alcohol-containing beverages, and a mix for preparing milkshakes.

14. Use of the powdered composition of any one of the claims 1-11 as a foamer or creamer.

INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2024/083773

A. CLASSIFICATION OF SUBJECT MATTER

INV. A23C11/04 A23F5/40 A23G1/56 A23G9/52 A23L2/39
A23L9/20 A23P30/40

ADD.

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)

A23P A23F 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

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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[x] Further documents are listed in the continuation of Box C.

[x] 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

Date of the actual completion of the international search	Date of mailing of the international search report
6 February 2025	17/02/2025

Name and mailing address of the ISA/	Authorized officer
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INTERNATIONAL SEARCH REPORT

International application No
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C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

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A	WO 2011/065946 A1 (NESTEC SA [CH]; NAPOLITANO GUILLERMO EDUARDO [US] ET AL.) 3 June 2011 (2011-06-03) Paragraphs [0039], [0067-0077]; table 1	1-14
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