

Single serve container for forming a beverage

The present invention relates to a single-serve container comprising a creamer powder, in some embodiments a dairy-creamer powder. That is, it relates to a container holding an amount of creamer powder which is suitable for forming a single whitened beverage on reconstitution, such as a beverage having a volume of 150 to 320ml. The powder described herein has a new formulation which provides an optimal creamer within the constraints of such a container, particularly volume constraints.

Creamers are well-known in the art. A creamer composition is a composition suitable for the whitening of a beverage, such as tea or coffee. It is used as a substitute for milk or cream which would otherwise be used in such beverages. The creamer may take the form of a dry powder or a liquid creamer composition and, when reconstituted in water or a beverage has a whitening effect. This is a consequence of the dispersion of fine fat droplets from the creamer which diffract light reflected from the beverage.

A range of creamer concentrates are known for dispensing from beverage cartridges. These are desirably concentrates or powders so that a small volume can be shipped while, on reconstitution with water, a larger milk-like beverage can be achieved by dilution and/or dispersion.

A particular problem with some of the known creamer powders is that they may be prone to leaving residue in the beverage capsule, particularly in systems which flush the concentrate through the capsule. This can lead to variation in the reconstituted beverage.

It is also desirable to produce a creamer composition that meets stricter nutritional requirements. For example, the UK Government has implemented new restrictions targeting products high in fat, sugar and salt (HFSS), and there are other similar restrictions in other countries.

US6426110 discloses a composition for a creamer powder is disclosed that comprises approximately 40% to approximately 60% by weight water-soluble protein, edible fat, at least one emulsifier, at least one stabilizer and less than 5% by weight carbohydrate.

WO2016/061896 discloses a zero-sugar creamer and preparation method therefor.

It is an object of the present invention to provide a creamer powder which is optimised for the space constraints of a single-serve beverage container, or at least to tackle problems associated therewith in the prior art or provide a commercially viable alternative thereto. It is further desirable to provide such a composition which meets tightened nutritional HFSS restrictions. It is also desirable to provide a product which meets these nutritional restrictions whilst still providing a foaming beverage with a milky taste.

- 10 Accordingly, the present invention provides a single-serve container comprising a creamer powder, the creamer powder comprising, based on the total weight of the powder:
- (i) 40 to 60wt% fat, wherein the fat consists of dairy fat and/or coconut oil;
 - (ii) at least 8wt% protein;
 - (iii) less than 28.5wt%, preferably less than 27.5wt%, total digestible
- 15 carbohydrates;
- wherein the creamer powder is substantially lactose-free.

- The present disclosure will now be described further. In the following passages different aspects/embodiments of the disclosure are defined in more detail. Each aspect/embodiment so defined may be combined with any other aspect/embodiment or aspects/embodiments
- 20 unless clearly indicated to the contrary. In particular, any feature indicated as being preferred or advantageous may be combined with any other feature or features indicated as being preferred or advantageous. It is intended that the features disclosed in relation to the product may be combined with those disclosed in relation to the method and vice versa.

- 25 The inventors sought to provide an improved creamer for use in a beverage capsule. The inventors were looking to provide a creamer powder having the advantages of both dairy and non-dairy creamers. In particular, they wanted to provide a creamer with a rich taste, without the disadvantages of lactose as an intolerance substance. They also wanted to provide a
- 30 strong whitening effect without compromising the foaming and dispensing properties. Indeed, they have now found a product with improved foam stability properties.

By substituting some of the glucose present in a conventional creamer for protein, the inventors have found that both the nutritional properties and the foaming properties can be

improved. Reducing the content of fillers such as glucose syrup and avoiding lactose (which only has a low sweetness contribution anyway) means that the volume of the creamer is consequently reduced, meaning that more can be loaded into a capsule, or that a smaller amount can experience better mixing and dispersal in the capsule.

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That is, the inventors have found that by basing the creamer powder on specific fat sources and by increasing the protein content, the creamer has a high efficacy per unit volume and is optimal for single serve applications. This is because the amount of filler in the creamer is significantly reduced. The inventors have further found that the careful selection of the protein source can further optimise the product, with improved flavour being obtained with micellar casein, an improved emulsion stability from sodium caseinate and a good balance of flavour and stability from micellar casein and denatured whey.

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The inventors have now found in particular, that by using a substantially pure dairy fat, such as anhydrous milk fat (AMF) which is like butter, as the fat source they can give a good milky flavour without the lactose being present. At the same time, the AMF provided a desirable flavour and mouthfeel.

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The present invention relates to a single-serve container comprising a creamer powder. A single-serve container is one which only contains enough of the powder to reconstitute a milky beverage in a serving size of water, typically 150 to 320ml, preferably 150 to 250ml. Examples of single serve containers are discussed further below, but include stickpacks and sachets (ripped open by a consumer), as well as beverage cartridges for dispensing a beverage from a beverage preparation machine. The requirement that the container is a single serve excludes multi-serve containers, such as multi-serve pots of powder or certain vending machine arrangements. In multi-serve arrangements, better whitening effects can be achieved by dispensing more of the powder, whereas this is not an option within the constraints of a single-serve arrangement.

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A creamer powder is a powder composition which on reconstitution with water provides an opaque beverage and generally one which is white and resembles milk. A dairy creamer composition is one which contains and is preferably based on dairy ingredients. A dairy ingredient is one derived from milk and this therefore covers a full range of milk, cream and butter-type products. It is conventional to produce dairy creamers by concentrating milk

and/or cream ingredients. This is in contrast to non-dairy creamers which, in order to replicate the mouthfeel of milk fats, often contain hydrogenated vegetable oils. The present creamer may contain dairy fat and optionally micellar casein (and any denatured whey), both of which have a dairy origin. The caseinate provided by the sodium caseinate may also have
5 a dairy origin. Due to allergy/intolerance considerations, any creamer which contains milk-derived components should be considered a dairy creamer.

The creamer powder is a dry particulate mass. The powder may be, for example, a spray-dried powder or may have further been agglomerated to improve the dissolution properties.
10 Preferably the creamer powder has a particle size distribution (as measured by Helos dry laser diffraction) with an x50 of from 80 to 300 μm , preferably 200 to 250 μm . The powder may have an x90 of 200 to 650 μm , preferably less than 500 μm , preferably from 350 to 450 μm . The powder may have a bulk density of from 400 to 600g/L, preferably 450 to 550g/L.

15 The creamer powder comprises 40 to 60wt% fat, based on the total weight of the powder. This fat consists of dairy fat and/or coconut oil. Preferably the fat is present in an amount of 50-55wt%. The composition is devoid of any non-dairy and non-coconut fats such as other vegetable fats. Dairy fats are those derived from milk. In some embodiments it is preferred
20 that the fat consists of anhydrous milk fat. In other embodiments it is preferred that the fat consists of coconut oil.

It is conventional to produce dairy creamers by concentrating milk and/or cream ingredients. However, in order to avoid the lactose intolerance substance but to still provide a dairy-
25 creamer, the inventors have found that the easiest approach to achieving the present invention is to start from a butter product which has a number of surprising further advantages. The preferred source of dairy fats is the commercially available anhydrous milk fat (AMF). This is essentially butter and has very low levels of lactose and dairy minerals.

30 The alternative approach adopted by the inventors is to use coconut oil as a fat source. This provides a suitable structure to the product while simultaneously avoiding the lactose intolerance substance. When the fat consists of coconut oil, preferably the protein is a mixture of micellar casein and denatured whey. In some embodiments the fat may be a blend of AMF and coconut oil which provides a dairy flavour and product while reducing the

amount of a dairy-derived ingredient that is required. It is most preferred that the fat is either coconut oil or AMF and not a blend, since these have been found to each individually provide an improved flavour over the blend.

5 The creamer powder comprises, based on the total weight of the powder at least 8wt% protein. Preferably the protein is present in an amount of from 10-20wt%, preferably 12 to 18wt%. Preferably the protein is selected from sodium caseinate and/or micellar casein and/or denatured whey. It is particularly preferred that the protein is a combination of two or more thereof, such as micellar casein and denatured whey protein. Indeed, the inventors
10 have found that the best balance of flavour and foaming can be achieved when the protein is provided as a mixture of micellar casein and a further protein source. Preferably the micellar casein is 50-70% of the total weight of protein in the creamer powder, and preferably the balance is denatured whey protein.

15 Sodium caseinate contains protein which is often derived from dairy sources. However, as discussed above it does not contain native dairy proteins as they are denatured in the formation of the salt. Sodium caseinate is a well-known ingredient for acting as a stabiliser and protein supplement. Often, sodium caseinate is obtained through acidification, curd formation, washing and drying of milk to create acid casein. When the curd obtained is
20 neutralized, sodium caseinate is produced. Also, dried acid casein can be used as starting material. Nowadays, also spray-drying and extrusion are widely used to obtain sodium caseinate.

Micellar casein is a commercially available ingredient. Casein micelles are the form in which
25 native dairy proteins are naturally occurring, such as that would be found in raw milk. Processes which denature the protein include heat treatments beyond conventional pasteurisation and/or acid treatments – micellar casein has not been so-treated. This is in contrast to sodium caseinate which is a milk protein derived from using acid or enzymes to remove and sodium to stabilise and solubilise protein from milk and it contains neither casein
30 micelles nor partially dissociated micelles. Rather, the protein in sodium caseinate is fully dissociated.

Micellar casein is commonly available as a milk protein isolate powder, such as one obtained by microfiltration of skim milk that is naturally rich in micellar casein. In addition to having a

low bacterial and spore counts, it has very clean flavour profile and it improves viscosity, structure, and texture of the product. Microfiltered milk is typically 85%+ micellar casein, with the balance being fat, ash, moisture and lactose. It will be appreciated that any fat contributed by this ingredient will be dairy fat and is accounted for within the above range.

5 The lactose also contributes to the lactose of the whole product and must therefore meet the requirements set out above to be substantially lactose-free. The micellar casein may be a so-called functional native micellar casein concentrate powder where the material has been treated to be more instantized and/or demineralised.

10 Denatured whey protein is whey protein that has been derived from a dairy source and treated to denature the proteins. Suitable methods for denaturing the whey include heat, acid and/or enzyme treatments of the whey. Denatured whey is often provided as a byproduct of cheese-making processes. Denatured whey is a commercially available product.

15 When the protein comprises two of the above protein sources, preferably the balance of the amounts is from 1:3 to 3:1 of the two sources, more preferably 1:2 to 2:1. A preferred combination is denatured whey and micellar casein, in particular, denatured whey and functional native micellar casein. In this blends, preferably the micellar casein is present in an amount of at least 50wt% of the protein.

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The creamer powder comprises, based on the total weight of the powder less than 28.5wt%, preferably less than 27.5wt% total digestible carbohydrates. The term "digestible carbohydrates" includes those carbohydrates present in the creamer, but excludes dietary fiber. That is, the term specifically excludes fibers which may be present in the creamer but

25 which cannot be digested by the end consumer. The classification of carbohydrates into digestible and non-digestible categories is well known in the art, with fibers being considered as non-digestible. Testing can be performed, in particular to determine the non-digestible carbohydrate content (the remainder being considered digestible) using conventional testing methods, including: lipid removal, protein removal, starch removal, selective precipitation of
30 fibers and fiber analysis, or by the Englyst-Cummings Procedure.

Preferably the digestible carbohydrates are present in an amount of 15 to 28.5wt%, more preferably 15 to 27.5wt%, preferably 20 to 27.5wt%. Preferably the digestible carbohydrates are present in an amount of less than 25wt%, more preferably less than 20wt%, preferably

15 to 24wt% and more preferably 20 to 23wt%. In some less-preferred embodiments the digestible carbohydrates may be present in an amount of less than 10wt%, preferably less than 5wt% and preferably the creamer powder is devoid of digestible carbohydrates.

- 5 Digestible carbohydrates used in the present invention are preferably selected from the group consisting of dried glucose syrup, maltodextrin, saccharose and lactose. Preferably the digestible carbohydrates consist of these alternatives. Here, dried glucose syrup has been used to avoid any ambiguity with the term "syrup" and refers to the fact that glucose syrup would be used in the composition before drying, but the water content would be
- 10 removed. Preferably the digestible carbohydrates in the creamer consist substantially of dried glucose syrup. Trace amounts may also be contributed by the other ingredients, such as present in trace levels in the fat or the protein source, as discussed herein. It should be appreciated here that the option for lactose only encompasses the trace levels permitted by the further requirement, discussed below, that the creamer powder is substantially lactose-
- 15 free.

The digestible carbohydrates especially glucose syrup, act as a bulking agent, but also enhances the flavour and mouthfeel of the reconstituted beverage. This is why it is desirable to provide glucose syrup, but in a reduced amount.

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When the product has low levels of digestible carbohydrates, the creamer powder may further comprise fibers (i.e. non-digestible carbohydrates). Preferably these components are present in relatively low amounts, such as less than 15wt%, more preferably 5-10wt%. These are discussed further below. Suitable fibers include corn fiber syrup, GOS and FOS.

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- The creamer powder is substantially lactose-free. By substantially lactose-free it is meant that the lactose content is less than 2wt% of the creamer, more preferably less than 1wt% of the creamer, more preferably less than 0.75wt%, more preferably less than 0.5wt%, preferably less than 0.1wt% and most preferably only trace amounts. In some embodiments
- 30 the lactose may be present in a range of from 0.75 to 0.1wt%. As will be appreciated, given the use of AMF (and optionally micellar casein) it is inevitable that some trace amount of lactose will always be present. If there is lactose present, then this is generally provided by the use of micellar casein ingredients (commonly provided as microfiltered milk). When using coconut oil as an ingredient then the lactose levels can be even lower. By way of example, a

functionalised micellar casein ingredient may contain ~5wt% lactose and a denatured whey protein product may contain ~5wt% lactose. An AMF ingredient may contain <0.2wt% lactose.

- 5 Preferably the powder comprises one or more stabilisers. Preferably the one or more stabilisers comprise and preferably consists of disodium phosphate (DSP) and/or dipotassium phosphate (DKP) and/or sodium stearoyl lactylate (SSL) and or sodium hexametaphosphate (SHMP) and/or one or more gums. The DSP and DKP are buffers to enhance the stability. SSL is a small molecular weight surfactant. Preferably the composition
- 10 is free from trisodium citrate. In some embodiments, the powder is free from gum. In other embodiments, the powder further comprises a gum. A suitable gum is gum Arabic which may be present as a stabiliser and emulsifying agent. Preferably, based on the dry weight of the composition, the one or more stabilisers are present in a total amount of from 0.5 to 10wt%, preferably about 2.5-7.5wt%.

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The creamer composition optionally comprises flavourings or mouthfeel enhancers. For the avoidance of doubt, neither the above stabilisers nor the glucose is considered to be a “flavouring” or a “mouthfeel enhancer” as further discussed below.

- 20 Flavourings include salt and compositions (which are commercially available) for imparting a dairy flavour. The latter typically comprises organic compounds with a characteristic dairy smell and taste. Preferably, based on the dry weight of the composition, flavourings are present in an amount of less than 2wt%, preferably less than 1wt%.

- 25 The creamer optionally comprises mouthfeel enhancers. Mouthfeel enhancers are well known in the art and preferably comprise (or consist) of fibres and oligosaccharides (considered non-digestible fibers). Examples of oligosaccharides include fructo-oligosaccharides (FOS) and galacto-oligosaccharides. Fibres and oligosaccharides act to thicken the final beverage and can be used to permit a further reduction in the levels of
- 30 glucose in the creamer. Preferably, based on the dry weight of the composition, mouthfeel enhancers are present in an amount of less than 25wt%, preferably less than 10wt% and preferably are not present.

The form of the powder can vary. Preferably, the creamer powder is a homogeneous, preferably spray-dried, creamer powder. That is, the components of the fat, protein and any digestible carbohydrates are all mixed together in liquid form before drying. Alternatively, the powder may be a dry mixture of a creamer base, protein source and any digestible

- 5 carbohydrates, wherein the creamer base comprises the fat. In this embodiment, theoretically, the creamer base, digestible carbohydrates and protein ingredients could be separated again as they are distinct and separate. In both instances the co-dried or dry mixture may additionally contain flavourings and fibres.
- 10 Preferably the single-serve container is a stickpack or sachet. Alternatively, the single-serve container is a beverage cartridge having a sealed inlet in fluid communication with a sealed outlet via a reservoir for holding the powder, whereby in use a beverage medium introduced at the inlet dissolves and flushes the powder out of the cartridge. Specific configurations and designs of machine-insertable beverage cartridges are well known in the art and other terms,
- 15 such as capsules and pods, may also be used. In beverage cartridges the ability of the powder to be flushed from the container is key and hence the ability to include less volume of ingredient to improve mixing and dispersal can be key.

According to a further aspect, there is provided a method for the manufacture of the single-serve container as described herein, the method comprising:

- 20 (i) dissolving a protein source in water to form a first mixture;
(ii) melting anhydrous milk fat and/or coconut oil;
(iii) mixing the melted fat with the first mixture to form a second mixture;
(iv) mixing the second mixture with at least one of fibers and digestible carbohydrates
- 25 to form a third mixture;
(v) homogenising the third mixture to form a homogenised mixture;
(vi) spray-drying the homogenised mixture to form a powder; and
(vii) loading the powder into a single-serve container and sealing it.
- 30 The anhydrous milk fat typically fully melts about 40°C.

Homogenisation is preferably performed with a two-step homogenisation and such systems are well known in the art. It is critical that the homogenised mixture has a fine dispersal of the fat component in order to ensure that a stable emulsion is formed. Preferably the

homogenised mixture has a fat droplet size D50 of less than 2 µm and more preferably less than 1 µm. Preferably the particle size distribution (PSD) is monomodal.

Before the spray-drying step it is desirable to set the solids content of the homogenised mixture to ensure that spray-drying can be performed efficiently. If the solids are too high, then the process may not produce a desirable powder. If the solids are too low, then the process has a high energy cost due to the amount of water to be removed. Preferably the mixture before spray-drying has a solids content of >45%, preferably >50%. Solids contents above 55% may not be readily dryable.

Spray-drying is a technique well known in the art. It is preferred that the spray-drying occurs at a temperature of at least 60 °C although excessive temperatures may be avoided to prevent burning of the product. Spray pressures in excess of 5 Bar are desirable.

According to a further aspect there is provided a method of preparing a beverage, the method comprising providing a single serve container as described herein and dispensing the creamer powder from the single-serve container. As noted above, the container can be either a stickpack or sachet or a beverage cartridge. With a stickpack or sachet the dispensing step will involve tipping the powder into a receptacle and then adding water. With a beverage cartridge the dispensing will be achieved by flushing out the powder with water when the machine is operated. Preferably the water has a temperature of from 80 to 95°C. In some embodiments the water further comprises tea, coffee or cocoa solids. This may occur when using a beverage preparation machine such that the creamer is placed in a receptacle and a beverage capsule comprising tea, coffee or cocoa solids is used to prepare a beverage for reconstituting the creamer.

It should be appreciated that the creamer powder as described herein may be co-packaged in the single serve container with one or more distinct ingredients, such as coffee solids or a separate sugar ingredient. In these embodiments it is preferred that the creamer powder is a homogeneous, preferably spray-dried, creamer powder.

According to a first preferred embodiment of the invention there is provided a single-serve container comprising a dairy-creamer powder, the dairy-creamer powder comprising, based on the total weight of the powder:

- (i) 45 to 55wt% fat, wherein the fat consists of dairy fat;
- (ii) 12-18wt% protein which is a mixture of micellar casein and a further protein source, preferably wherein the further protein source is denatured whey protein;
- (iii) less than 28.5wt%, preferably less than 27.5wt%, total digestible carbohydrates;

wherein the dairy-creamer powder comprises dried glucose syrup and is substantially lactose-free.

- 10 According to a second preferred embodiment of the invention there is provided a single-serve container comprising a creamer powder, the creamer powder comprising, based on the total weight of the powder:

- (i) 45 to 55wt% fat, wherein the fat consists of coconut oil;
- (ii) 12-18wt% protein which is a mixture of micellar casein and a further protein source, preferably wherein the further protein source is denatured whey protein, wherein the micellar casein is 50-70% by weight of the protein and, preferably the balance is denatured whey protein;
- (iii) 15 to 27.5wt% total digestible carbohydrates;

- 15 wherein the creamer powder comprises dried glucose syrup and is substantially lactose-free.
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The invention additionally provides a single-serve container comprising a dairy-creamer powder, the dairy-creamer powder comprising, based on the total weight of the powder:

- (i) 45 to 55wt% fat, wherein the fat consists of dairy fat;
- (ii) 12-18wt% protein which is a mixture of micellar casein and a further protein source, preferably wherein the further protein source is denatured whey protein;
- (iii) 15 to 27.5wt% dried glucose syrup;

wherein the dairy-creamer powder is substantially lactose-free.

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In this embodiment, there is no limitation on the digestible carbohydrate amount.

The invention additionally provides a single-serve container comprising a creamer powder, the creamer powder comprising, based on the total weight of the powder:

- (i) 45 to 55wt% fat, wherein the fat consists of coconut oil;
- (ii) 12-18wt% protein which is a mixture of micellar casein and a further protein source, preferably wherein the further protein source is denatured whey protein, wherein the micellar casein is 50-70% by weight of the protein and, preferably the balance is denatured whey protein;
- (iii) 15 to 25wt% dried glucose syrup;

wherein the dairy-creamers powder is substantially lactose-free.

In this embodiment, there is no limitation on the digestible carbohydrate amount.

- These embodiments were found to provide an optimum balance of efficient whitening, flavour and foam performance, including foam stability, despite meeting the constraints of the single-serve beverage. These two embodiments can be freely combined with the preferred features described herein.

Examples

The invention will now be described further in relation to the following non-limiting examples.

- High-protein creamers were formulated with coconut oil and anhydrous milk fat. Different protein sources were explored including sodium caseinate, micellar casein and a blend of micellar casein and denatured whey. The recipes were as-follows (~50wt% solids):

Glucose syrup ~24wt%

Fat source ~50wt%

Protein source ~15wt%

Fibers ~ 8wt%

Stabilisers ~balance (kept constant)

- Slurries of the ingredients were formed in a Thermomix TM, followed by high shear mixing, pasteurisation, homogenisation (500/100 bar) and then spray-drying.

The pH in each case of the slurries were around 7.

The viscosities of the 50% concentrated slurries measured at room temperature were extremely high in the range of 3000 mPa s. This is much higher than a conventional non-dairy creamer slurry which at room temperature are usually in the range of 30 mPa s. Despite the high viscosity, it was still possible to spray-dry the slurries. The higher
5 temperature (of the slurries before drying, greater than 60°C) and the shear thinning behaviour of the emulsion may have aided the process.

Particle size distributions (PSD) of the slurries were assessed to look at the oil particle size distribution (Mastersizer3000, Malvern Panalytical, UK). The PSD of the different creamer
10 emulsions show that the emulsions with sodium caseinate (NaCas) have a finer emulsion, which is likely due to its higher surface activity compared to Micellar casein (Mcas). The new slurries with NaCas were quite comparable to the reference Creamer X slurry. No significant difference was seen between coconut oil and AMF.

15 Particle sizes distributions were then reassessed on reconstituted creamer powder after spray-drying. Surprisingly, the emulsions with AMF seemed to preserve the emulsion droplet size better during spray drying. This could be due to a better compatibility of the dairy protein with the dairy fat resulting in more stable emulsions. The increase in Sauter diameter for coconut oil was about 20%, whereas for AMF it was less than 3%.

20 Slurries were then analysed with a Lumifuge at 10% solids concentration. Two trends were observed based on the lumifuge results. Emulsions with NaCas had a lower creaming rate than emulsions with MCas. Emulsions with AMF had a lower creaming rate than emulsions with CNO. Both recipes were more stable than a reference creamer M. An
25 explanation for this could be the much higher amount of protein.

Finally, taste test analysis was performed. The sensory aspects were assessed by six screened tasters. The tasting consisted of 2 rounds. First round was a pure tasting of creamers at 10% concentration, second round was as if it was a 3-in-1 mix (including coffee
30 and sugar)

Fat sources

All tasters distinguished the samples with AMF from the ones with Coconut oil as fat source.

The taste of AMF was described by some tasters as creamy/milky. 2 out of 6 tasters perceived a higher mouthfeel with the samples of AMF.

Protein sources

- 5 Creamers with NaCas as protein source were found to be more similar to the reference than creamers with MCas (could be expected since the reference creamer contains NaCas as its protein source). NaCas brings an off-taste, which was not found with micellar casein. The blend of micellar casein and denatured whey was identified as a preferred flavour and performing creamer. The optimal creamer comprising coconut oil contained a blend of
- 10 micellar casein and denatured whey protein since this had the most stable foam and a good flavour.

- Stability tests were performed and passed for all samples in soft water. Regarding the stability in hard water, the amount of phosphates in these recipes was concluded to be
- 15 sufficient.

Summary

- The use of AMF gave good results regarding creaming stability. The sensorial description of
- 20 the creamers with AMF was varying from creamy, milky to mouldy/buttery off taste.

- The creamers with micellar casein showed lower stability than the creamers with sodium caseinate. However, in sensorial evaluation an off-note was perceived in the sodium caseinate creamers which was not found in the micellar casein creamers.

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All percentages are by weight unless otherwise specified.

- The foregoing detailed description has been provided by way of explanation and illustration and is not intended to limit the scope of the appended claims. Many variations in the
- 30 presently preferred embodiments illustrated herein will be apparent to one of ordinary skill in the art and remain within the scope of the appended claims and their equivalents.

For the avoidance of doubt, the entire contents of all documents acknowledged herein are incorporated herein by reference.

Claims:

1. A single-serve container comprising a creamer powder, the creamer powder comprising, based on the total weight of the powder:
 - (i) 40 to 60wt% fat, wherein the fat consists of dairy fat and/or coconut oil;
 - (ii) at least 8wt% protein;
 - (iii) less than 28.5wt%, preferably less than 27.5wt%, total digestible carbohydrates;wherein the creamer powder is substantially lactose-free.
2. The single-serve container according to claim 1, wherein the fat is present in an amount of 50-55wt%.
3. The single-serve container according to claim 1 or claim 2, wherein the protein is present in an amount of from 10-20wt%, preferably 12 to 18wt%.
4. The single-serve container according to any preceding claim, wherein the protein is selected from sodium caseinate and/or micellar casein and/or denatured whey.
5. The single-serve container according to any preceding claim, wherein the creamer powder is a dairy-creamer powder and the fat consists of anhydrous milk fat (AMF).
6. The single-serve container according to any of claims 1 to 4, wherein the fat consists of coconut oil.
7. The single-serve container according to any preceding claim, wherein the protein comprises a mixture of micellar casein and a further protein source, preferably denatured whey.
8. The single-serve container according to claim 7, wherein the micellar casein is 50-70% by weight of the protein in the creamer powder.

9. The single-serve container according to any preceding claim, wherein the digestible carbohydrates are present in an amount of 15 to 25wt%, preferably 17 to 24wt%.
- 5 10. The single-serve container according to any preceding claim, wherein the digestible carbohydrates are selected from the group consisting of dried glucose syrup, maltodextrin, saccharose and lactose.
11. The single-serve container according to any preceding claim, wherein the creamer
10 powder further comprises fibers.
12. The single-serve container according to any preceding claim, wherein the creamer powder is free from gum or comprises a gum, preferably gum Arabic.
- 15 13. The single-serve container according to any preceding claim, wherein the creamer powder comprises one or more stabilisers.
14. The single-serve container according to any preceding claim, wherein the creamer powder is a homogeneous spray-dried creamer powder.
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15. The single-serve container according to any of claims 1 to 14, wherein the powder is a dry mixture of a creamer base, a protein source and any digestible carbohydrates, wherein the creamer base comprises the fat.
- 25 16. The single-serve container according to any preceding claim, wherein the single-serve container is a stickpack or sachet.
17. The single-serve container according to any of claims 1 to 15, wherein the single-serve container is a beverage cartridge having a sealed inlet in fluid communication with a
30 sealed outlet via a reservoir for holding the powder, whereby in use a beverage medium introduced at the inlet dissolves and flushes the powder out of the cartridge.
18. A method for the manufacture of the single-serve container according to any preceding claim, the method comprising:

- (i) dissolving a protein source in water to form a first mixture;
 - (ii) melting anhydrous milk fat and/or coconut oil;
 - (iii) mixing the melted fat with the first mixture to form a second mixture;
 - (iv) mixing the second mixture with at least one of fibers and digestible carbohydrates
- 5 to form a third mixture;
- (v) homogenising the third mixture to form a homogenised mixture;
 - (vi) spray-drying the homogenised mixture to form a powder; and
 - (vii) loading the powder into a single-serve container and sealing it.
- 10 19. A method of preparing a beverage, the method comprising providing a single serve container according to any of claims 1 to 17 and dispensing the creamer powder from the single-serve container.