(19) DANMARK

(10) DK/EP 2263473 T3

(12) Oversættelse af europæisk patentskrift

Patent- og Varemærkestyrelsen

(51) Int.Cl.: *A 23 D 7/005 (2006.01)* *A 23 C 15/12 (2006.01)* *A 23 D 7/00 (2006.01)* *A 23 D 7/05 (2006.01)*

(45) Oversættelsen bekendtgjort den: **2018-06-06**

(80) Dato for Den Europæiske Patentmyndigheds bekendtgørelse om meddelelse af patentet: **2018-02-28**

(86) Europæisk ansøgning nr.: **10185997.3**

(86) Europæisk indleveringsdag: **2005-02-08**

(87) Den europæiske ansøgnings publiceringsdag: **2010-12-22**

(62) Stamansøgningsnr: **05388011.8**

(84) Designerede stater: **AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HU IE IS IT LI LT LU MC NL PL PT RO SE SI SK TR**

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(54) Benævnelse: **Blandingsprodukt**

(56) Fremdragne publikationer:
EP-A- 1 279 338
WO-A-99/43218
WO-A1-99/51105
AU-B2- 529 036
US-A- 4 298 625
US-A- 6 083 548
US-A- 6 136 349

DESCRIPTION

[0001] The present invention relates to a butter-like dairy spread comprising at least butter, edible vegetable fat, and a taste ingredient, such as a milk constituent, and a method for producing such a dairy spread.

[0002] The invention is defined by the claims. Dairy spreads based on butter mixed with vegetable oils are well-known and highly appreciated as such. Dairy spreads, in contrast to butter, are sufficiently soft to be spread unproblematic on e.g. sliced bread, directly from a refrigerator (temperature of about 4-6°C). Thus, due to their easy use there is a growing demand after such dairy spreads based on butter mixed with vegetable oils.

[0003] AU-B-49373/79 discloses a spreadable butterfat-rich product, which is produced by adding an edible fat or oil to a butterfat product resulting from churning of cream or from subjecting cream to a butter-making operation, where the edible fat or oil is dispersed through the butterfat product by a working operation which operation is such as to generate shear rates in excess of 50 sec^{-1}.

[0004] A similar process is known from DK 171699 B1, which discloses a method for producing a butter-like food fat being directly spreadable at refrigeration temperature (4 to 5°C). Preferably the butter-like food fat containing 80 to 83% fat is produced by addition of vegetable oil, water, and salt. Initially conventional butter is produced, which preferably contains 80 to 83% fat and which is made exclusively from milk. Subsequently, the conventional butter is passed continuously through a tight, closed plant, whereby the butter initially passes through a kneading station followed by addition of half the total amount of added vegetable oil. Then the butter mixture passes through a mixer, whereafter the remaining portion of the amount of added vegetable oil and water and salt are added.

[0005] WO 99/43218 A relates to a method of producing fat mixture of beta-sitosterol and is used in food products as an agent that lowers the cholesterol in serum. The beta-sitosterol is dissolved in rapeseed oil during heating of the mixture until around 110 C followed by cooling and mixture with water and further cooling to room temperature before the mixture is added to a food product such as butter.

[0006] US 6 136 349 A relates to food seasonings including fat spreads and discloses the addition of plant sterols to various food ingredients such as a mixture of vegetable oil and butter by use of conventional dairy practice.

[0007] EP 1 279 338 A relates to the use of olive oil for the production of a butter-like product.

[0008] AU 529 036 B2 A relates to a dairy product which composes of a blend of butter, vegetable oil and water and/or milk.

[0009] US 4 298 625 relates to a protein food product in form of a spreadable cream or foam of an oil in water emulsion which has a consistency of thick paste that can be cut into slices. It does not, however, contain butter.

[0010] However, the known types of spreads based on butter mixed with vegetable oils or fats suffer from the drawback that they are not particularly stable at room temperature. When dairy spreads are used, after a while at room temperature an oily substance will exude to the surface of the spread, which in the view of consumers is unappetizing. When refrigerated after such an exuding of oily substance the spread will not regain its butter-like appearance.

[0011] The object of the present invention is to provide a butter-like dairy spread, which is more stable, even after being kept at prolonged periods at room temperature.

[0012] The present invention provides a method for producing a butter-like dairy spread, which is spreadable when taken directly from a refrigerator, and convenient to use. The butter-like dairy spread according to the invention keeps its butter-like characteristics and appearance, even after long time at room temperature (approx. 20-23°C). Moreover, the butter-like dairy spread provides an excellent mouth-feel and taste experience for the consumer and, therefore, provides a good alternative for butter, as it may contain lesser fat and a part of the fat present is vegetable fat, which is considered healthier than animal fat.

[0013] Consequently, the invention provides a method for producing a butter-like dairy spread comprising at least butter, edible vegetable fat, and a taste ingredient, such as a milk constituent, by which edible vegetable fat, which has a solid fat content of 10-45% or less at 20°C, is mixed with at least butter and taste ingredient at a temperature below 22°C during the production of the butter-like dairy spread.

[0014] It is believed that the careful mixing of the butter with vegetable fat and taste ingredient at a temperature below 22°C, preferably a temperature below 20°C, provides for the excellent properties of the butter-like dairy spread according to the invention, partly due to the fact that the complex crystal structure of the vegetable fat and the butter is substantially maintained during mixing. Thus, a crystallisation step after mixing is not required.

[0015] Moreover, it has unexpected appeared that it is possible to mix all the components of the butter-like dairy spread in one single mixing step and, consequently, avoid stepwise addition and mixing of the components. A stepwise procedure would, of course, be possible but not desirable due to the requirements of further mixers, pipes etc.

[0016] In the context of this invention preferably no more than 45% of the edible vegetable fat is in solid form at 20°C (measured according to IUPAC 2.150a) when the vegetable fat is mixed with butter and taste ingredient(s) and optionally other ingredients. Thus the vegetable fat has a solid appearance, without being to hard, If the amount of solid fat content in the edible vegetable fat is to high at normal room temperatures the butter-like dairy spread will not be readily spreadable. The solidification is preferably obtained by relatively rapid cool and

kneading vegetable fat from an elevated temperature above the melting point of the fat to a temperature below the melting point of the fat, causing at least a part of the fat to solidify. When the vegetable fat is produced this way, it is in normal dairy terminology denoted crystallized fat even though not all of the fat is present as solid fat or fat crystals. The optionally remaining non-solid or non-crystalline parts of the vegetable fat may be in a semi-solid amorphous phase or liquid phase, optionally as droplets of fat dispersed within the solid fat. It is believed that at least 10 or suitable 15% crystalline fat is sufficient to form a complex network of fat crystals, which will keep the fat connected with a solid or semi-solid appearance, very similar to the appearance of butter at the same temperature. Preferably at least 20%, more preferred 25% of the vegetable fat is on crystalline form during the production of the butter-like diary spread at a temperature below 22°C. Conveniently, at least 30% of the vegetable fat is on crystalline form during the production of the butter-like diary spread at a temperature below 22°C. The solidification or crystallization of the vegetable fat may be performed in connection with the production of the butter-like dairy spread. Alternatively vegetable fat, which has been crystallized in advance and stored may be used and mixed with the butter, taste ingredient(s) and optionally other ingredients. The optimal conditions suitable for solidifying or crystallizing a certain type of vegetable fat can be determined by the skilled person by use of routine experiments.

[0017] By keeping the temperature below 22°C a satisfactory solid fat content or crystallization of the edible vegetable fat is maintained during the mixing process. The gentle mixing caused by keeping the temperatures below 22°C ensures that no undesired melting of fat crystals appears, either in the vegetable fat or in the butter. The edible vegetable fat with a solid fat content of no more than 45% at 20°C gives the butter-like dairy spread a texture of sufficient softness, so that the butter-like dairy spread is spreadable at temperatures around 5°C, and yet still stable at temperatures around 20°C. The solid fat content of the vegetable fat is at least 10% or suitable 15% at 20°C, which will provide the vegetable fat with a solid or semi-solid appearance, very similar to the appearance of butter at the same temperature. Preferably the solid fat content of the vegetable fat is at least 20%, more preferred 25%, even more preferred at least 30% at 20°C when measured according to IUPAC 2.150a.

[0018] The taste ingredient may comprise rather large amounts of water, which is admixed to the edible vegetable fat and the butter. However, the amount of water is sufficiently low to allow the mixing into the resulting butter-like dairy spread without any use of emulsifying agents. Although a wide range of taste ingredients, natural or artificial, may be used, the taste ingredient is preferably a milk constituent which may be skimmed-milk, or a skimmed-milk powder dissolved in water, and optionally comprising one or more cultures of lactic bacteria to improve the taste. In this manner the taste ingredient is of natural origin and highly compatible with the butter and vegetable fat.

[0019] In a preferred embodiment of the method according to the invention the edible vegetable fat is supplied on liquid form at a temperature in the range of 42-60°C, suitable in the range of 45-55°C, and rapidly cooled prior to mixing to a temperature in the range of 7-18°C, suitably 10-15°C to crystallize or at least partly solidify the edible vegetable fat. The

supply of edible fat on liquid form eases the handling of the fat before its use for the butter-like dairy spread. Moreover, it allows the manufacturer of the butter-like dairy spread more control over the crystallization or solidification of the edible vegetable fat, which is highly advantageously in respect of e.g. quality control. Preferably the edible vegetable fat is cooled within a period of time in the range from about 15 seconds to about 15 minutes, preferably within a period of time in the range from about 15 seconds to about 7 minutes in order to optimise the crystallization. Preferably the vegetable fat is essentially free of water. However, it is in a non-preferred embodiment possible to mix water to the fat in liquid form and form an emulsion of fat and water. The vegetable fat may be mixed with up to about 30-50% of water.

[0020] According to the above preferred embodiment the cooled edible vegetable fat is post-crystallized at a temperature in the range of 8-18°C, suitable in the range of 10-15°C for a predetermined period of time of at least 30 seconds, preferably a period of time in the range from 2 min to 30 min, conveniently for a period of time in the range 4 min to 18 min, prior to the mixing with butter, taste ingredient and optional other ingredients. This procedure ensures a sufficient degree of solidification or crystallization for the formation of the network of crystals to provide the vegetable fat with a solid appearance. Preferably the edible vegetable fat is crystallized and post-crystallized within a period of time in the range from 2 to 30 min, more preferred within a period of time in the range from 3 to 20 min. to optimise the process.

[0021] In order to obtain the best possible properties of the butter-like dairy spread according to invention it is preferred that the edible fat has a solid fat content when measured according to IUPAC 2.150a in the following range:

solid fat content at 10°C	50-70%
solid fat content at 20°C	30-45%
solid fat content at 30°C	10-20%
solid fat content at 40°C	<3%

[0022] A vegetable edible fat with such a melting profile provides the resulting spread with a rheological behaviour substantially like soft butter, and the vegetable fat appears to be in a solid form at normal room temperatures (18-25°C), although it may comprise major liquid and/or semi-solid phases. However, the crystallized edible fat can have other solid fat contents than the stated ones, e.g. up to 10% higher contents and/or 5% lower, at one or more of the mentioned four temperature ranges. Due to variation of the butter during the year, the butter may have varying hardness, which can be compensated with more "soft" fat or more "hard" fat, respectively. The "hardness" of the fat is correlated to the solid fat content. Preferably the edible vegetable fat melts in the temperature range 33-48°C, preferably in the temperature range 35-45°. Vegetable fats that melts in such temperature range has proven to be very suitable and provide excellent properties, e.g. in respect of softness and spreadability to the dairy product.

[0023] For the purpose of improving the quality of the butter-like dairy spread in respect of

consumer health it is preferred that the edible vegetable fat is substantially free of trans fatty acids. At present it is recognized that trans fatty acids has a negative effect on human health by increasing the level of harmful cholesterol in blood and the risk of heart diseases.

[0024] Moreover, to provide a balanced mixture of fats the edible fat preferably includes 38 to 70%, suitable 44 to 67% saturated fatty acids, 23 to 45%, suitable 26 to 41% monounsaturated fatty acids, and 2-23, suitable 4 to 17% polyunsaturated acids.

[0025] The saturated fatty acids is preferably selected from capric acid(10:0), lauric acid(12:0), myristic acid(14:0), palmitic acid(16:0), stearic acid(18:0), arachidic acid(20:0), docosanoic acid(22:0), lignoceric acid(24:0), and mixtures thereof. The saturated fatty acids may also comprise a minor amount of lower saturated fatty acids like e.g. butyric acid(4:0) and caproic acid(6:0).

[0026] The monounsaturated fatty acids is preferably selected from 9-dodecenoic acid(12:1(n-3)), 9-tetradecenoic acid or myrestoleic acid(14:1(n-5)), 9-hexadecenoic acid or palmitoleic acid(16:1(n-7)), 6-octadecenoic acid or petroselinic acid(18:1(n-12)), 9-octadecenoic acid or oleic acid(18:1(n-9)), 11-octadecenoic acid or vaccenic acid(18:1(n-7)), 9-eicosenoic acid(20:1(n-11)), 11-eicosenoic acid (20:1(n-9)), 13-docosenoic acid or eurucic acid(22:1(n-9)), 15-tetracosenoic acid or nervonic acid (24:1(n-9)), and mixtures thereof.

[0027] The polyunsaturated fatty acids is preferably selected from linoleic acid(18:2(N-6)), γ-linoleic acid(18:3(N-6)), homo-γ-linoleic acid(20:3(N-6)), arachidonic acid(20:4(N-6), docasopentenoic acid(22:5(n-6)), α-linoleic acid(18:3(n-3)), eicsopentanoic acid(20:5(n-3)), docosahexanoic acid(22:6(n-3)), eicosatrienoic acid(20:3(n-9)) and mixtures thereof.

[0028] If desired one or more fatty acids may be added to the vegetable fat, butter and taste ingredient separately, before mixing

[0029] In a preferred embodiment of the method according to the invention at least one vegetable oil is added to the butter, edible vegetable fat, and taste ingredient prior to mixing. The vegetable oil or oils will contribute to the "softness" or spreadability of the butter-like dairy product at low temperatures. The vegetable oil is preferably selected from the group consisting of sunflower oil, corn oil, sesame oil, soya bean oil, palm oil, linseed oil, grapeseed oil, rapeseed oil, olive oil, groundnut oil and mixtures thereof. The preferred vegetable oils are oils that are relatively neutral in taste compared to butter.

[0030] According to the method the edible vegetable fat with a solid fat content not exceeding about 45% at 20°C is added to a mixer in an amount to constitute 7-38 wt%, preferably 9-29 wt% of the butter-like dairy spread based on the total weight of the dairy spread. The preferred amount of vegetable fat provides for a butter-like dairy spread with fine properties in respect of softness and mouth-feel.

[0031] Preferably the edible vegetable fat is added at a temperature in the range 7 to 16°C,

suitable a temperature in the range 10 to 14°C prior to mixing. In this way undesired melting of the vegetable fat is avoided and, moreover, the vegetable fat contributes to keeping the temperature during mixing below 22°C, preferably below 20°C.

[0032] In a preferred embodiment of the method according to the invention the butter is added in an amount to constitute 32-68 wt%, suitable 35-65 wt% of the butter-like dairy spread based on the total weight of the dairy spread. Preferably the butter is added at a temperature in the range 7 to 16°C, suitable in the range 10 to 14°C prior to mixing to avoid undesired melting and to contribute to keep the temperature during mixing below 22°C. In order to obtain the butter-like character of the dairy spread the amount of butter is important. If the amount of butter is less than about 25 wt% the spread will loose its butter-like character. On the other hand, if the amount of butter becomes too high the dairy spread tends to be too hard at refrigerated temperatures, and it has been found that the amount of butter should preferably not exceed 68 wt%.

[0033] The taste ingredient is preferably added in an amount to constitute 3-35 wt%, suitable 5-28 wt% of the butter-like dairy spread based on the total weight of the dairy spread. As previously explained the taste ingredient may contain substantial amounts of water, which may contribute to the softness of the butter-like dairy spread, and as such the taste ingredient may not only add taste to the dairy spread, but also further softness. It is preferred that the taste ingredient is added with a temperature in the range 2 to 13°C, suitable with a temperature in the range 4 to 10°C prior to mixing to cool the butter-like dairy spread during mixing.

[0034] In case edible oil is added to the mixture of vegetable fat, butter and taste ingredient, the edible vegetable oil is preferable added in an amount to constitute 3-33 wt%, suitable 5-26 wt% of the butter-like dairy spread based on the total weight of the dairy spread. As mentioned the vegetable oil may contribute to further soften the butter-like dairy spread and the higher the content of butter the higher content of vegetable oil may be desirable.

[0035] Preferably edible vegetable oil is added with a temperature in the range 2 to 20°C, conveniently in the range 4 to 14°C prior to mixing to aid cooling of the butter-like dairy spread during mixing.

[0036] With the aim of avoiding artificial additives it is preferred that the butter-like dairy spread does not contain emulsifying agents or other artificial additives. Consequently, it is preferred that the butter-like dairy spread according to the invention only includes natural constituents.

[0037] In order to avoid undesired melting of vegetable fat and butter during mixing it is preferred that the mixing is carried out at a temperature below 22°C, suitable at a temperature below 20°C, and more preferably at a temperature in the range 14 to 19°C.

[0038] Moreover, for the purpose of avoiding undesired melting the butter-like dairy spread is subsequent to mixing cooled to a temperature below 16°C, preferably to a temperature in the

range 3 to 14°C, more preferred to a temperature in the range 4 to 8°C

[0039] After the mixing, and optionally packaging, before delivery to supermarkets etc. for sale it is preferred that the butter-like dairy spread subsequent to mixing is cooled and stored at a temperature below 16°C, preferably at a temperature in the range 2 to 14°C, preferably at a temperature in the range 4 to 8°C for at least 24 hours. In this way the butter-like dairy spread will "ripen" and get a desired taste and texture due a finishing of solidification or crystallization of fat.

[0040] The invention further relates to a butter-like dairy spread comprising at least butter, edible vegetable fat, and a taste ingredient, such as a milk constituent, wherein the edible vegetable fat has a solid fat content of 10-45% at 20°C,.

[0041] wherein the butter constitutes 30-68 wt% of the butter-like dairy spread based on the total weight of the dairy spread and the edible vegetable fat form constitutes 7-38 wt% of the butter-like dairy spread based on the total weight of the dairy spread.

[0042] The invention further relates to a butter-like dairy spread comprising at least butter, edible vegetable fat, and a taste ingredient, such as a milk constituent in which the vegetable fat has a solid fat content of 10-45% or less at 20°C, and the butter-like dairy spread has a solid fat content at 20°C of at least 15% when measured according to IUPAC 2.150a and said edible fat includes 44 to 67% saturated fatty acids, 26 to 41% monounsaturated fatty acids, and 4 to 17% polyunsaturated acids. Such a dairy spread has proven to have brilliant properties in respect of mouth-feel and spreadability, in fact the butter-like dairy spread can be spread directly from a refrigerator (approx 5°C).

[0043] For the purpose of providing a balanced distribution of fats in the butter-like dairy spread according to the invention it is preferred that the edible fat includes 38-70%, suitable 44 to 67% saturated fatty acids, 23-45%, suitable 26 to 41% monounsaturated fatty acids, and 2-23%, suitable 4 to 17% polyunsaturated acids. Such a distribution of fatty acid in the edible fat provides an edible fat with good properties in respect of softening the butter-like dairy spread, while still keeping it stable at room temperature. Moreover, the distribution of fatty acids is also advantageously in respect of consumer health.

[0044] Consequently, the saturated fatty acids, the monounsaturated fatty acids and the polyunsaturated fatty acids preferably are selected from the fatty acids mentioned above.

[0045] In a preferred embodiment of the butter-like dairy spread according to the invention the taste ingredient includes water, skimmed-milk powder, salt, and one more cultures of lactic bacteria. Thus, the taste ingredient comprises only natural substances, and provides a water phase for butter-like dairy spread. The water phase, which is substantially clear water, may constitute 58-95 wt%, preferably 65-85 wt% of the taste ingredient, solid milk substance preferably 1-8 wt%, more prefered 2-5 wt%, cultures of lactic bacteria preferably 2-20 wt%, more preferred 4-18 wt%, and salt suitable 0.5-4 wt%, preferably 1-3 wt%.

[0046] In order to obtain a characteristic similar to that of butter it is preferred that the butter-like dairy spread has a butter content so that butter constitutes 30-68 wt%, suitable 33-65 wt% of the butter-like dairy spread based on the total weight of the dairy spread. If the content of butter is below about 30 wt%, the dairy spread will loose to much of its butter-like characteristics. If the content of butter exceeds about 68 wt% the butter-like dairy spread tends to be too hard a lower temperatures (e.g. refrigerated temperatures).

[0047] Preferably the edible vegetable fat, constitutes 7-38 wt%, suitable 9-29 wt% of the butter-like dairy spread based on the total weight of the dairy spread. Such an amount of vegetable fat is sufficient to provide both softness and stability to the butter-like dairy spread according to the invention.

[0048] Preferably the taste ingredient constitutes 3-35 wt%, suitable 5-28 wt% of the butter-like dairy spread based on the total weight of the dairy spread. The taste ingredient may provide both taste and water phase to the butter-like dairy spread according to the invention.

[0049] In an embodiment, which is particular preferred, the butter-like dairy spread further comprises at least one vegetable oil. A vegetable oil may contribute to softness and smoothness of the butter-like dairy spread.

[0050] Preferable the at least one vegetable oil is selected from sunflower oil, corn oil, sesame oil, soya been oil, palm oil, linseed oil, grapeseed oil, rapeseed oil, olive oil, groundnut oil and mixtures thereof.

[0051] For the purpose of obtaining a balanced distribution between butter, vegetable fat and vegetable oil in the butter-like dairy spread it is preferred that the edible vegetable oil, when present, constitutes 3-33 wt%, suitable 5-28 wt% of the butter-like dairy spread based on the total weight of the dairy spread. When the amount of vegetable oil is kept within the preferred limit the vegetable oil will contribute to further softness of the butter-like dairy spread without compromising the stability. In principal it is preferred to add higher amount of vegetable oil if the amount of butter is high.

[0052] The invention will now be described in further details with reference to a preferred embodiment and a drawing, in which

Fig. 1
: depicts a schematic flow-sheet for manufacture of butter-like dairy spread according to the invention.

Fig. 2
: depicts a schematic flow-sheet for manufacture of butter-like dairy according to the invention including addition of oil.

[0053] Unless other stated, all percentages % are weight percentage wt%.

[0054] Butter is an water-in-oil emulsion, comprising >80% milkfat, but also containing water in the form of tiny droplets, perhaps some milk solids-non-fat, with or without salt; texture is a result of working/kneading during processing at appropriate temperatures, to establish fat crystalline network that results in desired smoothness; butter is used as a spread, a cooking fat, or a baking ingredient. Butter of good quality can be obtained from various creameries.

[0055] Vegetable fat is a fat extracted from plants. A fat has a solid appearance a normal room temperature (18-25°C). The fat may include fat in liquid form, optionally within the solid fat as tiny droplets. Suitable edible vegetable fats are e.g. vegetable fats based on palm oil and palm kernel oil (which can be delivered from e.g. American Palm Oil Council; United States, or from Aarhus United; Denmark). Vegetable fats based on palm oil and palm kernel oil are at present preferred, however, other vegetable fats with similar properties may be also be suitable, e.g. vegetable fats like peanut butter, cacao butter or coconut butter.

[0056] In respect of stability the dairy spread should have substantially the same appearance as butter, in respect of exuding oily substances, after being kept at 22°C for two hours.

[0057] The taste ingredient may be any taste ingredient that that provides a butter-like taste, e.g. sourness to the dairy spread. The taste ingredient may comprise natural and synthetic flavours and substantial amounts of water. However, ingredients on natural basis are preferred, such as a milk constituent, e.g. comprising milk (full milk, skimmed milk, cream etc. optionally provided as milk powder), one or more cultures of lactic bacterias, salt and water. Milk powder, e.g. skimmed milk powder, and lactic bacteria may be obtained from Danisco A/S; Denmark.

[0058] Vegetable oil is based on fatty substances extracted from plants. However, in contrast to vegetable fats, vegetable oil is in liquid form at normal room temperatures (18-25°C). Suitable edible vegetable oils are vegetable oils that are substantially neutral in taste, like e.g. rapeseed oil, linseed oil, corn oil and sunflower oil, which can be obtained from wide range of suppliers (e.g. Aarhus united; Denmark).

[0059] With reference to figure 1 edible vegetable fat kept above its melting point (45-55°C) in a tank 1 is feed to a cooler and crystallization unit 2 where the fat is cooled to below 15°C to at least partly solidify or crystallize to obtain vegetable fat in solid form. The vegetable fat remains in the unit 2 for about 15 seconds to 20 minutes. From the unit 2 the vegetable fat is led to a post-crystallizing unit 3 for further crystallizing at a temperature in the range of approx. 7 to 18°C. The vegetable fat, at least partly on solid or crystallized form, is led to a pump 4, which via pipe 5 feeds the vegetable fat to mixer 6.

[0060] Simultaneously, butter in container 7 with a temperature in the range 7 to 16°C is filled into a stirrer 8 before it via pump 9 and pipe 5 is feed to mixer 6. From tank 10 taste ingredient, which in these embodiment comprise water and skimmed-milk powder with added cultures of

lactic bacteria 11, 12 and salt 13 is feed to the mixer 6 via pump 14 and pipe 5. The taste ingredient is feed to the mixer 6 with a temperature in the range 2-13°C.

[0061] In the mixer 6 the edible vegetable fat is mixed with butter and taste ingredient at a temperature below 22°C to form butter-like dairy spread.

[0062] After the mixing the butter-like dairy spread is conveyed through a cooler 15, which cools the butter-like dairy spread to a temperature below 16°C. Then the butter-like dairy spread is conveyed to a packing station 16 for packing. Finally, before the butter-like dairy spread is send to supermarkets etc. for sale and consuming, the packed butter-like dairy spread is stored in a storage 17 at a temperature below 16°C for at least 24 hours for ripening.

[0063] In an alternative embodiment outlined in figure 2, edible vegetable fat kept above its melting point (45-55°C) in a tank 101 is feed to a cooler and crystallization unit 102 where the fat is cooled to below 15°C to at least partly solidify or crystallize to obtain vegetable fat in solid form. The vegetable fat remains in the unit 102 for about 15 seconds to 20 minutes. From the unit 102 the vegetable fat is led to a post-crystallizing unit 103 for further crystallizing at a temperature in the range of approx. 7 to 18°C. The vegetable fat, at least partly on solid or crystallized form, is led to a pump 104, which via pipe 105 feeds the vegetable fat to mixer 106.

[0064] Simultaneously, edible vegetable oil from tank 107 with a temperature in the range 2-20°C is feed to the mixer 106 via pump 108 and pipe 105. Butter in container 109 with a temperature in the range 7 to 16°C is filled into a stirrer 110 before it via pump 111 and pipe 105 is feed to mixer 106. From tank 112 taste ingredient, which in these embodiment comprise water and skimmed-milk powder with added cultures of lactic bacteria 113, 114 and salt 115 is feed to the mixer 106 via pump 116 and pipe 105. The taste ingredient is feed to the mixer 106 with a temperature in the range 2-13°C.

[0065] In the mixer 106 the edible vegetable fat is mixed with edible vegetable oil, butter and taste ingredient at a temperature below 22°C to form butter-like dairy spread.

[0066] After the mixing the butter-like dairy spread is conveyed through a cooler 117, which cools the butter-like dairy spread to a temperature below 16°C. Then the butter-like dairy spread is conveyed to a packing station 118 for packing. Finally, before the butter-like dairy spread is send to supermarkets etc. for sale and consuming, the packed butter-like dairy spread is stored in a storage 119 at a temperature below 16°C for at least 24 hours for ripening.

[0067] The flow-sheets depicted in fig. 1 and fig 2 only describes preferred embodiments. It is clear that is it possible to exclude the pipe 5, 105, as the ingredients can be feed directly to the mixer 6, 106. The means for adding taste ingredient 10, 11, 12, 13, 112, 113, 114, 115 may have a different configuration if other taste ingredients are used. Finally, number of mixers 6, 106 may vary from 1 to 2 or 3 or more, depending on the capacity of the mixer applied. Thus, more mixers may be used in series, although it may be considered as only one mixing step as

all components of the dairy spread are present form the beginning to the end of the mixing.

Examples

[0068] Butter-like dairy spreads according to the invention is produced with the following constituents:
Butter in the form of regular dairy butter from creamery.
Vegetable fat based on palm oil from Aarhus United, with the following characteristic (according to IUPAC 2.150a):

solid fat content at 10°C	approx. 60%
solid fat content at 20°C	approx. 30%
solid fat content at 30°C	approx. 10%

Vegetable oil; rapeseed oil from Aarhus United.
Taste ingredient; skimmed milk powder and cultures of lactic bacteria from Danisco:

Water	78%
Salt	3%
Skimmed milk powder	14%
Lactic bacteria	5%

Example 1

[0069] Dairy spreads are produced according to the method outlined in figure 1.

[0070] Composition 1:

Butter	56%
Vegetable fat	26%
Taste ingredient	18%

[0071] Composition 2:

Butter	50%
Vegetable fat	25%
Taste ingredient	25%

The resulting dairy spreads have texture and taste like butter and can be spread on white bread when taken from a refrigerated temperature of approx. 5°C.

Example 2

[0072] Dairy spreads are produced according to the method outlined in figure 2.

[0073] Composition 3:

Butter	56%
Vegetable fat	15%
Vegetable oil	15%
Taste ingredient	14%

[0074] Composition 4:

Butter	48%
Vegetable fat	16%
Vegetable oil	16%
Taste ingredient	20%

The resulting dairy spreads have texture and taste like butter and can be spread on white bread when taken from a refrigerated temperature of approx. 5°C. Although composition 4 contains less than 50% butter and a substantial amount of water it still has a butter-like appearance and texture when produced according to the invention.

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- AU4937379B **[0003]**
- DK171699B1 **[0004]**
- WO9943218A **[0005]**
- US6136349A **[0006]**
- EP1279338A **[0007]**
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P A T E N T K R A V

1. Fremgangsmåde til fremstilling af et smør-lignende, mælkeholdigt smørepålæg omfattende mindst smør, spiseligt vegetabilsk fedt og en smagsbestanddel, såsom en mælkebestanddel, kendetegnet ved at det spiselige vegetabilske fedt har et faststof fedtindhold på 10-45% ved 20°C, hvor det spiselige vegetabilske fedt sammenblandes med mindst smør og smagsbestanddelen ved en temperatur under 22°C ved fremstillingen af smør-lignende, mælkeholdigt smørepålæg, hvor sammenblandingen af smør med vegetabilske fedt og smagsbestanddel foregår ved en temperatur under 22°C.

2. Fremgangsmåde ifølge krav 1, hvor det spiselige vegetabilske fedt tilsættes i flydende form ved en temperatur i området 42-60°C og hurtigt afkøles forud for sammenblandingen til en temperatur i området 7-18°C for at krystallisere, fortrinsvis krystalliseres og efterkrystalliseres den spiselige vegetabilske fedt inden for en tidsperiode i intervallet fra 2 til 30 min.

3. Fremgangsmåde ifølge et hvilket som helst af krav 1 og 2, hvor det spiselige vegetabilske fedt har et faststof fedtindhold når det måles ifølge IUPAC 2.150a:

faststof fedtindhold ved 10°C 50-70%

faststof fedtindhold ved 20°C 30-45%

faststof fedtindhold ved 30°C 10-20%

faststof fedtindhold ved 40°C <3%.

4. Fremgangsmåde ifølge et hvilket som helst af de foregående krav, hvor det spiselige vegetabilske fedt er i alt væsentligt frit for transfedtsyrer.

5. Fremgangsmåde ifølge et hvilket som helst af de foregående krav, hvor det spiselige vegetabilske fedt indbefatter 44 til 67% mættede fedtsyrer, 26 til 41% monoumættede fedtsyrer og 4 til 17% polyumættede syrer.

6. Fremgangsmåde ifølge et hvilket som helst af de foregående krav, hvor mindst én vegetabilsk olie tilsættes til det spiselige vegetabilske fedt, smør og smagsbestanddel forud for sammenblanding, fortrinsvis hvor den vegetabilske olie er valgt fra gruppen bestående af solsikkeolie, majsolie, sesamolie, sojaolie, palmeolie, linolie, vindruekerneolie, rapsolie, olivenolie, jordnøddeolie og blandinger deraf.

7. Fremgangsmåde ifølge hvilke som helst af de foregående krav, hvor den spiselige vegetabilske fedt tilsættes i en mængde til at udgøre 7-38 vægt% af det smør-lignende, mælkeholdige smørepålæg baseret på den samlede vægt af det mælkeholdige smørepålæg og/eller hvor smørret tilsættes i en mængde til at udgøre 32-68 vægt% af det smør-lignende, mælkeholdige smørepålæg baseret på den samlede vægt af det mælkeholdige smørepålæg. 8. Fremgangsmåde ifølge et hvilket som helst af de foregående krav, hvor det spiselige vegetabilske fedt tilsættes med en temperatur i området 7 til 16°C forud for sammenblanding.

9. Fremgangsmåde ifølge et hvilket som helst af de foregående krav, hvor smørret tilsættes med en temperatur i området 7 til 16°C forud for sammenblanding.

10. Fremgangsmåde ifølge et hvilket som helst af de foregående krav, hvor smagsbestanddelen tilsættes i en mængde til at udgøre 3-35 vægt% af det smør-lignende, mælkeholdige smørepålæg baseret på den samlede vægt af det mælkeholdige smørepålæg, og hvor smagsbestanddelen eventuelt tilsættes med en temperatur i området 2 til 13°C forud for sammenblanding.

11. Fremgangsmåde ifølge et hvilket som helst af krav 6 til 10, hvor den spiselige vegetabilske olie tilsættes i en mængde til at udgøre 3-33 vægt% af det smør-lignende, mælkeholdige smørepålæg baseret på den samlede vægt at det mælkeholdige smørepålæg. 12. Fremgangsmåde ifølge et hvilket som helst af de foregående krav 6 til 11, hvor den spiselige vegetabilske olie tilsættes med en temperatur i området 2 til 20°C forud for sammenblanding.

13. Fremgangsmåde ifølge et hvilket som helst af de foregående krav, hvor det smør-lignende mælkeholdige smørepålæg ikke indeholder emulgerende tilsætningsstoffer.

14. Fremgangsmåde ifølge et hvilket som helst af de foregående krav, hvor sammenblandingen udføres ved en temperatur under 20°C, fortrinsvis ved en temperatur i området 14 til 19°C.

15. Fremgangsmåde ifølge et hvilket som helst af de foregående krav, hvor det smør-lignende, mælkeholdige smørepålæg efterfølgende sammenblanding afkøles til en temperatur under 16°C, fortrinsvis til en temperatur i området 4 til 14°C. 16. Fremgangsmåde ifølge et hvilket som helst af de foregående krav, hvor det smør-lignende, mælkeholdige smørepålæg efterfølgende sammenblanding afkøles og opbevares ved temperatur under 16°C, fortrinsvis ved en temperatur i området 2 til 14°C, i mindst 24 timer.

17. Fremgangsmåde ifølge et hvilket som helst af de foregående krav, hvor smørret, det spiselige vegetabilske fedt og den eventuelle vegetabilske olie udgør mindst 59%, fortrinsvis mindst 65% af det smør-lignende, mælkeholdige smørepålæg.

18. Smør-lignende, mælkeholdigt smørepålæg omfattende mindst smør, spiselig vegetabilsk fedt og en smagsbestanddel såsom en mælkebestanddel, hvor det spiselige vegetabilske fedt har et faststof fedtindhold på 10-45% ved 20°C, hvor smørret udgør 30-68 vægt% af det smør-lignende mælkeholdige smørepålæg baseret på den samlede vægt af det mælkeholdige smørepålæg og det spiselige vegetabilske fedt udgør 7-38 vægt% af det smør-lignende mælkeholdige smørepålæg baseret på den samlede vægt af det mælkeholdige smørepålæg.

19. Smør-lignende, mælkeholdigt smørepålæg ifølge krav 18 omfattende mindst smør, spiselig vegetabilsk fedt, og en smagsbestanddel såsom en mælkebestanddel, hvor det smør-lignende, mælkeholdigt smørepålæg tilvejebringes ved en fremgangsmåde, hvor det spiselige vegetabilske fedt sammenblandes med mindst smør og smagsbestanddelen ved en temperatur under 22°C ved fremstillingen af det smør-lignende, mælkeholdige smørepålæg, hvor smør med vegetabilsk fedt og smagsbestanddel sammenblandes ved en temperatur under 22°C, og hvor det spiselige vegetabilske fedt har et faststof fedtindhold

på 10-45%, ved 20°C, det smør-lignende, mælkeholdige smørepålæg har et faststof fedtindhold ved 20°C på mindst 15% ved måling ifølge IUPAC 2.150a, og det spiselige fedt indbefatter 44-67% mættede fedtsyrer, 26 til 41% monoumættede fedtsyrer og 4 til 17% polyumættede syrer.

20. Smør-lignende, mælkeholdigt smørepålæg ifølge krav 18-19, hvor smagsbestanddelen indbefatter vand, skummetmælkspulver, salt og én eller flere kulturer af mælkesyrebakterier.

21. Smør-lignende, mælkeholdigt smørepålæg ifølge et hvilket som helst af de foregående krav 18-20, hvor smagsbestanddelen udgør 3-35 vægt% af det smør-lignende, mælkeholdige smørepålæg baseret på den samlede vægt af det mælkeholdige smørepålæg.

22. Smør-lignende, mælkeholdigt smørepålæg ifølge et hvilket som helst af de foregående krav 18-21, hvor det smør-lignende smørepålæg yderligere omfatter mindst én vegetabilsk olie og hvor den vegetabilske olie fortrinsvis er valgt fra gruppen bestående af solsikkeolie, majsolie, sesamolie, sojaolie, palmeolie, linolie, vindruekerneolie, rapsolie, olivenolie, jordnøddeolie og blandinger deraf.

23. Smør-lignende, mælkeholdigt smørepålæg ifølge krav 22, hvor den spiselige vegetabilske olie, ved tilstedeværelse, udgør 3-33 vægt% af det smør-lignende, mælkeholdige smørepålæg baseret på den samlede vægt af det mælkeholdige smørepålæg.

DRAWINGS

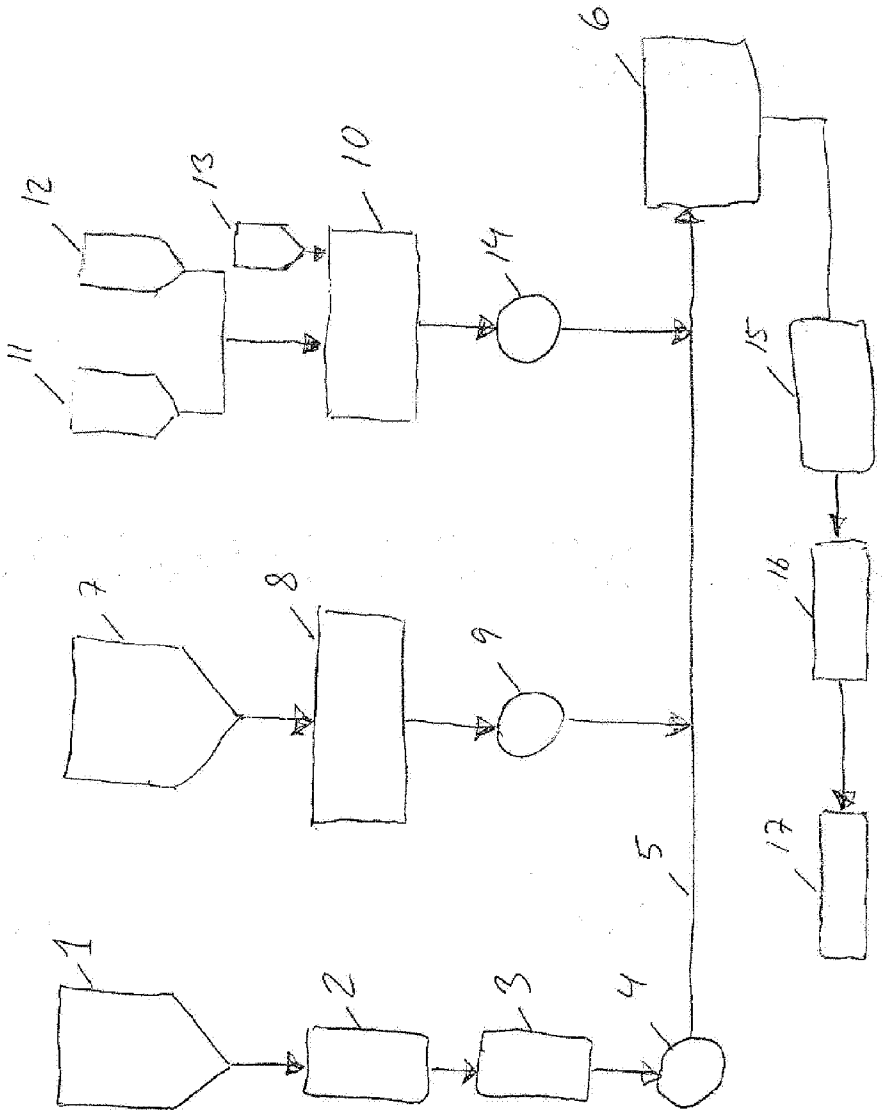

Fig 1

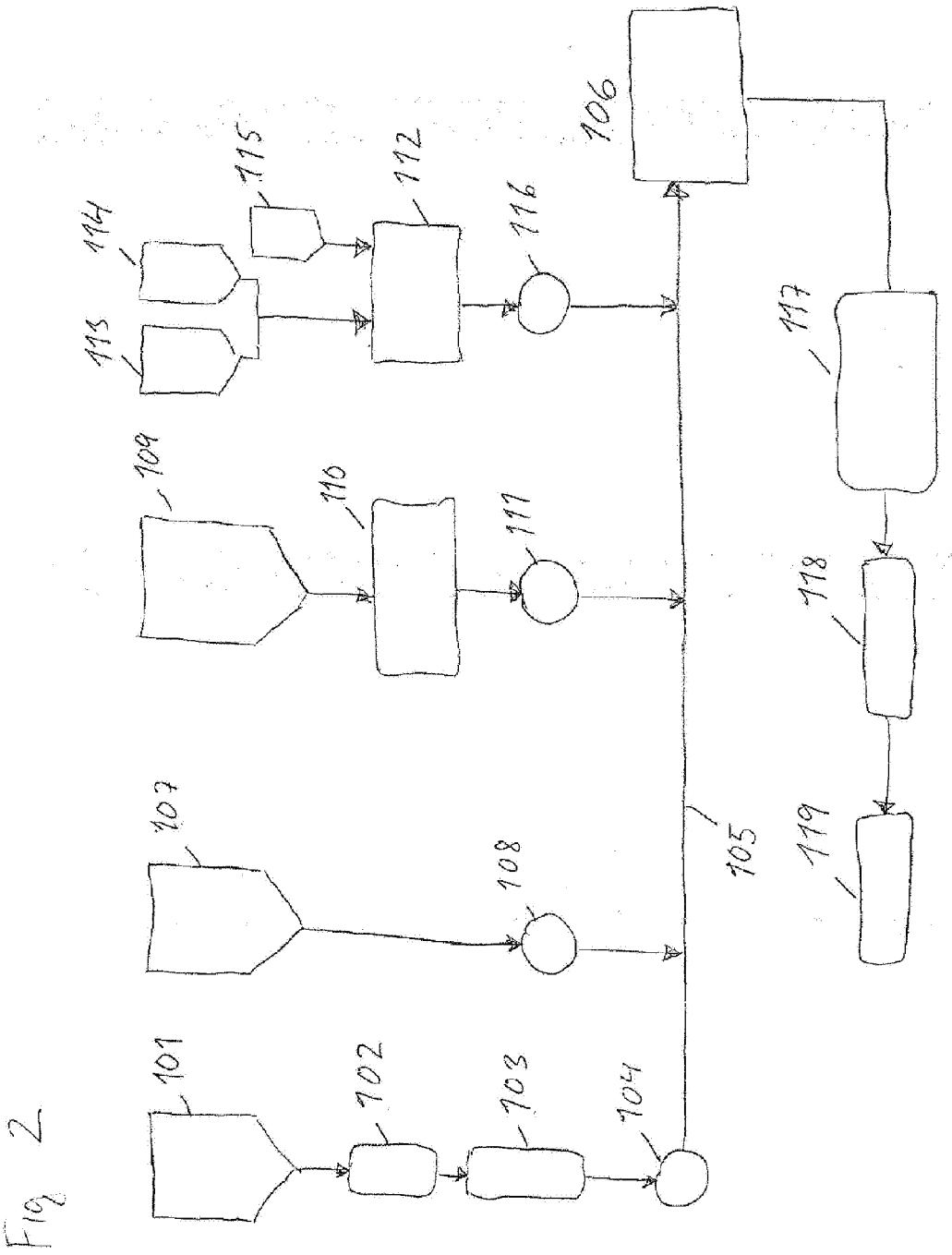
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Fig. 2