

MILK BASED PASTY FOOD PRODUCTS

PCT TEXT

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This invention is directed to a milk base food product that makes available a high energy content per pasty consumption unit.

5 It is well known, that the energy requirements of children can be provided by nourishment based on solid or semi-solid milk products, wherein the food product can be frequently provided between two biscuit-type coverings which can simulate a sandwich structure (slices of bread). Such food-products are usually bite-solid and have a relatively small water
10 content, so that after their consumption a certain liquid need remains. Food products of this type are type are described, for example in EP 64 155.

The food products, as long as they are not consumed unduly can provide the daily need of milk components which generally speaking,
15 children and youths, require for their organism. This is valid especially for serum proteins, milk fats, electrolytes (calcium-ions contained in milk), trace elements and the like contained in milk. While at a particular point in time youths restrict or cease their milk consumption, toddlers often cannot take up the necessary volume of milk as well as not wishing to do this. In this
20 respect, the reduced milk consumption leads to an insufficient share of necessary energy quantity which must be supplemented by other nutrients, which generally speaking, is highly undesirable.

One has already attempted to supplement the calorific value of milk
25 drinks by the addition of milk-cream in which, generally speaking, leads to a thick consistency which, among other things, is not suitable for the production of multi-layered structures whose layers do not flow into each other. Such structures must already have at the filling point, a predetermined viscosity that ensures the a laid-over mass which is filled in
30 the subsequent step does not penetrate into the layer lying therebelow. In this respect such solid food products require the provision of a thickening

material so that the fluid food product is so conditioned as to achieve a higher viscosity value.

On the other hand the fillability of such fluid products with a high solid/calorie content is limited by machinery since the mixed fluid mass must flow through a ultra-high temperature heater at temperatures of 120-140°C, on the other hand the thus heat-treated solution must be brought to a filling temperature of less than 10°C at which it must maintain the previously mentioned viscosity value. In both cases the solution to be so treated must have such a viscosity that it can pass both through the ultra-high temperature heating arrangement as well as the filling arrangement at usual machine pump pressures. On the basis of these facts therefore up till now, the filling of milk products with a high dry mass content appeared only to be possible without thickening materials, so that the production of pasty food products appeared to be difficult. In order to give such known food products an improved consistency therefore, it was suggested that during the filling there be provided air in combination with stabilizers so as to yield a foamy, suitably whipped cream-like, more solid structure.

On the other hand such a creamy, pudding-like structure is desirable for such a product since such masses are preferentially eaten by children. This is particularly true for multi-layered arrangements in which the layers possess a different taste composition as well as color, for example a vanilla/chocolate mixture, such as is the case with puddings.

These do not however contain a desirable content of milk components.

From the GB 2 110 517 A, jellied milk compositions are known in which the usual milk is treated with a dried fat emulsion, a modified starch as well as gel formers in the form of Iota-Carrageenan and Xanthan for the purpose of thickening. A thus produced milk product does not have a

unitary cream/smooth consistency since gel fragments are dispersed therein. Since additionally the product seems too slimy and furthermore has an unpleasant taste without flavoring, it cannot be utilized for the formation of a well tasting cream.

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Insofar as the need existed to provide a concentrated milk product with a high fat content, which has the consequence that the volume to be taken up by the consumer, can be reduced by half or more without reducing the milk components upon which the energy requirements are based. It is particularly desirable that an energy consumption unit be made available so that it corresponds to a glass of milk (0.2 l) wherein the volume of this consumption unit is reduced to more than one half, preferably to 1/3 of this volume.

15 It is particularly desirable to provide a spoonable, that is to say, pasty mass which is particularly suitable for the construction of multi-layer structures. The foregoing tasks are thus the basis of the present invention.

In accordance with a first independent invention idea, the solution is provided by a pasty milk-based food product which has a high energy content per consumption unit with a milk content of between 75-92 wt.%, wherein the milk has a fat content of between 12-18 wt.%, a sugar content of between 5-20 wt.%, a starch content of from 1.5-2.5 wt.%, and a gel former content of 0.1 -0.5 wt.%, wherein the relationship of starch to gel former is 15:1 to 7:1 with respect to the weight, a flavorant content of 0.1-0.5 wt.%, and a viscosity of at least 3 Pa.s. The tasks of the present invention can be solved by such a food product.

Technologically this pasty food product offers an excellent workability, since on the one hand it can pass through the ultra-high temperature heating without blocking problems and on the hand, through the charging arrangements at the appropriate temperatures. The charging

viscosity is at least 3 Pa.s at 10°C, so that this food product can be filled unproblematically. Based on viscosity, it has a pasty composition, which basically is determined by the high fat content of milk and to the thickening material. By means of this content of thickening material, the viscosity can
5 be so arranged that as far as the fillability is concerned, it will not rise substantially over 15 Pa. at 10°C.

The viscosity of the mass in accordance with the present invention should advantageously lie in the range of 5-10 Pa.s at 10°C. The viscosity
10 is measured in accordance with DIN 53019 with a rotation viscosimeter with a shearing speed of 6.46 (1/second). The maintenance of such viscosity limits critical to the present invention, for as if the lower limits of the viscosity are exceeded, the filling arrangement begins to drip and one can no longer obtain a solid phase frontier surface in order to place an upper
15 layer solidly over a lower layer. It is also essential that the masses in accordance with the present invention do not require in contrast to puddings, a post-thickening step, so in accordance with the present invention, that already at the filling step, a pasty consistency of the end product is reached.

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In accordance with the present invention it is possible to provide, on a lower, that is to say, first applied layer, which preferably has a viscosity of 5 PA S, a viscous upper layer which, for example, has a viscosity twice as large (10 Pa.s at 0°C). Herein one is able to obtain more readily an exact
25 border surface between the upper and the lower layers, wherein one may determine that this is possible even with a substantially equal viscosity values, for example, at 5 Pa.s. Thus, in accordance with the present invention, a multi-layer arrangement may be produced in which the lower, first-applied layer, has a lower viscosity, than the upper, subsequently
30 applied layer, without an interflow of the layers.

It is furthermore to be noted that the dry-mass of the layers need not necessarily correspond with of the viscosity of the respective coating mass.

Thus, for example, the dry-mass of the lower layer can be maximally at 38-39 wt.%, while its viscosity is at 5 Pa.s, while the dry-mass of the upper
5 layer can be in the range of 30-31 wt.% and yet have a viscosity of about 10 Pa.s. In this respect choice of the thickening system for the provision of the viscosity values is important. In accordance with the present invention, the dry-mass advantageously lies between 30 and 40 wt.% relative to total weight.

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The minimum viscosity value of the food product of the present invention thus guarantees that one can not only provide milk products in accordance with present invention from a mass but also multi/many layered products which can be formed through the stacking of different layers.
15 Particularly desired is a multi-layer arrangement in which the equal basis composition provided comprises milk, sugar and thickening materials. This basis composition has then added thereto in accordance with taste desire of particular aromas, fruit pulps, fruit purees, fruit extracts, such as cocoa and the like.

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In contrast to pudding-masses or similar other masses, in which the viscosity rises strongly after filling, the viscosity of the food product of the present invention remains substantially unchanged after filling, that is to say, that the filled mass remains in its pasty condition without solidifying.
25 Thus already in the basic material, the viscosity desired in the final food product (pasty structure) may be set in a predetermined manner.

As already determined hereinbefore, in the preferred multi-layered product having a viscosity level of at least 3 Pa.s during filling, clear
30 boundaries exist between the individual layers which can be particularly clearly set in a light/dark arrangement (cocoa/nut/layers). Such a multi-layer arrangement not only maintains its layer structure at filling, but rather also

after longer storage at room temperature and can be knocked over several times, without that this structure being destroyed. On the other hand, such a multi-layer arrangement can readily be stirred through with a spoon so that an unitary mass may be obtained from the pasty/creamy structure in a
5 relatively short mixing time.

In accordance with a second independent invention idea, there is provided a food product in accordance with the present invention relative to 100 g of total composition, which has an energy content of at least 170
10 kcal, suitably more than 190 kcals. Herein, the energy portion, relating to the milk proportion, relative to the various components available for the provided energy lies at at least 65%, preferably 70% and more, wherein the remaining energy proportion may be substantially attributed to the sugar component.

15

Because of this high energy content per weight unit, the amount to be consumed, per energy unit, can be held small. This has the consequence that with respect to a predetermined milk volume, for example 0.2 l, the volume of the food, in accordance with the present invention, can be
20 reduced to about 1/3, while the energy component attributed to the milk itself essentially remains the same. At the same time, the mass in accordance with the present invention additionally, still has a creamy structure that can be pleasantly eaten in the form of a cream.

25 The solid content (dry mass) of the mass in accordance with the present invention can be up to 40 wt.% of the total mass, wherein then the limit of workability is reached. Preferably the dry mass lies between 29 and 39 wt.%.

30 By "milk" there is to be understood in accordance with the present invention, a milk with a fat content of 12-18, suitably 15 wt.%.

Such a milk may generally be produced from decreamed whole milk by the addition of previously separated milk-fat in form of cream. This implementation form is preferred. On the other hand however, the milk-fat can be partially, that is to say, up to 50%, be replaced with plant fat and/or oil. These plant fats and/or oils must then be in form of oil in water emulsions and be mixed with the milk to the desired fat content.

The milk itself is provided in the form of full whole milk, but can however be reconstituted from skim milk or whole milk powder. As previously already determined however the provision of full milk in conjunction with the addition of cream to the formation a milk with at least 15% fat content is to be preferred.

The pasty milk product generally contains milk in an amount of 75-92 wt.%, preferably 78-90 wt.%, related to the total weight of the end product.

The energy segment controlled by the milk (wherein under "milk" is always to be understood the fat amplified milk), generally lies above 65, preferably 70% relative to the total energy content of the mixture.

As sweetening materials there may be utilized crystal sugar, fructose, sugar syrup, glucose, inverted sugar and their mixtures. Raw sugar is preferred in a quantity between 5-20, preferably 7-16 wt.%.

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In addition to the previously mentioned sweetening materials other sweeteners can be provided. Among these belong Saccharin, Cyclamate, Acesulfam, Aspartam, and the like.

30 Crystal sugar can be partially or totally replaced by such other sweeteners. The viscosity change caused thereby in the food product in accordance with the present invention, has the consequence of a reduction

in the dry mass which again has an effect on the viscosity of the entire mixture. Hereinbelow it will be explained how this viscosity may be adjusted.

5 The main content of the provided thickening material is starch, wherein under the term "starch" there may also be understood chemically modified starch. Employable starches are for example tuber-plant starches, such as potato meal, cornstarch, wax-corn starch, wheat starch, mannioc starch, and the like. During the modification such starches are generally
10 hydrolyzed with acid and split to lower polymeric food products with the assistance of alpha-amylase. Equally, such food products can be hydrated and substituted. The molecular weight of the starch glucose polymers depends upon the splitting procedure and generally lies between 1000 and 2000 Daltons for Amylose and between 107-108 for an Amylopectin. Such
15 different starches also show differentiable viscosity conditions in dependence upon the temperature. Such starches are placed into commerce by the companies Cerester and Roquette.

Furthermore, the viscosity of the final product is also determined by
20 the starch addition during the ultra-high temperature heating of the food product of the present invention which contributes further to the dissociation of the starch. Thus, the treated food product has a higher viscosity with respect to the starting product which can be lead back to the heating treatment in the ultra-high temperature heating arrangement.

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As already previously determined, the starch carries the main responsibility for the thickening (gel formation) of the food product of the present invention.

30 In accordance with the present invention, there may be utilized other gel forms such as Carubin (locust bean gum), Carrageenan, Guaran, and the like, as well as mixtures thereof, wherein the Carrageenan is to be preferred.

The Carrageenans utilized in the present invention generally have a molecular weight of between 200,000 to 800,000 Daltons and generate a gel which reversibly destroyed by mechanical influences such as stirring, pumping, cooling or filling, with respect to its structure, but can still be filled
5 without the formation of clumps. (Advantageously, of the Carrageenans, there may be utilized in accordance with a first variant, λ -Carrageenan and in accordance with a second variant, a mixture of iota and Kappa-Carrageenan, wherein the weight relationship lies between 2:1 and 1:2, preferably 1:0.77 to 0.7:1.)

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As a further advantageous gelling material, locust bean gum may be utilized which similarly is a non-ionic gelling material based on Galactose/Mannose. Gelations formed in this manner are normally structure-viscous, however not cutting firm.

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In accordance with the present invention the starch proportion is between to 1.5-2.5 wt.% and advantageously lies at around 2 wt.%.

The further gel formers in the form of Carrageen and/or locuast bean
20 gum lie in an amount from 0.1-0.3, preferably 0.15-0.25 wt.%. Thus, the relationship of the starch derivatives to the gel formers lies relative to weight, in the range of 15:1 to 5:1.

Furthermore, natural and nature-identical aroma materials may be
25 present in mixtures in accordance with present invention. To such aroma-materials below, for example, vanilla, Lemon-Orange aroma, as well as the usual aromas utilized in the feeding field which are, as mentioned, nature-identical. Such aromas can be utilized in amounts of between 0.1-0.5 wt.% relative to the entire mixture.

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For further aromatization, the addition of cocoa powder is possible which generally speaking, is strongly de-oiled. Hereby a creamy mass of dark brown color and a cocoa taste is formed. This cocoa powder can be provided to the mixture in an amount of 2-3, preferably about 2.5 wt.%.
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Additionally, fruit pulps or fruit purees can be added in order to direct the taste of the cream into the desired direction. Thus, for example, strawberry or apricot purees may be utilized.

10 As a fruit pulp, a nut, in particular a hazelnut pulp is preferred, that provides a substantial taste-giving component. Such a pulp/Puree can be provided in the quantity of 1-2, preferably 1.4-1.7 wt.%. Provided hazelnut pulp is provided, this not only carries the aroma of the mixture but also as increase in the nutritional physiological properties, since hazelnut pulp has
15 a relatively high content of unsaturated fatty acids, as well as a high albumin value. Further nut pulps for a such nut pulps include cashew nuts, peanuts, pistachios, almond, and walnuts. On the other hand, as discussed above, such an extract may be replaced by fruit purees and/or aromas.

20 The pH value lies in the weak acid range with respect to the incorporation of acidic fruits into the food product but generally however, close to the neutral point (pH = 6-7).

The mass in accordance with the present invention is produced as
25 follows.

Into the milk provided with milk fat which already comprises the major part of the volume of the mixture, the individual components are sequentially added with stirring, wherein in order to reduce clumping,
30 individual components may be combined with each other. For example, the Carageenan component with crystal sugar or the cocoa powder with the crystal sugar.

After completion of the mixing procedure, the thus obtained mixture is sterilized for a short time in ultra-high temperature heater at a temperatures of 120-140°C whereby, as previously stated, a starch dissociation of the starch components occurs.

5

Subsequently, the heat-treated mixture is cooled to 10°C, wherein a viscosity of at least 3 Pa.s is obtained. Thereafter, the filling takes place into a plastic container which is subsequently sealed off with an aluminum foil.

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In accordance with the first preferred embodiment of the present invention a homogeneous single phase mixture having a pasty condition is produced.

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With respect to such a pasty food product, one may be concerned with a substantially colorless food product which can be provided with any desired aroma, for example, vanilla, or nut aroma. On the other hand one can generate a colored food product wherein the color comes from an aroma material as well as from food coloring, if the dry content of the mixture is not practically changed hereby. On the other hand, pulp or puree type mixtures can be added which thus increase the dry mass. The production of a cocoa taste is preferred by the addition of cocoa powder and/or the production of a nut taste by the addition of nut pulp. On the other hand, as determined above, there may be utilized a fruit puree, for example strawberry puree or the like, whereby a reddish tone is generated in the cream type food product.

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If necessary, upon this layer there may be placed one or more layers of a semi-solid/solid food product. For this purpose, biscuit-like layers such as those in a sandwich envelope, a cream layer, a pudding, yogurt, or sweet sauce layer may be utilized.

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In accordance with a second preferred embodiment, a multi-layer arrangement in accordance with the present invention is produced which has at least two different colors and tastes in different layers. These layers are advantageously based on the same basic composition, in which 5 differentiable color/taste provisions are provided by differentiable taste-forming powder/puree/pulp/aromas.

Particularly preferred is a two-layer light/dark arrangement that is produced thereby that a layer is provided to form the dark color with cocoa 10 component, while the light layer is mixed with an aroma material forming properties. This two-layer arrangement is substantially available without mixing the two layers and is, long term, structurally stable.

There follow two examples for a single layer and an example of a 15 multi-layer arrangement, wherein the percentages are given based on weight.

Example 1

A first pasty food product is formed through mixing following 20 components:

Milk with 15% fat content	90%
Crystal sugar	7%
Starch derivatives	2.5%
Gel formers (Lambda-Carrageenan) 0.4%	0.4%
25 Aroma (vanilla)	0.1%

This food-product is light and comprises a dry mass based on 100 g, of approximately 31%. It comprises approximately 2.7 g albumin, 13.5 g carbohydrates and 13.4 g fat. The energy content, also per 100 g is 186 30 kcals, corresponding to 773 KJ. The viscosity amounts to 10 Pa.s at 10°C.

Example 2

For the production of a dark pasty mass, the following components are mixed together.

	Milk with 15% fat	81%
5	Crystal sugar	13%
	Cocoa powders strongly deoiled	2.3%
	Starch	1.4%
	Hazelnut pulp	1.7%
10	Gel formers (mixtures of iota - and Kappa-Carrageenan in a weight relationship of 1:1)	0.4%
	Aroma (vanilla and nut 1:1)	0.2%

Based upon on 100 g, this mixture has an albumin content of 3.1 g, carbohydrate content of 20.8 g, a fat content of 13.1 g, and a dry mass of approximately 38%. That energy content is 213 Kcals, corresponding to 890 KJ at 100 g. The viscosity amounts to 5.5 Pa.s at 10°C.

Example 3

Two-Layer Arrangement

The mass in accordance with Example 1 and the mass in accordance with Example 2 are filled into a synthetic container in accordance with the following standards. First, 22.5 g of the mixture of Example 2 (dark mass) is filled in and thereafter 40 g of the light mass, in accordance with Example 1 are layered thereover. The end product has following composition.

It comprises albumin content of 2.9 g, carbohydrate content of 15.9 g and a fat content of 13.5 g, and has an energy content of 197 kcal/819 KJ, wherein these values are relative to 100 g.

This cups can be packaged with further three cups to provide a separable cup arrangement which thus has a weight of 250 g of the pasty food product.

Comparison - Example 1

Example A of GB 2 110 517 was followed, except that instead of modified wax-corn starch, which is a hydroxypropyl starch, there is utilized a pure modified wax-corn starch. The recipe has the following composition:

5	Milk 3.5 (sic), fat	82.2%
	Sugar	9%
	vegetable fat	7.4%
	Modified wax-corn starch	1%
	Iota-Carrageenan	0.2%
10	Xanthan	0.1%
	Locust Bean gum	0.1%

This food product has a dry mass of 27.7%. The viscosity after prolonged cooling is circa 7 Pa.s at 11°C. The fat content is approximately 10.5%.

The total components after mixing, are heated in an ultra-high temperature arrangement and thereafter cooled off. This caused the consistency to become more solid and gel fragments were noted. Altogether, it was not possible to obtain a creamy-smooth consistency.

Without aroma, the product has an unpleasant taste and furthermore has a slimy mouth feel.

CLAIMS:

1. A pasty food based food product, which makes available a high energy-content per consumption unit characterized by a content of milk of 75-92 wt.%, wherein the milk has a fat content of 12-18 wt.%, sugar of 5-20 wt.%, starch of 1.5-2.5 wt.%, gel former of 0.1-0.5 wt.%, wherein the ratio of starch to gel former is between 15:1 to 5:1, relative to the total weight, aroma materials of 0.1-0.5 wt.% and having a viscosity of at least 3 Pa.s at 10°C.
2. Pasty food product in accordance with claim 1, characterized by a fat content of the milk of approximately 15 wt.%.
3. Pasty food product in accordance with claims 1 or 2, characterized thereby that it has a milk content of 78-90 wt.%, a sugar content of 7-16 wt.%, a starch content of about 2 wt.% a gel former content of about with 0.15-0.4 wt.%.
4. Pasty food product in accordance with claim 1, characterized thereby that the viscosity lies in the range 5-10 Pa.s at 10°C.
5. Pasty food product in accordance with any of claims 1-4, characterized thereby that as gel former there is utilized Carrageenan and or locust bean gum.
6. Pasty food product in accordance with claim 1, characterized thereby that the starch is hydrolytically or enzymatically modified.
7. Pasty food product in accordance with any of the claims 1-6, characterized thereby that it contains cocoa powders in a quantity of 2-3, preferably approximately 2.5 wt.%.



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8. Pasty food product in accordance with any of claims 1-7, characterized thereby that it contains fruit pulp or fruit puree in an amount of approximately 1-2 wt. %.

5 9. Pasty food product in accordance with claim 8, characterized thereby that it comprises hazelnut pulp in an amount of approximately 1.7 wt. %.

10. Multi-layer arrangement comprising at least one layer of a pasty food product in accordance with claims 1-9 as the first layer, wherein upon this first layer there is laid a pasty, at least semi-solid food product which has at least the same viscosity as the first layer.

11. Multi-layer arrangement in accordance with claim 10, characterized thereby that at least two layers are provided whose basic composition corresponds to that of with claim 1, wherein the individual layers possess a different color/different taste.

12. Multi-layer arrangement in accordance with claims 10 or 11, characterized thereby that the lower layer is a dark layer colored with cocoa, whereas the upper layer is a light layer provided with vanilla or nut taste.



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