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Az európai szabadalom ellen, megadásának az Európai Szabadalmi Közlönyben való meghirdetésétől számított kilenc hónapon belül, felszólalást lehet benyújtani az Európai Szabadalmi Hivatalnál. (Európai Szabadalmi Egyezmény 99. cikk(1))

A fordítást a szabadalmat az 1995. évi XXXIII. törvény 84/H. §-a szerint nyújtotta be. A fordítás tartalmi helyességét a Szellemi Tulajdon Nemzeti Hivatala nem vizsgálta.



Description

[0001] The invention relates mainly to a method for preparing a cheese powder.

[0002] The invention also relates to a method for preparing a cheese product by reconstitution from the said cheese powder.

[0003] Cheese products cover various milk-derived products. The latter would include in particular pressed cheeses, processed cheeses, soft cheeses and cream cheeses. These cheese products also take many forms. They may be found, for example, in the form of portions, slices and blocks and creams for spreading. Moreover, the composition of these products may be manifold according to the desired taste and nutritional specificities. The cheese product may thus be flavoured or reduced in fat or lactose.

[0004] Each cheese product must thus satisfy particular form, texture, functionality and nutritional property characteristics which involve appropriate manufacturing processes.

[0005] For example, processed cheeses are conventionally manufactured by melting a cheese or a blend of cheeses optionally supplemented with other dairy products.

[0006] The conventional manufacture of processed cheese thus consists of two essential steps.

[0007] Firstly, the manufacture of the cheese from milk during which take place in succession the known operations of renneting, clotting, draining, pressing and finally maturing.

[0008] Next, the cheese, or usually a blend of matured cheeses, is ground and blended with various dairy protein ingredients such as milk powder, caseins or caseinates, which makes it possible to reequilibrate the protein composition with regard, firstly, to the protein quality of the matured cheeses used, and, secondly, to the processed cheese's targeted protein composition.

[0009] It may also be envisaged to add to the blend fats such as cream and/or butter.

[0010] The blend is then functionalized via concomitant chemical, thermal and mechanical treatments. To this end, emulsifying salts such as citrates, orthophosphates or polyphosphates in sodium form are added to the blend. The blend obtained then undergoes a stabilization step of cooking-sterilization at temperatures of between 70 and 140°C.

[0011] During these steps, the pH is adjusted so as to determine the form of the protein molecules of the processed cheese.

[0012] Finally, the creaming and texturizing steps end the reorganization of the protein network before packaging.

[0013] The production of processed cheese is thus subjected to the variability of the raw materials resulting from the diversity of origins of the used cheeses as well as their evolution linked to their storing.

[0014] More generally, the requirements on cheese products both in terms of texture and of nutritional qualities run counter to this uncontrollable nature of the raw materials.

[0015] In this context, the present invention is directed towards a new technique for manufacturing cheese products which makes it possible to overcome the abovementioned drawbacks, and which especially makes it possible to control precisely the composition of the cheese product obtained according to a common process schema.

[0016] To this end, the method of the invention consists of a method for preparing a cheese powder for the reconstitution of a cheese product, which is essentially characterized in that it comprises at least the steps of:

- preparing a dairy blend comprising components consisting especially of fat and protein and whose respective fat and protein contents relative to the solids content of the blend are adjusted according to the corresponding targeted contents in the cheese product after reconstitution,

- renneting of the dairy blend obtained in the preceding step, clotting and production of a coagulum,
- cutting of the coagulum obtained in the preceding step and production of a cheese blend,
- functionalization of the cheese blend obtained in the preceding step via at least one emulsification operation and production of a functionalized cheese blend that is capable of undergoing reconstitution by blending with a liquid component,
- drying of the functionalized cheese blend obtained in the preceding step and production of a cheese powder.

[0017] The process of the invention is particularly innovative in that the cheese product is manufactured from milk treated according to a cheese process giving a reconstitutable nature to the cheese powder obtained and stabilizing the functionalities via the drying operation. Moreover, the composition of the intermediate product, the cheese powder, is adjusted directly in the cheesemaking vat during the preparation of the dairy blend.

[0018] The process of the invention is described as "closed" as no other dairy product than those used in the dairy blend has been added. However, there may be provision for additions of additives other than dairy to the dairy blend or during the functionalisation step.

[0019] The process of the invention may also comprise the following optional characteristics considered in isolation or according to all the possible technical combinations:

- the components used in the dairy blend are pasteurized and no heat treatment above 65°C is performed during said process;

- the fat content of the dairy blend is adjusted by adding a controlled amount of one or more dairy components consisting in particular of fat, and the protein content of the dairy blend is adjusted by adding a controlled amount of one or more dairy components consisting in particular of protein;

- the solids content of the dairy blend is adjusted by adding a controlled amount of one or more dairy components in dried form to the dairy blend, taking into account the solids content of the other dairy components of the dairy blend in fluid form;

- the fat content of the dairy blend is adjusted by adding a controlled amount of whole milk and/or of cream, and the protein content of the dairy blend is adjusted by adding a controlled amount of whole milk and/or of skimmed milk and/or of serum protein concentrate obtained by ultrafiltration of serum and/or of skimmed milk microfiltration or ultrafiltration retentate and/or of skimmed milk powder and/or of skimmed milk microfiltration or ultrafiltration retentate powder and/or cream;

- the solids content of the dairy blend is adjusted by adding a controlled amount of skimmed milk powder and/or of skimmed milk microfiltration or ultrafiltration retentate powder, taking into account the relative contents of serum protein concentrate obtained by ultrafiltration of serum and/or of skimmed milk microfiltration or ultrafiltration retentate and/or of cream in the dairy blend;

- the process comprises one or more successive steps of draining after the step of cutting of the coagulum;

- the lactose content relative to the solids content of the dairy blend is adjusted by adding a controlled amount of each of the dairy components constituting the dairy blend and according to the corresponding lactose content targeted in the cheese product after reconstitution;

- the lactose content relative to the solids content of the dairy blend is adjusted:

- by adding a controlled amount of each of the dairy components constituting the dairy blend, and

- by controlling the volume of whey drained off during the draining step(s),

in accordance with the corresponding lactose content targeted in the cheese product after reconstitution;

- the functionalization step comprises a chemical emulsification operation at a temperature of between 45 and 65°C;

- the chemical emulsification is performed by adding at least one emulsifying salt made of sodium and/or potassium citrates, phosphates of diphosphate, triphosphate, polyphosphate and/or orthophosphate type, and/or lactates;

- the process comprises a shearing operation subsequent to the chemical emulsification operation;

- the functionalization step comprises a mechanical emulsification operation reducing the mean particle size to less than 500 micrometres;

- colourants, flavourings or gelling agents are added to the dairy blend during the functionalization step;

- the drying step is performed by drying via atomization;

- the functionalized cheese blend comprises a fat content relative to the solids content of between 40% and 50%, a protein content relative to the solids content of between 26% and 40%, and optionally a lactose content relative to the solids content of between 10% and 20%;

- the functionalized cheese blend comprises a fat content relative to the solids content of between 48% and 55%, a protein content relative to the solids content of between 18% and 25%, and optionally a lactose content relative to the solids content of between 13% and 25%;

- the functionalized cheese blend comprises a fat content relative to the solids content of between 50% and 55%, a protein content relative to the solids content of between 28% and 35%, and optionally a lactose content relative to the solids content of between 5% and 10%;

- the functionalized cheese blend comprises a fat content relative to the solids content of between 65% and 75%, a protein content relative to the solids content of between 15% and 20%, and optionally a lactose content relative to the solids content of between 3% and 10%.

[0020] The invention also relates to a functionalized cheese powder obtained from the abovementioned process.

[0021] The invention also relates to a process for preparing a cheese product, which is essentially characterized in that it comprises at least one reconstitution step which consists of at least one operation of mixing a liquid component with the cheese powder obtained via the abovementioned process.

[0022] The process for manufacturing a processed cheese may also comprise the following optional characteristics considered in isolation or according to all the possible technical combinations:

- the proportion of liquid component is between 40% and 65%, and the proportion of cheese powder is between 35% and 60%.

- the liquid component is water,
- after the reconstitution step, the manufacturing process of a dairy product comprises a step of adding colourant and/or flavourings and/or gelling agents and/or cheeses,
- the process comprises a cooking-sterilization step subsequent to the step of mixing the liquid component with the cheese powder.

[0023] Other characteristics and advantages of the invention will emerge clearly from the description that is given below, as a guide and in no way limiting, with reference to the annexed drawings, among which:

- Figure 1 is a synoptic schema of the process for preparing the cheese powder of the invention according to a first variant,
- Figure 2 is a synoptic schema of the process for preparing the cheese powder of the invention according to a second variant, and
- Figure 3 is a synoptic schema of the process for preparing the cheese product of the invention by reconstitution using the cheese powder according to the first or second variant.

[0024] With reference to Figure 1, a dairy blend 1 is made by blending various dairy components chosen to control the fat and protein contents and, where appropriate, the lactose content of the dairy blend 1.

[0025] The fat content of the dairy blend 1 is controlled by adding whole milk and/or cream in fixed quantities.

[0026] The protein content is adjusted by adding whole milk and/or skimmed milk and/or serum protein concentrate obtained by ultrafiltration of serum and/or of skimmed milk microfiltration or ultrafiltration retentate and/or of skimmed milk powder and/or of skimmed milk microfiltration or ultrafiltration retentate powder and/or of cream in fixed quantities.

[0027] The lactose content is adjusted according to the relative contents of the chosen dairy components.

[0028] These respective contents of fat, protein and, where appropriate, lactose in the dairy blend 1 are adjusted according to the finished product, i.e. the targeted final cheese product after reconstitution.

[0029] More precisely, the respective ratios between the fat content and the solids content, between the protein content and the solids content, and, where appropriate, between the lactose content and the solids content are controlled from the development of the dairy blend and according to the targeted final product.

[0030] To this end, the control of the solids content of the dairy blend is performed by adjusting a controlled amount of skimmed milk powder and/or of skimmed milk microfiltration or ultrafiltration retentate powder. The control of the solids content of the dairy blend also requires that the relative contents of serum protein concentrate obtained by ultrafiltration of serum and/or of skimmed milk microfiltration or ultrafiltration retentate and/or of cream which comprises a substantial quantity of solids, be taken into account.

[0031] The dairy blend 1 is then heated to a temperature of between 30 and 36°C, after which it undergoes a renneting-clotting operation 2 which is performed by means of clotting enzymes such as animal enzymes (rennet) or plant or microbial enzymes.

[0032] The blend then undergoes a step of cutting of the coagulum 3. These operations correspond to those conventionally used for the manufacture of cheese.

[0033] Draining 4 is then performed. This operation is also performed for the manufacture of traditional matured cheese.

[0034] In the process of the invention, this draining operation 4 makes it possible first to control the solids content of the blend. Specifically, the blend is intended to be dried. The drying operation can only be performed economically for a blend whose solids content is greater than about 34% by weight.

[0035] Moreover, the draining operation 4 also makes it possible to control the lactose content in the finished product. When the targeted product must comprise a particular lactose content, the draining volume is adjusted in consequence. Thus, several draining operations may be performed depending on the draining capacity, an addition of water possibly being made between each draining.

[0036] After the draining operation 4, the functionalization of the cheese blend obtained is performed directly in the cheesemaking vat.

[0037] The functionalisation of proteins conventionally consists of putting proteins into a reactive state making it possible to render groupings functional, unlike in the native protein. This reactive state can take a structural conformation shape specific to the protein, in particular regarding its degree of opening to generate functional groupings inaccessible in the native protein, or take the shape of a change of the proteins' ionic environment. The functionalized proteins will therefore have capacities which they did not possess in their native state.

[0038] According to the invention, the functionalization consists of one or more emulsification operations 5. This operation may be performed chemically and/or mechanically optionally accompanied by a heat treatment.

[0039] Chemically, the emulsifying salts that may be used are especially sodium and/or potassium citrates, phosphates of diphosphate, triphosphate, polyphosphate or orthophosphate type, and/or lactates, or alternatively lactates.

[0040] Instead of the chemical emulsification route, mechanical emulsification may be envisaged, which consists, for example, in applying large shear stresses generated by the speed and shape of the tools used and directed towards reducing the mean particle size to less than 500 micrometres in order to obtain a uniform and stable phase up to the subsequent operation of drying of the product.

[0041] When the emulsification operation is performed chemically, a subsequent mechanical treatment operation, for example by shear, is preferably performed.

[0042] Functionalization via chemical emulsification may be performed at temperatures of between 45 and 65°C. The lower limit of 45°C corresponds to a temperature for which the proteins are in a favourable state for emulsification, and the upper limit of 65°C corresponds to a temperature for which coagulation of the serum proteins takes place. This low functionalization temperature makes it possible to conserve the molecules in order to make them suitable for reconstitution after the drying operation.

[0043] It should be noted that the heating to temperatures of between 45 and 65°C may be replaced with a mechanical action. It is therefore understood that the chemical, thermal and mechanical functionalization routes are combined together so as to perform the emulsification operation.

[0044] According to the process of the invention, the functionalization of the blend does not require any pasteurization heat treatment in this step on account of the use of raw materials in the dairy blend that are already pasteurized.

[0045] More generally, the blend does not undergo any heat treatment above a temperature of 65°C, so as to avoid any protein degradation opposing the subsequent reconstitution of the product. As previously explained, there is no need to perform a substantial heat treatment on account of the use of pasteurized components in the blend.

[0046] It should be noted that an acidification operation, not shown, is performed, either during the operation for preparing the dairy blend 1, or at the time of functionalization, or in the reconstitution step.

[0047] If necessary, the blend may be stored and transported before the following drying operation 6. In this case, the blend will be cooled to a temperature of about 8 to 10°C.

[0048] The drying operation is performed in an appropriate atomization drying tower, and the cheese powder 7 is then obtained after this drying operation.

[0049] By virtue of its consistency, this cheese powder 7 may be packaged, stored, transported and conserved.

[0050] It is thus possible to envisage the manufacture of the cheese powder 7 at one site and the reconstitution of the cheese product at another site.

[0051] The cheese powder obtained from the abovementioned process is a functionalized cheese powder. This functionalization may be proven through recognized tests of functionalization consisting of comparing a specific property pertaining to the strength of the protein network of a functionalized cheese product, for example its foaming property, its emulsifying property or its thermal stability, to a non-functionalized dairy product sample. It can be then found that obtaining the specific property requires less quantity of a functionalized cheese product than a non-functionalized cheese product.

[0052] Moreover, without going over the 65°C threshold during the elaboration process of the cheese powder, the proteins contained in the cheese powder are not degraded. The powder is therefore rendered reconstitutable, as the blend of the powder with a liquid component results in a cheese product with the targeted characteristics. Further, the absence of protein degradation can be proven by recognised techniques of analysis in this domain.

[0053] With reference to Figure 3, the reconstitution of the cheese product is performed by mixing 8 the cheese powder 7 with a liquid component.

[0054] The liquid component may be water or any other liquid component depending on the targeted cheese product.

[0055] The proportion of liquid component is chosen according to the targeted solids content of the finished product.

[0056] The blend then undergoes a cooking-sterilization operation 9 and a texturing operation 10 before being packaged 11.

[0057] The cooking-sterilization operation 9 is advantageously performed at this stage of the process and not at the time of functionalization, for the reasons presented previously.

[0058] It may also be envisaged after the reconstitution step, to add colourants, flavourings, texturing components such as gelling agents and/or cheeses.

[0059] As a variant, the adding of colourants, flavourings or gelling agents may be performed during the functionalization step before the drying process.

[0060] The product obtained is a cheese product which may be of the processed cheese, soft cheese or cream cheese type which are comparable with the same products obtained via conventional channels.

[0061] With reference to Figure 2 and according to a second variant of the invention, the process for preparing the cheese powder 7 does not comprise a draining operation.

[0062] In this case, the dairy blend 1 is prepared by mixing together various dairy components chosen to control, besides the fat and protein contents, the solids content.

[0063] To this end, the solids content is mainly adjusted by adding skimmed milk powder and/or skimmed milk microfiltration or ultrafiltration retentate powder in fixed quantities.

[0064] The contents of serum protein concentrate obtained by ultrafiltration of serum and/or skimmed milk microfiltration or ultrafiltration retentate and/or cream, which have a substantial solids content, are also taken into account.

[0065] The other operations for preparing the cheese powder 7 remain unchanged. This is likewise the case for the preparation of the reconstituted cheese product as described previously with reference to Figure 3.

[0066] It is particularly noteworthy in the process of the invention to be able to control the protein and fat contents and, where appropriate, the lactose content of the finished product in the step for preparing the dairy blend.

[0067] Specifically, in the case where the process does not envisage a draining operation, the percentages of fat, protein and, where appropriate, lactose relative to the solids are adjusted in the dairy blend according to the same percentages targeted in the finished product and taking into account the addition of the solids which increase the solids content, especially of the emulsifying salts when the latter are used during an emulsification operation.

[0068] In the case where the process envisages draining operations, the content of solids in the form of lactose removed during the draining and of the lesser contents of protein and fat also removed during draining will also be taken into account.

[0069] The calculations for determining the components and the respective contents thereof in the dairy blend according to the targeted finished product will thus be adjusted on the basis of solids consisting of protein, fat, lactose and minerals.

[0070] It is also noteworthy in the process of the invention to be able to conduct a functionalization on a blend controlled on fats, protein, and where appropriate lactose which confer the known characteristics of functionalization in the prior art.

[0071] The process of the invention is thus a process which may be defined as "closed" in the sense that once the dairy blend has been made, no other dairy component is added during the process. For each step, the contents, especially of protein and fat, relative to the solids are controlled, whether it be a matter of preparing the dairy blend, of performing the draining or of adding the emulsifying salts. Functionalization of the blend is thus performed whilst controlling the protein and fat contents in the blend.

[0072] In addition, the control of the protein and fat contents of the components of the dairy blend involves the use of various components (whole milk, serum protein concentrate, cream, etc.) which may each be pasteurized beforehand. Consequently, the process does not require any pasteurization operation or any other heat operation which would degrade the proteins. The absence of protein degradation during the process thus makes it possible to reconstitute the cheese product from the cheese powder.

[0073] Finally, the process of the invention is also noteworthy in that, in addition to controlling the protein and fat contents and conserving the structure of the proteins, this process is performed in a cheesemaking vat and involves known steps for the manufacture of matured cheeses. As a result, the process of the invention does not require any substantial modification of existing installations.

[0074] The process of the invention thus makes it possible to obtain a cheese product in which the protein is not degraded or proteolyzed, which gives it better functionalities.

[0075] The process of the invention also makes it possible to obtain a dry cheese product from which a cheese product may be reconstituted by adding liquid material, the dry cheese product not changing over time.

[0076] Finally, in the particular context of producing processed cheeses, the process of the invention makes it possible to manufacture a processed cheese derived from a single technique, thus making it possible to overcome the problems inherent to the use of matured cheeses, especially problems of non-uniformity of composition and of proteolysis.

[0077] The examples below of preparation of a functionalized dairy blend, of manufacture of cheese powder and of reconstitution of a cheese product are given in a non-limiting manner.

Example 1: Preparation of a cheese powder for the production of a cheese product in the form of slices and blocks

[0078] This example targets a processed cheese intended for making slices and blocks and containing 43% by weight of solids, 18.5% by weight of fat and 15.5% by weight of protein, i.e. contents relative to the solids content of 43% fat and 36% protein.

[0079] The standardized dairy blend is made by mixing in a cheesemaking vat 945 litres of whole milk and 45 litres of serum protein concentrate obtained by ultrafiltration of serum. Citric acid is added such that the mixture has a pH of 5.85.

[0080] The dairy blend obtained has a weight content of solids of 123 g/L, a weight content of fat of 31 g/L and a weight content of protein of 35 g/L, i.e. a content relative to the solids content of 25% fat and 28% protein.

[0081] The blend obtained is then heated to 33°C and clotting is then performed by renneting. To this end, a dose of 15 ml/1000 L of rennet is added. The clotting is completed in 30 minutes. The clotted mixture is then heated to 37°C.

[0082] Two cycles of draining off the whey are performed via a first draining of 565 litres of whey, the addition of 565 litres of water, and then a second draining of 565 litres of whey.

[0083] The functionalization of the blend obtained after draining is performed directly in the cheesemaking vat. To this end, the temperature of the blend is raised to 62°C. 6 kg of emulsifying salts based on orthophosphates, citrates and polyphosphates are added and the blend is sheared in an appropriate blender.

[0084] The blend obtained has a weight content of solids of 142 g/L, a weight content of fat of 49.5 g/L and a weight content of protein of 52 g/L, i.e. a content relative to the solids content of 35% fat and 37% protein.

Example 2: Preparation of a functionalized blend for the production of a cheese product in the form of slices and blocks

[0085] This example is directed towards a processed cheese for making slices and blocks, containing 45% by weight of solids, 19.5% by weight of fat, 15.5% by weight of protein and 5% by weight of lactose, i.e. a content relative to the solids content of 41% fat, 34% protein and 11% lactose.

[0086] The standardized dairy blend is prepared by blending in a cheesemaking vat 2068 litres of whole milk, 95 litres of serum protein concentrate obtained by ultrafiltration of serum and 44 litres of cream. Citric acid is added such that the blend has a pH of 5.73.

[0087] The dairy blend obtained has a weight content of solids of 125.5 g/L, a weight content of fat of 39 g/L, a weight content of protein of 31 g/L and a weight content of lactose of 47 g/L, i.e. a content relative to the solids content of 31% fat, 25% protein and 38% lactose.

[0088] The blend obtained is then heated to 33°C, and clotting is then performed by renneting. To this end, a dose of 15 ml/1000 L of rennet is added.

[0089] The clotting is completed in 50 minutes. The clotted blend is then heated to 37°C.

[0090] Two cycles of draining off the whey are performed via a first draining of 1435 litres of whey, the addition of 700 litres of water and then a second draining of 825 litres of whey.

[0091] The functionalization of the blend obtained after draining is performed directly in the cheesemaking vat. To this end, the temperature of the blend is raised to 50°C. 12.7 kg of emulsifying salts based on orthophosphates, citrates and polyphosphates, and 2.8 kg of common salt are added, and shearing of the blend is performed in an appropriate blender.

[0092] The functionalized dairy blend obtained has a weight content of solids of 200 g/L, a weight content of fat of 87 g/L, a weight content of protein of 64 g/L and a weight content of lactose of 23 g/L, i.e. a content relative to the solids content of 43.5% fat, 32% protein and 11.5% lactose.

Example 3: Preparation of a functionalized dairy blend for the production of a cheese product in the form of slices and blocks

[0093] As for Example 2, a processed cheese for making slices and blocks is targeted, containing 45% solids, 18.5% fat, 15.5% protein and 5% lactose, i.e. a content relative to the solids content of 41% fat, 34% protein and 11% lactose.

[0094] The standardized dairy blend is prepared by mixing in a cheesemaking vat 940 litres of whole milk, 43 litres of serum protein concentrate obtained by ultrafiltration of serum, 20 kg of milk powder and 50 litres of cream.

[0095] The dairy blend obtained has a weight content of solids of 150.5 g/L, a weight content of fat of 50 g/L, a weight content of protein of 36 g/L and a weight content of lactose of 51 g/L, i.e. a content relative to the solids content of 33% fat, 24% protein and 34% lactose.

[0096] The blend obtained is then heated to 33°C and clotting is then performed by renneting. To this end, a dose of 100 ml/1000 L of rennet is added.

[0097] The clotting is completed in 30 minutes. The clotted blend is then heated to 37°C.

[0098] Two cycles of draining off the whey are performed via a first draining of 500 litres of whey, the addition of 360 litres of water and then a second draining of 400 litres of whey. 20 kg of cheese fines are added to the blend.

[0099] The functionalization of the blend obtained after draining is performed directly in the cheesemaking vat. To this end, the temperature of the blend is raised to 50°C, 7.2 kg of emulsifying salts based on orthophosphates, citrates and polyphosphates, and 1.2 kg of common salt are added, and shearing of the blend is performed in an appropriate blender. At the same time as the functionalization, 0.7 kg of citric acid is added to the blend.

[0100] The functionalized dairy blend obtained has a weight content of solids of 195 g/L, a weight content of fat of 79 g/L, a weight content of protein of 64 g/L and a weight content of lactose of 27 g/L, i.e. a content relative to the solids content of 40% fat, 33% protein and 14% lactose.

Example 4: Preparation of cheese powder and reconstitution of a cheese product of processed cheese type for slices and blocks from the functionalized blends of Examples 2 and 3

[0101] The functionalized dairy blends of Examples 2 and 3 are mixed together and then dried by atomization.

[0102] The processed cheese powder obtained contains 97% by weight of solids, 41.5% by weight of fat, 31% by weight of protein and 10.5% by weight of lactose, i.e. a content relative to the solids content of 43% fat, 32% protein and 11% lactose.

[0103] Reconstitution of the processed cheese is performed by mixing 45% water and 55% processed cheese powder. Correction of the pH by adding citric acid and correction of the salt content are applied.

[0104] The processed cheese obtained contains 44% by weight of solids, 18.5% by weight of fat, 15% by weight of protein and 4.5% by weight of lactose, i.e. a content relative to the solids content of 42% fat, 34% protein and 10% lactose.

Example 5: Preparation of cheese powder and reconstitution of a cheese product of processed cheese type for slices and blocks

[0105] It is sought to prepare a processed cheese intended for making slices and blocks, containing 45% by weight of solids, 20.5% by weight of fat, 13.5% by weight of protein and 6.5% by weight of lactose, i.e. a content relative to the solids content of 46% fat, 30% protein and 14% lactose.

[0106] The standardized dairy blend is prepared by mixing in a cheesemaking vat 640 litres of skimmed milk microfiltration or ultrafiltration retentate, 76 kg of skimmed milk microfiltration or ultrafiltration retentate powder and 360 litres of cream.

[0107] The dairy blend obtained has a weight content of solids of 314 g/L, a weight content of fat of 145 g/L and a weight content of protein of 102 g/L, i.e. a content relative to the solids content of 46% fat and 32.5% protein.

[0108] The blend obtained is then heated to 35°C and clotting is then performed by renneting. To this end, a dose of 150 ml/1000 L of rennet is added. Clotting is completed in 30 minutes.

[0109] The functionalization of the blend obtained after blending is performed directly in the cheesemaking vat. To this end, the temperature of the blend is raised to 55°C, 19.4 kg of emulsifying salts based on orthophosphates, citrates and polyphosphates, and 6 kg of common salt are added, and shearing of the mixture is performed in an appropriate blender. At the same time as the functionalization, 3.9 kg of citric acid are added to the blend.

[0110] The blend obtained has a weight content of solids of 333 g/L, a weight content of fat of 145 g/L and a weight content of protein of 100 g/L, i.e. a content relative to the solids content of 44% fat and 30% protein.

[0111] The functionalized dairy blend is then dried by atomization.

[0112] The processed cheese powder obtained contains 98% solids, 42% fat, 29% protein and 18% lactose, i.e. a content relative to the solids content of 43% fat, 29% protein and 18% lactose.

[0113] The reconstitution of the processed cheese is performed by mixing 46% by weight of water and 54% by weight of processed cheese powder.

[0114] The reconstituted processed cheese obtained contains 45% by weight of solids, 19% by weight of fat and 13% by weight of protein, i.e. a content relative to the solids content of 42% fat and 29% protein.

Example 6: Preparation of a functionalized dairy blend for the manufacture of a cheese product in the form of processed cheese portions

[0115] It is sought to prepare a cheese product in the form of processed cheese portions containing 41% by weight of solids, 21% by weight of fat, 8.5% by weight of protein and 6.5% by weight of lactose, i.e. a content relative to the solids content of 51% fat, 21% protein and 16% lactose.

[0016] The standardized dairy blend is prepared by mixing in a cheesemaking vat 990 litres of whole milk, 55 litres of serum protein concentrate obtained by ultrafiltration of serum, and 117 litres of cream.

[0117] The dairy blend obtained has a weight content of solids of 159 g/L, a weight content of fat of 76 g/L, a weight content of protein of 31 g/L and a lactose content of 44 g/L, i.e. a content relative to the solids content of 48% fat, 19.5% protein and 28% lactose.

[0118] The mixture obtained is then heated to 33°C and clotting is then performed by renneting. To this end, a dose of 50 ml/1000 L of rennet is added. Clotting is completed in 70 minutes. The clotted mixture is then heated to 55°C.

[0119] A cycle of draining off the whey is performed by draining off 510 litres of whey.

[0120] The functionalization of the blend obtained after draining is performed directly in the cheesemaking vat. To this end, the temperature of the blend is maintained at 55°C, 6.7 kg of emulsifying salts based on orthophosphates, citrates and polyphosphates, and 2.5 kg of common salt are added, and shearing of the mixture is performed in an appropriate blender. At the same time as the functionalization, 2 kg of citric acid are added to the blend.

[0121] The clotted and functionalized dairy blend obtained has a weight content of solids of 242 g/L, a weight content of fat of 126 g/L, a weight content of protein of 49.5 g/L, and a content of lactose of 41 g/L, i.e. a content relative to the solids content of 52% fat, 20.5% protein and 17% lactose.

Example 7: Preparation of a cheese powder and reconstitution of a cheese product in the form of processed cheese portions

[0122] It is sought to prepare a cheese product in the form of processed cheese portions containing 41% by weight of solids, 21% by weight of fat, 6.5% by weight of protein and 6.5% by weight of lactose, i.e. a content relative to the solids content of 51% fat, 21% protein and 16% lactose.

[0123] The standardized dairy blend is prepared by mixing in a cheesemaking vat 47 litres of serum protein concentrate obtained by ultrafiltration of serum, 225 litres of skimmed milk microfiltration or ultrafiltration retentate, 20 kg of milk retentate powder and 191 litres of cream.

[0124] The dairy blend obtained has a weight content of solids of 311.5 g/L, a weight content of fat of 178 g/L, a weight content of protein of 66.5 g/L and a weight content of lactose of 58.5 g/L, i.e. a content relative to the solids content of 57% fat, 21% protein and 19% lactose.

[0125] The blend obtained is then heated to 53°C and clotting is then performed by renneting. To this end, a dose of 90 ml/1000 L of rennet is added. Clotting is completed in 25 minutes. The clotted blend is then heated to 55°C.

[0126] The functionalization of the blend obtained after blending is performed directly in the cheesemaking vat. To this end, the temperature of the blend is maintained at 55°C, 7.4 kg of emulsifying salts based on orthophosphates and polyphosphates, and 2.5 kg of common salt are added, and shearing of the blend is performed in an appropriate blender. At the same time as the functionalization, 2.5 kg of citric acid are added to the blend.

[0127] The blend obtained has a weight content of solids of 273 g/L, a weight content of fat of 136 g/L, a weight content of protein of 57.5 g/L and a weight content of lactose of 56 g/L, i.e. a content relative to the solids content of 50.5% fat, 21% protein and 20.5% lactose.

[0128] The functionalized blend is then dried by atomization.

[0129] The processed cheese powder obtained has a weight content of solids of 97%, a weight content of fat of 46.5% and a weight content of protein of 20.5%, i.e. a content relative to the solids content of 48% fat and 21% protein.

[0130] Two reconstitutions of processed cheese are performed:

[0131] The first reconstitution is performed by mixing 42% water and 58% processed cheese powder.

[0132] The processed cheese obtained has a weight content of solids of 41%, a weight content of fat of 20% and a weight content of protein of 8.6%, i.e. a content relative to the solids content of 49% fat and 21% protein.

[0133] The second reconstitution is performed by mixing 46% water and 54% processed cheese powder.

[0134] The reconstituted processed cheese obtained has a weight content of solids of 45%, a weight content of fat of 21% and a weight content of protein of 9%, a content relative to the solids content of 47% fat and 20% protein.

Example 8: Preparation of a cheese powder and reconstitution of a cheese product in the form of processed cheese portions

[0135] It is sought to prepare a cheese product in the form of processed cheese portions containing 41% by weight of solids, 21% by weight of fat, 8.5% by weight of protein and 6.5% by weight of lactose, i.e. a content relative to the solids content of 51% fat, 21% protein and 16% lactose.

[0136] The standardized dairy blend is prepared by mixing in a cheesemaking vat 1700 litres of whole milk, 130 litres of serum protein concentrate obtained by ultrafiltration of serum, 70 kg of milk powder and 380 litres of cream.

[0137] The dairy blend obtained has a weight content of solids of 215 g/L, a weight content of fat of 100.5 g/L, a weight content of protein of 41 g/L and a weight content of lactose of 56 g/L, i.e. a content relative to the solids content of 47% fat, 19% protein and 26% lactose.

[0138] The mixture obtained is then heated to 33°C and clotting is then performed by renneting. To this end, a dose of 75 ml/1000 L of rennet is added.

[0139] Clotting is completed in 40 minutes. The clotted blend is then heated to 55°C.

[0140] A cycle of draining off the whey is performed by draining off 1040 litres of whey.

[0141] The functionalization of the blend obtained after blending is performed directly in the cheesemaking vat. To this end, the temperature of the blend is maintained at 55°C, 15.5 kg of emulsifying salts based on orthophosphates and polyphosphates, and 6 kg of common salt are added, and shearing of the blend is performed in an appropriate blender. At the same time as the functionalization, 4.9 kg of citric acid are added to the blend.

[0142] The blend obtained has a weight content of solids of 323 g/L, a weight content of fat of 164 g/L, a weight content of protein of 67 g/L and a weight content of lactose of 49 g/L, i.e. a content relative to the solids content of 51% fat, 21% protein and 15% lactose.

[0143] The blend is then dried by atomization.

[0144] The processed cheese powder obtained has a weight content of solids of 96%, a weight content of fat of 50%, a weight content of protein of 20% and a weight content of lactose of 15%, i.e. a content relative to the solids content of 51% fat, 20.5% protein and 15% lactose.

[0145] Two reconstitutions of the processed cheese are performed:

[0146] The first reconstitution is performed by mixing 42% water and 58% processed cheese powder.

[0147] The reconstituted processed cheese obtained contains 41% by weight of solids, 21% by weight of fat and 8% by weight of protein, i.e. a content relative to the solids content of 51% fat and 19.5% protein.

[0148] The second reconstitution is performed by mixing 46% water and 54% processed cheese powder.

[0149] The reconstituted processed cheese obtained has a weight content of solids of 45%, a weight content of fat of 23% and a weight content of protein of 9%, i.e. a content relative to the solids content of 51% fat and 20% protein.

Example 9: Preparation of a functionalized and dried dairy blend for the preparation by reconstitution of a cheese product in the form of processed cheese portions

[0150] It is sought to prepare a functionalized dairy blend for the preparation by reconstitution of a cheese product in the form of processed cheese portions containing 45% by weight of solids, 20.5% by weight of fat and 10.5% by weight of protein, i.e. a content relative to the solids content of 46% fat and 30% protein.

[0151] The standardized dairy blend is prepared by mixing in a cheesemaking vat 275 litres of skimmed milk microfiltration retentate, 85 kg of skimmed milk microfiltration retentate powder and 235 litres of cream.

[0152] The dairy blend obtained has a weight content of solids of 390 g/L, a weight content of fat of 195 g/L and a weight content of protein of 120 g/L, i.e. a content relative to the solids content of 50% fat and 31% protein.

[0153] The blend obtained is then heated to 33°C and clotting is then performed by renneting. To this end, a dose of 170 ml/1000 L of rennet is added.

[0154] Clotting is completed in 30 minutes. The clotted blend is then heated to 55°C.

[0155] 100 litres of water are added to the vat. No draining is performed.

[0156] Next, 2.8 kg of citric acid are added to the blend and shearing of the blend is performed in an appropriate blender. The emulsion of the blend is obtained via this mechanical shear operation.

[0157] The blend obtained has a weight content of solids of 303 g/L, a weight content of fat of 110 g/L and a weight content of protein of 97 g/L, i.e. a content relative to the solids content of 36% fat and 32% protein.

[0158] The clotted and functionalized blend is then dried by atomization.

[0159] The processed cheese powder obtained has a weight content of solids of 97.5%, a weight content of fat of 41% and a weight content of protein of 35%, i.e. a content relative to the solids content of 42% fat and 35% protein.

Example 10: Preparation of a functionalized and dried dairy blend, and reconstitution of a cheese product of processed cheese type in the form of "slice on slice" slices and blocks

[0160] It is sought to prepare a cheese product of processed cheese type in the form of "slice on slice" slices and blocks, i.e. slices and blocks without individual wrapping, which have a firmness sufficient to be stacked and separated from each other.

[0161] It is sought for this cheese product to contain 54% by weight of solids, 27.5% by weight of fat, 17% by weight of protein and 4% by weight of lactose, i.e. a content relative to the solids content of 51% fat, 31.5% protein and 7.5% lactose.

[0162] The standardized dairy blend is prepared by mixing in a cheesemaking vat 1180 litres of whole milk, 80 kg of skimmed milk microfiltration or ultrafiltration retentate powder and 240 litres of cream.

[0163] The dairy blend obtained has a weight content of solids of 229 g/L, a weight content of fat of 100.5 g/L and a weight content of protein of 58 g/L and a weight content of lactose of 60 g/L, i.e. a content relative to the solids content of 44% fat, 25% protein and 26% lactose.

[0164] The blend obtained is then heated to 33°C, and clotting is then performed by renneting. To this end, a dose of 80 ml/1000 L of rennet is added. Clotting is completed in 20 minutes. The clotted blend is then heated to 55°C.

[0165] Three draining cycles are performed:

[0166] A first cycle of draining off the whey is performed by draining off 600 litres of whey. A volume of water equivalent to the volume drained off is added to the vat.

A second cycle of draining off the whey is performed by draining off 600 litres of whey. A volume of water equivalent to the volume drained off is added to the vat.

Finally, a third cycle of draining off the whey is performed by draining off 675 litres of whey.

[0167] The functionalization of the blend obtained after blending is performed directly in the cheesemaking vat. To this end, the temperature of the blend is maintained at 55°C, 13.3 kg of emulsifying salts based on orthophosphates, citrates and

polyphosphates, and 5.2 kg of common salt are added, and shearing of the blend is performed in an appropriate blender. At the same time as the functionalization, 3.6 kg of citric acid are added to the blend.

[0168] The blend obtained has a weight content of solids of 30 g/L, a weight content of fat of 15.5 g/L, a weight content of protein of 9 g/L and a weight content of lactose of 1.5 g/L, i.e. a content relative to the solids content of 51.5% fat, 30% protein and 5% lactose.

[0169] The clotted and functionalized blend is then dried by atomization.

[0170] The processed cheese powder obtained has a weight content of solids of 96%, a weight content of fat of 40%, a weight content of protein of 30% and a weight content of lactose of 8%, i.e. a content relative to the solids content of 49% fat, 31% protein and 8% lactose.

[0171] The reconstitution is performed by mixing 45% water and 55% processed cheese powder.

[0172] The reconstituted processed cheese obtained has a weight content of solids of 54%, a weight content of fat of 26.5%, a weight content of protein of 16.5%, a weight content of lactose of 4.4%, i.e. a content relative to the solids content of 49% fat, 30.5% protein and 8% lactose.

Example 11: Preparation of a functionalized and dried dairy blend, and reconstitution of a cheese product of cream cheese type

[0173] It is sought to prepare a cheese product of cream cheese type containing 46% solids, 32.5% fat, 8% protein and 2.5% lactose, i.e. a content relative to the solids content of 71% fat, 17% protein and 5% lactose.

[0174] The standardized dairy blend is prepared by mixing in a cheesemaking vat 440 litres of whole milk, 145 litres of water, 65 kg of skimmed milk microfiltration or ultrafiltration retentate powder and 550 litres of cream.

[0175] The dairy blend obtained has a weight content of solids of 324 g/L, a weight content of fat of 217 g/L, a weight content of protein of 51.5 g/L and a weight content of lactose of 33 g/L, i.e. a content relative to the solids content of 67% fat, 16% protein and 10% lactose.

[0176] The blend obtained is then heated to 33°C and clotting is then performed by renneting. To this end, a dose of 80 ml/1000 L of rennet is added.

[0177] Clotting is completed in 20 minutes. The clotted blend is then heated to 55°C.

[0178] A cycle of draining off the whey is performed by draining off 610 litres of whey.

[0179] The functionalization of the blend obtained after blending is performed directly in the cheesemaking vat. To this end, the temperature of the blend is maintained at 55°C, 4.5 kg of emulsifying salts based on orthophosphates, citrates and polyphosphates, and 3 kg of common salt are added, and shearing of the blend is performed in an appropriate blender. At the same time as the functionalization, 9 kg of citric acid are added to the blend.

[0180] The blend obtained contains 32% by weight of solids, 20.5% by weight of fat, 5.5% by weight of protein and 3% by weight of lactose, i.e. a content relative to the solids content of 64% fat, 17% protein and 9.5% lactose.

[0181] The clotted and functionalized blend is then dried by atomization.

[0182] The cream cheese powder obtained has a weight content of solids of 99%, a weight content of fat of 66% and a weight content of protein of 19%, i.e. a content relative to the solids content of 67% fat and 19% protein.

[0183] The reconstitution is performed by mixing 55% water and 45% cream cheese powder.

[0184] The reconstituted cream cheese obtained contains 44.5% solids, 30% fat and 8.5% protein, i.e. a content relative to the solids content of 67.5% fat and 19% protein.

Example 12: Preparation of a functionalized and dried dairy blend for the reconstitution of a cheese product of block type

[0185] It is sought to prepare a cheese product of block type containing 50% by weight of solids, 22.5% by weight of fat, 16% by weight of protein and 8% by weight of lactose, i.e. a content relative to the solids content of 45% fat, 32% protein and 16% lactose.

[0186] The standardized dairy blend is prepared by mixing in a cheesemaking vat 1275 litres of whole milk, 80 kg of milk powder and 125 litres of cream.

[0187] The dairy blend obtained has a weight content of solids of 211 g/L, a weight content of fat of 85 g/L, a weight content of protein of 47 g/L and a weight content of lactose of 72 g/L, i.e. a content relative to the solids content of 40% fat, 22% protein and 34% lactose.

[0188] The blend obtained is then heated to 32°C and clotting is then performed by renneting. To this end, a dose of 60 ml/1000 L of rennet is added.

[0189] Clotting is completed in 20 minutes. The clotted blend is then heated to 55°C.

[0190] A cycle of draining off the whey is performed by draining off 875 litres of whey.

[0191] The functionalization of the blend obtained after blending is performed directly in the cheesemaking vat. To this end, the temperature of the blend is maintained at 55°C, and 11.5 kg of emulsifying salts based on orthophosphates, citrates and lactates are added, and shearing of the blend is performed in an appropriate blender.

[0192] The blend obtained contains 32% by weight of solids, 14% by weight of fat and 8.5% by weight of protein, i.e. a content relative to the solids content of 44% fat and 27% protein.

[0193] The clotted and functionalized blend is then dried by atomization.

[0194] The cheese product powder obtained has a weight content of solids of 96%, a weight content of fat of 44% and a weight content of protein of 27%, i.e. a content relative to the solids content of 45% fat and 27.5% protein.

Eljárás sajt por előállítására, és eljárás sajt termék előállítására a sajt por rekonstrukciójával

SZABADALMI IGÉNYPONTOK

1. Eljárás sajt por előállítására sajt termék újjáalakítására, azzal jellemezve, hogy legalább az alábbi lépéseket tartalmazza:

- készítünk egy tej keveréket (1), melyet főként zsír és protein komponensek alkotnak, és amelynek a saját zsír- és protein tartalma a keverék (1) szilárd anyag tartalmára vonatkoztatva a sajt termékben az újjáalakítás után elérni kívánt megfelelő tartalom szerint van beállítva,
- beoltjuk (2) az előző lépésben kapott tej keveréket, koaguláljuk, és koagulátumot állítunk elő,
- az előző lépésben kapott koagulátumot felvágjuk (3), és sajt keveréket képezünk,
- az előző lépésben kapott sajt keveréket funkcionáljuk (5) legalább egy emulgeálási művelettel, és így funkcionalizált sajt keveréket kapunk,
- a funkcionalizált sajt keveréket megszártjuk (6), és sajt port képezünk (7), mely újjáalakítható egy folyékony komponenssel való összekeveréssel.

2. Az 1. igénypont szerinti eljárás, azzal jellemezve, hogy a tejkeverék készítéséhez alkalmazott komponensek pasztörizáltak, jellemezve továbbá azzal, hogy 65 °C hőmérséklet feletti lépést nem végzünk az említett eljárás során.

3. Az 1. vagy 2. igénypontok bármelyike szerinti eljárás, azzal jellemezve, hogy

- a tej keverék (1) zsírtartalmát szabályozott mennyiségű egy vagy több tej komponens, főként zsír, például teljes tej és/vagy tejszín hozzáadásával állítjuk be, és
- a tej keverék (1) protein tartalmát szabályozott mennyiségű, egy vagy több tej komponens, főleg protein, például teljes tej, és/vagy zsírszegény tej, és/vagy szérum protein koncentrátum, melyet szérum ultraszűrésével és/vagy zsírszegény tej mikro szűréséből és/vagy ultraszűréséből visszamaradva kaptunk, és/vagy zsírszegény tejpor és/vagy zsírszegény tej és/vagy tejszín mikro szűréséből vagy ultraszűréséből visszamaradt porként kaptunk, hozzáadásával állítjuk be.

4. Az előző igénypontok bármelyike szerinti eljárás, azzal jellemezve, hogy

- a tej keverék (1) szilárd anyag tartalmát egy vagy több, szabályozott mennyiségű tej komponens szárított formában a tej keverékhez (1) való hozzáadásával állítjuk be, te-



kintetbe véve a többi, a tej keverékben (1) folyékony formában lévő tej komponens szilárd anyag tartalmát, például sovány tejpor és/vagy sovány tej mikro szűréséből vagy ultraszűréséből visszamaradt por, figyelembe véve a relatív szérum protein koncentrációt tartalmát, melyet a szérum és/vagy a tej keverékben (1) lévő sovány tej és/vagy tejszín mikro szűréséből vagy ultraszűréséből visszamaradva kaptunk.

5. Az előző igénypontok bármelyike szerinti eljárás, azzal jellemezve, hogy egy vagy több egymás utáni dekantálási lépést (4) végzünk a koagulátum vágási lépés (3) után.

6. Az előző igénypontok bármelyike szerinti eljárás, azzal jellemezve, hogy a laktóz tartalmát a tej keverék (1) szilárd anyag tartalmára vonatkoztatva a tej keveréket (1) alkotó valamennyi komponens szabályozott mennyiségének hozzáadásával állítjuk be, és a sajt termékben az újjáalakítás utáni megfelelő, elérni kívánt laktóz tartalom szerint.

7. Az 5. vagy 6. igénypontok bármelyike szerinti eljárás, azzal jellemezve, hogy a laktóz tartalmát a tej keverék (1) szilárd anyag tartalmára vonatkoztatva úgy állítjuk be, hogy:

- a tej keverék (1) valamennyi komponensének szabályozott mennyiségét adagoljuk, és
- a dekantálási lépés vagy lépések alatt a tej szérum térfogatát szabályozzuk,

a sajt termékben az újjáalakítás utáni megfelelő, elérni kívánt laktóz tartalom szerint.

8. Az előző igénypontok bármelyike szerinti eljárás, azzal jellemezve, hogy a funkcionális lépés tartalmaz egy kémiai eljárással, 45 és 65 °C között végzett emulgeálási műveletet.

9. A 8. igénypont szerinti eljárás, azzal jellemezve, hogy az emulgeálást kémiai úton úgy végezzük, hogy legalább egy, citrátokon, difoszfát típusú foszfátokon, trifoszfátokon, polifoszfátokon és/vagy ortofoszfátokon és/vagy nátrium-laktátokon és/vagy kálium-laktátokon alapuló emulgeáló sókat adagolunk.

10. A 8. vagy 9. igénypontok bármelyike szerinti eljárás, azzal jellemezve, hogy a kémiai eljárással végzett emulgeálási eljárás után tartalmaz egy nyírási műveletet.

11. Az 1-7. igénypontok bármelyike szerinti eljárás, azzal jellemezve, hogy a funkcionális lépés tartalmaz egy mechanikai eljárással végzett emulgeálási műveletet, melynek során a szemcsék átlagos méretét kevesebb, mint 500 mikrométerre csökkentjük.

12. Az előző igénypontok bármelyike szerinti eljárás azzal jellemezve, hogy a szárítási lépést (6) porlasztva szárítással végezzük.

13. Funkcionalizált sajt por, melyet az 1-12. igénypontok bármelyike szerinti eljárással állítottunk elő.

14. Eljárás sajt termék előállítására, azzal jellemezve, hogy tartalmaz legalább egy újjáalakítási lépést, mely legalább egy keverési műveletet (8) foglal magában, a 13. igénypont szerinti sajt por (7) folyékony komponenssel, például vízzel való keverésére.

15. A 14. igénypont szerinti eljárás, azzal jellemezve, hogy a folyadék komponens aránya 40 és 65% közötti, és jellemezve azzal, hogy a sajt por (7) aránya 35 és 60% közötti.

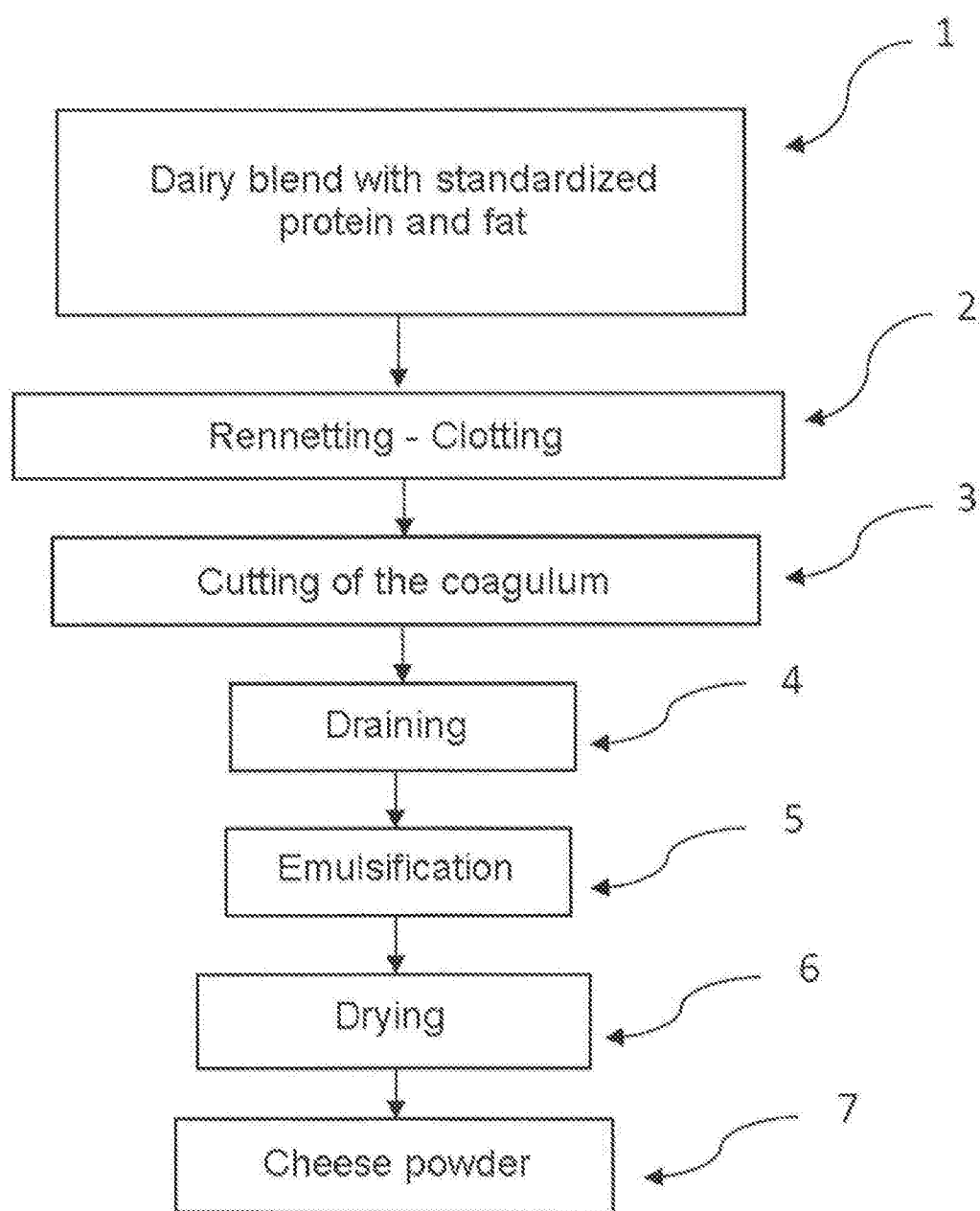


FIG 1

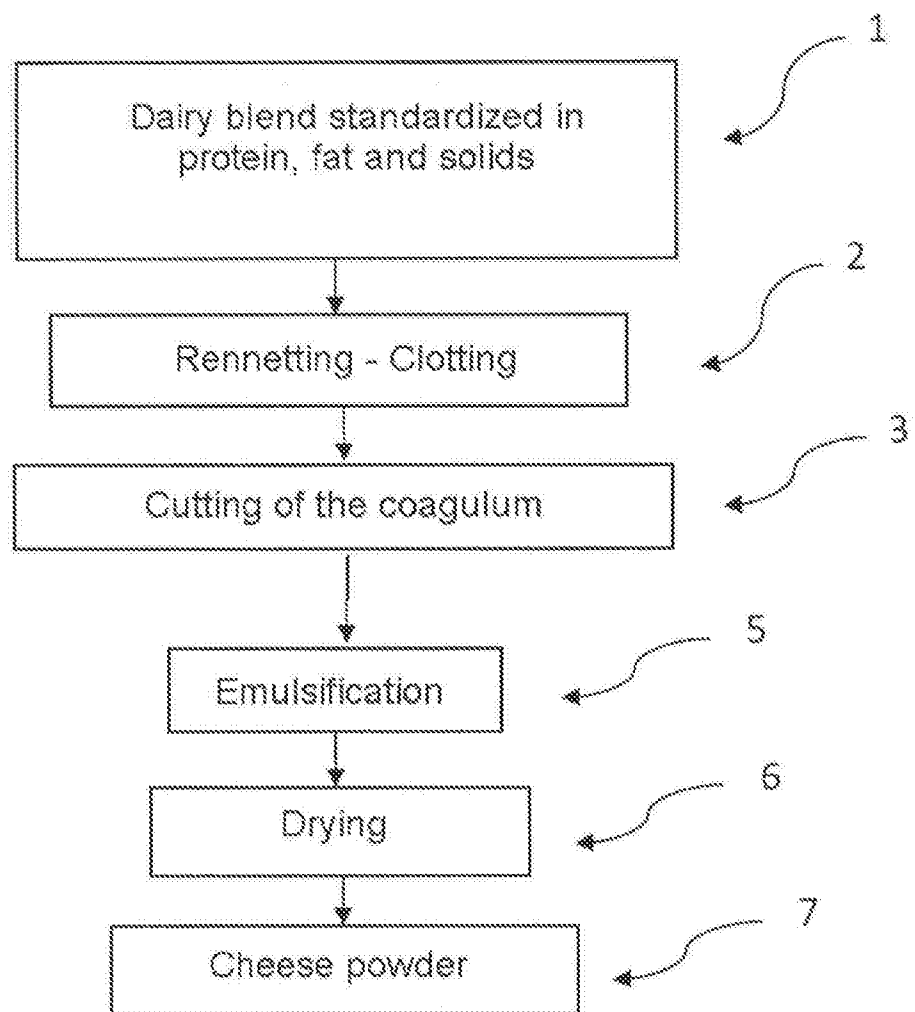


FIG 2

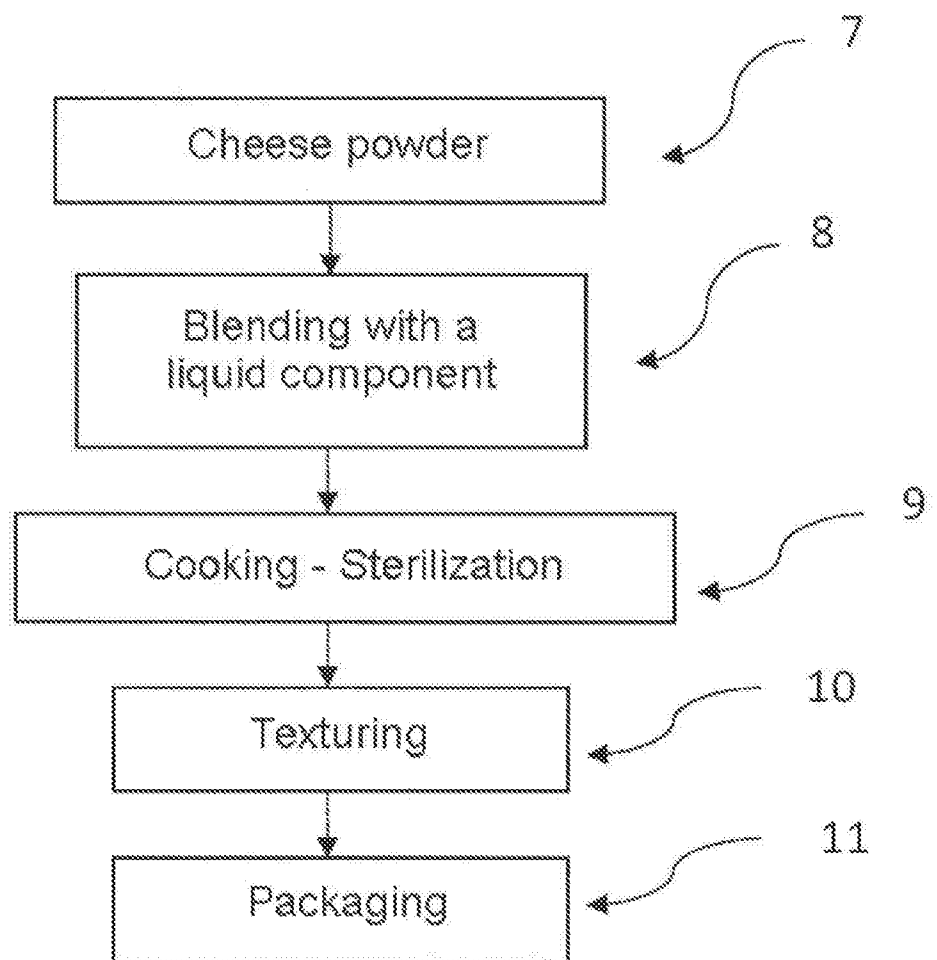


FIG 3