

DESCRIPTION

FRESH CREAM HAVING RICH MILK FLAVOR AND METHOD FOR MANUFACTURING THE SAME

Technical Field

[0001]

The present invention relates to a fresh cream having a rich milk flavor whose salty flavor is not emphasized despite the use of concentrated skim milk or powdered skim milk, and a method for manufacturing the same.

Background Art

[0002]

JP 2008-109940 A (Patent Literature 1 mentioned below) discloses a method for manufacturing a cream including conducting a membrane concentration treatment of raw milk, and centrifugal separating the concentrate. This document discloses filter treatments using a RO (reverse osmosis) membrane, a NF (nanofilter) membrane and an UF (ultrafiltration) membrane as examples of membrane concentration treatments. Furthermore, this literature discloses that water, potassium and sodium can be decreased by conducting a membrane concentration treatment using a nanofilter membrane (paragraph [0016]). In addition, Example 1 of this literature discloses a result of an embodiment in which raw milk having a solids-not-fat (SNF) concentration of 8.9% was subjected to a nanofilter membrane treatment to obtain concentrated milk having a SNF concentration of 13.4%, and this concentrated milk was centrifuged to obtain a cream (paragraph [0027]). In Example 1 of this literature, it is considered that the obtained cream had a fat content of 47.5% and a solids-not-fat content of 7%.

[0003]

JP 2002-51699 A (Patent Literature 2 mentioned below) discloses a method for manufacturing processed milk, including centrifugal separating raw milk and then conducting a reverse osmosis (RO) membrane treatment.

[0004]

JP 2002-253116 A (Patent Literature 3 mentioned below) discloses a method for manufacturing processed milk, by which a solids-not-fat concentration and a calcium concentration are increased and a sodium concentration is decreased by centrifugal separating raw material milk and then conducting a membrane treatment. This literature discloses processed milk that contains solids-not-fat by 10-12 wt%, and has a concentration ratio of calcium to sodium of 2.5-4 (paragraph [0009]).

Citation List

Patent Literature

[0005]

Patent Literature 1: JP 2008-109940 A

Patent Literature 2: JP 2002-51699 A

Patent Literature 3: JP 2002-253116 A

Summary of Invention

Technical Problem

[0006]

It was generally considered that the flavor of butter is improved by accentuating a salty flavor as in salted butter, and thus it was considered that there is no special problem when concentrated skim milk or powdered skim milk is directly used in the production of butter. On the other hand, it was considered that the flavor of flesh

cream is deteriorated by increasing a salty flavor, and thus it was considered that it was necessary to conduct a desalination treatment or the like since the salty flavor derived from concentrated skim milk or powdered skim milk is accentuated when the concentrated skim milk or powdered skim milk is directly used in the production of a fresh cream.

[0007]

An object of the present invention is to provide a fresh cream having a rich milk flavor without strong salty flavor despite the use of concentrated skim milk or powdered skim milk, and a method for manufacturing the same.

Solution to Problem

[0008]

The present invention is essentially based on the finding that a fresh cream having a rich milk flavor in which the salty flavor derived from concentrated skim milk or powdered skim milk has been suppressed can be obtained, when a milk fat content is adjusted to be slightly high and a content of solids-not-fat (SNF) is then increased by adding concentrated skim milk or powdered skim milk.

[0009]

A first aspect of the present invention relates to a method for manufacturing a fresh cream. This method for manufacturing a fresh cream includes a separation step (S101) and a dilution step (S102). This method may suitably include known steps in a method for manufacturing a fresh cream, including a pasteurization step (S103). By increasing a milk fat content in the separation step (S101), and then incorporating a milk ingredient with a high SNF and a low fat in the dilution step (S102), the fat content suppresses the salty flavor of the milk ingredient with a high SNF and a low fat, and

consequently a fresh cream having a rich milk flavor can be obtained.

[0010]

The separation step (S101) is a step of obtaining a separated cream having a fat rate of 51-65 mass% by centrifugal separating a raw material milk. The separated cream means a raw material cream having a fat content that has been increased by undergoing the separation step.

[0011]

The dilution step (S102) is a step of obtaining a diluted cream having a fat rate of 45-50 mass%, and a solids-not-fat content of 6-15 mass%, by adding either or both of concentrated skim milk and powdered skim milk to the separated cream. The diluted cream means a raw material cream having a fat rate that has been decreased by the dilution step. A preferable dilution step is such that the concentrated skim milk is added to the separated cream, by which a diluted cream having a fat rate of 45-50 mass% and a solids-not-fat content of 6-15 mass% is obtained, from the viewpoints of flavor and production properties (easiness of mixing) and the like.

[0012]

The pasteurization step (S103) is a step of pasteurizing the diluted cream. The pasteurization step is generally a step of killing or decreasing common bacteria and the like included in the diluted cream by retaining the diluted cream at a constant temperature for a constant time. Generally, the pasteurized diluted cream is cooled after the pasteurization step.

[0013]

A second aspect of the present invention relates to a fresh cream produced by any of the manufacture methods mentioned above. In this fresh cream, the fat rate has not been changed so significantly, whereas the solids-not-fat content has been enhanced

as compared to those of general and conventional fresh creams. At this time, this fresh cream has a rich milk flavor and thus is tasty, despite that the fresh cream is supposed to have a strong salty flavor and thus is not tasty. The reason therefor is considered that the salt ingredient derived from the concentrated skim milk or powdered skim milk is suitably surrounded by the fat ingredient of the fresh cream, and consequently the salty flavor is suppressed.

Advantageous Effects of Invention

[0014]

According to the present invention, a fresh cream having a rich milk flavor, and a method for manufacturing the same can be provided.

Brief Description of Drawings

[0015]

Fig. 1 shows graphs as substitutes for drawings which show the result of the aroma analysis of the fresh cream of the present invention.

Fig. 2 shows graphs as substitutes for drawings which show the result of the sensory evaluation of the fresh cream of the present invention.

Description of Embodiments

[0016]

A first aspect of the present invention relates to a method for manufacturing a fresh cream. This method for manufacturing a fresh cream includes a separation step (S101) and a dilution step (S102). This method may suitably include steps that are known in a method for manufacturing a fresh cream, including a pasteurization step

(S103). The fresh cream is a known one as disclosed in, for example, JP 4736893 B1 and the publications cited in the present specification. In the Ministerial Ordinance on Milk and Milk products Concerning Compositional Standards, etc., a fresh cream is defined as “raw milk, cow milk or special cow milk from which ingredients other than milk fat have been removed”.

[0017]

General methods for producing a fresh cream have been already known. In the present invention, a fresh cream can be produced by using an already-known apparatus for producing a fresh cream and suitably adopting conditions that are known to a person skilled in the art. The method for producing a fresh cream will be explained below. However, the present invention is not limited to the following examples, and also includes examples in which the examples explained below are suitably modified within a scope that is obvious to a person skilled in the art.

[0018]

In the method for manufacturing a fresh cream of the first aspect of the present invention, by increasing a milk fat content in the separation step (S101) and incorporating a milk ingredient having a high SNF and a low fat in the dilution step (S102), the salty flavor of the milk ingredient having a high SNF and a low fat is suppressed by the fat content, and consequently, a fresh cream having a rich milk flavor can be obtained.

[0019]

The raw material milk used in the method for manufacturing a fresh cream of the present invention may be raw milk (unpasteurized milk) or non-homogenized milk (pasteurized milk), and an example of the milk is cow milk.

[0020]

The separation step (S101) is a step of centrifugal separating a raw material milk to obtain a separated cream. The separated cream means a raw material cream in which the fat content has been increased by undergoing the separation step. The fat rate of the separated cream is preset considering the aspects of flavor such as the salty flavor, rich taste and milk flavor of the fresh cream as a final product of the diluted cream, the aspects of physical properties such as emulsification stability, whipping time and overrun, and the like. The fat rate of the separated cream is 51-65 mass%, preferably 52-60 mass%, more preferably 53-58 mass%. The centrifugation may be conducted by using a known centrifuge. The conditions for the centrifugation are known. Examples of the conditions for the centrifugation are 1,000-10,000 G and 1 second -10 minutes. By adjusting the rotation velocity and centrifugation time for the centrifugation, the fat rate, solids-not-fat content, water content and the like included in an actually obtained separated cream can be adjusted.

[0021]

The dilution step (S102) is a step of obtaining a diluted cream by adding either or both of concentrated skim milk and powdered skim milk to the separated cream. The diluted cream means a raw material cream in which the fat rate has been decreased by the dilution step. The fat rate of this diluted cream is preset considering the aspects of flavor such as the salty flavor, rich taste and milk flavor of the fresh cream as a final product, the aspects of physical properties such as emulsification stability, whipping time and overrun, and the like. The fat rate of the diluted cream is 45-50 mass%, preferably 46-49 mass%, more preferably 47-48 mass%. Furthermore, the solids-not-fat content in the diluted cream is 6-15 mass%, preferably 7-13 mass%, more preferably 8-12 mass%. From the viewpoints of flavor, production properties (easiness of mixing) and the like, a preferable dilution step is a step of adding concentrated skim

milk to the separated cream, by which a diluted cream having a fat rate of 45-50 mass% (preferably 46-49 mass%, more preferably 47-48 mass%) and a solids-not-fat content of 6-15 mass% (preferably 7-13 mass%, more preferably 8-12 mass%) is obtained.

[0022]

The concentrated skim milk includes concentrated partially-skimmed milk, and may also be a whey concentrated liquid or the like. The powdered skim milk includes powdered partially-skimmed milk, and may also be a whey powder, a whey protein concentrate (WPC), a whey protein isolate (WPI), casein, sodium caseinate, calcium caseinate, a milk protein concentrate (MPC) or the like. Among these, from the viewpoint of effective improvement of a natural milk flavor, concentrated skim milk, concentrated partially-skimmed milk, powdered skim milk and powdered partially-skimmed milk are preferable.

[0023]

The pasteurization step (S103) is a step of pasteurizing the diluted cream to kill or decrease common bacteria and the like contained in the diluted cream. The pasteurization step in the present invention includes complete killing or decreasing common bacteria and the like, as well as a sterilization step and the like. Examples of the pasteurization method are known methods including direct heating pasteurization (an injection system, an infusion system), indirect heating pasteurization (a plate system, a tubular system, a shell & tube system, a surface scraping system), internal heating pasteurization (an energization system, a microwave system, a high frequency wave system, a far infrared ray system), overheating water vapor pasteurization, retort pasteurization, ultraviolet pasteurization, high pressure pasteurization, electrolysis magnetic field pasteurization, radiation pasteurization and chemical pasteurization. By retaining the diluted cream at a constant temperature for a constant time, in the case

when common bacteria and the like contained in the diluted cream are to be pasteurized, ultra-high temperature pasteurization (UHT) or a high temperature-short time (HTST) pasteurization process may be conducted. In general, after the pasteurization step, the pasteurized diluted cream is cooled. The ultra-high temperature pasteurization (UHT) is, for example, a treatment for pasteurizing at 110-150°C (preferably 120°C-140°C, more preferably 120°C-130°C) for 1 second - 30 seconds (preferably 1 second - 10 seconds, more preferably 1 second - 5 seconds). The high temperature-short time (HTST) pasteurization process is, for example, pasteurization at 60-100°C (preferably 70-100°C, more preferably 72-75°C) for 5 seconds - 5 minutes (preferably 5 seconds - 1 minute, more preferably 10 seconds - 30 seconds).

[0024]

A second aspect of the present invention relates to a fresh cream produced by any of the manufacture methods mentioned above. In this fresh cream, the fat rate has not been changed so significantly, whereas the solids-not-fat content has been enhanced as compared to those of general and conventional fresh creams. In this case, this fresh cream has a rich milk flavor and thus is tasty, despite that the fresh cream is supposed to have a strong salty flavor and thus is not tasty. The reason therefor is considered that the salt ingredient derived from the concentrated skim milk or powdered skim milk is suitably surrounded by the fat ingredient of the fresh cream, and consequently the salty flavor is suppressed.

Examples

[0025]

Example 1

Raw milk was centrifuged so that the fat rate became 55 mass%, whereby a

raw material cream was obtained. Furthermore, this raw material cream was mixed with concentrated skim milk with a solids-not-fat content of 33 mass%, and the fat rate was adjusted so as to be 47.5 mass%, whereby a diluted cream was obtained. The diluted cream was then pasteurized (120°C, 15 seconds) and cooled (5°C) to obtain a fresh cream. The obtained fresh cream had a fat rate of 47 mass%, and contained a solids-not-fat content at a ratio of 8 mass%.

[0026]

Comparative Example 1

Raw milk was centrifuged so that the fat rate became 47.5 mass%, whereby a raw material cream was obtained. This raw material cream was pasteurized (120°C, 15 seconds) and cooled (5°C), whereby a fresh cream was obtained. The obtained fresh cream had a fat rate of 47 mass%, and contained a solids-not-fat content at a ratio of 4.7 mass%.

[0027]

The physical properties of the fresh creams obtained in Example 1 and Comparative Example 1 were compared. The result is shown in Table 1.

[0028]

[Table 1]

Table 1. Comparison of physical properties and flavors of product of present invention and control product		
	Control product	Product of present invention
Emulsification stability [%]	100	90
Whipping time	3 min 05 sec	2 min 55 sec
Overrun [%]	100	88
Flavor	Fine	Considerably fine (rich milk taste)
Comprehensive evaluation	○	◎

[0029]

The emulsification stability was calculated with deeming the time required for the agglomeration of the control product of Comparative Example 1 as 100 when a fresh cream (100 g) was put into a beaker (200 ml), and the fresh cream was retained at an ordinary temperature (25°C) and shaken at 120 times/min, and evaluated by a relative numerical value.

[0030]

The whipping time was represented by a time required by the fresh cream to reach an optimum whipping (foamed) state when sugar was added to the fresh cream so as to be 7 mass%, and the fresh cream was whipped by using a hand mixer.

[0031]

The overrun was calculated by the following formula as an increase rate (increase ratio) of the volume of the fresh cream.

[0032]

$$\frac{([\text{The weight of the cream with a certain volume}] - [\text{the weight of the cream with a certain volume after foaming}])}{[\text{the weight of the cream with a certain volume after foaming}]} \times 100 [\%]$$

[0033]

In the fresh cream of Example 1, the viscosity was felt to be somewhat high in the aspect of physical properties as compared to that of the fresh cream (control product) of Comparative Example 1. However, although the emulsification stability, whipping time and overrun showed slightly small numerical values in the fresh cream of Example 1 as compared to those of the control product, the fresh cream was fine as a whole in the aspect of physical properties. Furthermore, the fresh cream of Example 1 was better in the aspect of flavor as compared to the control product since a rich milk flavor (milk feeling) was felt strongly. In addition, in the fresh cream of Example 1,

the comprehensive evaluation was finer than that of the control product.

[0034]

Analysis of aroma ingredients

For the fresh creams obtained in Example 1 and Comparative Example 1, the aroma ingredients were analyzed. The results are shown in Table 2 and Fig. 1. 2.5 g of each sample was collected in a 20 ml vial bottle, 50 ng of methyl isobutyl ketone was added thereto as an internal standard, and the bottle was sealed airtight and warmed at 60°C for 40 minutes. The ingredients volatilized in the head space were collected by solid phase microfibers (SUPELCO Stable Flex Carboxene/PDMS, 1 cm) and subjected to a GC/MS analysis (n=3). The analysis conditions for the GC/MS were as follows. As to the detected surface areas of the respective compounds, the sulfur compounds (DMS, DMDS, DMTS) were measured by a selective ion monitoring (SIM) process, and the other compounds were measured by a total ion monitoring process.

[0035]

Column: DB-WAX

Temperature raising: 40°C (5 min) - 15°C/min - 250°C (10 min)

Mode: SIM/TIM simultaneous measurement

SIM-extracted ions of sulfur compounds: 62, 94, 126 (m/z)

[0036]

[Table 2]

	RT	Comparative Example 1	Example 1	
Methyl isobutyl ketone	5.073	100	100	
2-Heptanone	8.536	580	312	Heating of fat
2-Nonanone	11.085	60	34	Heating of fat
Hexanal	6.773	5.16	18	Oxidation of fat derived from raw milk
d-Decalactone	17.395	27.29	18	Oxidation of fat (heating and change over time)
d-Dodecalactone	18.774	3.61	2.88	Oxidation of fat (heating and change over time)
Furfural	11.620	0.98	0.87	Heating of sugar (Maillard)
Acetone	2.246	3,645	2,697	Derived from raw milk
2-Butanone	3.005	3,891	1,398	Derived from raw milk
Butanoic acid	13.327	130	115	Handling of raw milk
Hexanoic acid	15.041	183	203	Handling of raw milk
Octanoic acid	16.689	124	99	Handling of raw milk
Dimethylsulfide (DMS)	1.929	195	35	Derived from raw milk
Dimethyldisulfide (DMDS)	6.519	0.380	0.612	Oxidation of protein by heating
Dimethyltrisulfide (DMTS)	10.988	0.150	0.329	Oxidation of protein by heating

[0037]

From Table 2 and Fig. 1, it was found that the aroma ingredients derived from raw milk were many in the fresh cream of Comparative Example 1. On the other hand, it was found that the aroma ingredients derived from oxidation by heating were many in the fresh cream of Example 1. In other words, very thick aroma was created in the fresh cream of Example 1. The reason is considered to be derived from that the fresh cream of Example 1 contained more mineral ingredients and protein ingredients than those in the fresh cream of Comparative Example 1.

[0038]

Sensory Evaluation

The fresh cream obtained in Example 1 was subjected to sensory evaluation by 24 expert panels. The result is shown in Table 3 and Fig. 2.

[0039]

[Table 3]

Frequency distribution

	Pure	Fresh milk flavor	Egg-like odor	Sweetness	Continuity, mouthfeel and thickness (richness)	Fineness of aftertaste	Comprehensive evaluation
3	0	0	0	0	0	0	0
2	1	1	5	6	11	1	4
1	2	7	4	8	6	5	4
0	1	1	10	4	4	3	4
-1	10	8	4	2	1	11	8
-2	8	5	1	4	2	3	4
-3	1	1	0	0	0	0	0
Total	23	23	24	24	24	23	24

[0040]

From Table 3 and Fig. 2, it was found that the fresh cream of Example 1 provided excellent continuity, mouthfeel and thickness.

[0041]

Example 2

A cream brulee was produced by using the fresh cream of Example 1. 500 g in total of raw materials were used, which were 290 g of the fresh cream of Example 1, 70 g of cow milk, 90 g of egg yolk and 50 g of granulated sugar. The egg yolk was mixed with the granulated sugar, and the mixture was stirred by a hand mixer until the entirety got clouded whitely. The cow milk was warmed to 50°C, and the stirred product of the egg yolk and granulated sugar and the fresh cream were added thereto, and the mixture was stirred thoroughly. The obtained mixture was poured into cocottes. Each cocotte was baked by being retained for 40 to 50 minutes in an oven that had been pre-heated by an upper heater of 150°C and a lower heater of 160°C. By this way, a cream brulee was obtained.

[0042]

The obtained cream brulee did not have a strong salty flavor, and was excellent in flavor and thus a fine cream brulee. A rich milk flavor was maintained also in the

case when the fresh cream of Example 1 was used as a raw material for a cream brulee.

[0043]

Example 3

A mousse was produced by using the fresh cream of Example 1. 500 g in total of raw materials were used, which were 200 g of the fresh cream of Example 1, 248.5 g of cow milk, 42.5 g of granulated sugar and 9 g of gelatin. The cow milk was warmed to 70°C, the granulated sugar and gelatin were added thereto, and the mixture was mixed thoroughly. The obtained mixture was cooled by ice water, and stirred slowly until thickness was exhibited. The fresh cream that had been whipped until half whipped was added to the obtained stirred product, and the mixture was filled in a container. Thereafter, the mixture was retained and cooled in a refrigerator (5°C) in each container. By this way, a mousse was obtained.

[0044]

This obtained mousse did not have a strong salty flavor, and was excellent in flavor and thus a fine mousse. A rich milk flavor was maintained also in the case when the fresh cream of Example 1 was used as a raw material for a mousse.

CLAIMS

1. A method for manufacturing a fresh cream, comprising:
a separation step of centrifugal separating a raw material milk to obtain a separated cream having a fat rate of 51-65 mass%, and
a dilution step of adding either or both of concentrated skim milk and powdered skim milk to the separated cream to obtain a diluted cream having a fat rate of 45-50 mass%, and a solids-not-fat content of 6-15 mass%.
2. The method for manufacturing a fresh cream according to claim 1, wherein the dilution step is a step of adding the concentrated skim milk to the separated cream to obtain a diluted cream having a fat rate of 45-50 mass%, and a solids-not-fat content of 6-15 mass%.
3. The method for manufacturing a fresh cream according to claim 1, further comprising a pasteurization step of pasteurizing the diluted cream after the dilution step.
4. A fresh cream produced by the method for manufacturing a fresh cream according to any of claims 1 to 3.