

Description
Title of Invention
METHOD FOR CRYSTALLIZING FAT AND/OR OIL

Technical Field

[0001]

The present invention relates to a method for crystallizing a fat and/or oil containing an SUS-type triglyceride, where SUS represents a 2-unsaturated, 1,3-disaturated glyceride, S represents a saturated fatty acid having from 16 to 22 carbons, and U represents an unsaturated fatty acid having 18 carbons.

Background Art

[0002]

Interesterified oils obtained by selectively introducing a saturated fatty acid into the 1- and 3-positions of shea butter, sal fat, Allanblackia fat, palm oil, or high-oleic sunflower oil contain a large amount of symmetric triglyceride (SUS), such as StOSt, POSt, or POP, where St represents stearic acid, O represents oleic acid, and P represents palmitic acid. From these SUS-containing fats and/or oils, various fats and/or oils for chocolate and cocoa butter alternative fats similar to cocoa butter are produced.

The fats and/or oils described above can be used as they are in products used for confectionery, such as chocolate, cream, and margarine. However, to obtain a high-quality cocoa butter alternative fat having good snap, heat-resistant shape-retaining properties, and good cold "melt-in-the-mouth" qualities for chocolate, an SUS is often concentrated in its crystal fraction.

[0003]

As a dry fractionation method to obtain a crystal fraction with high SUS content in a higher yield, a static crystallization method has been proposed. Patent Document 1 discloses a method in which a stable crystal seed of β, β prime is added at a temperature higher by 3 to 10°C than the freezing point temperature of a raw material fat and/or oil, and after crystallization to a certain extent, a paste-like crystal slurry is transferred to a press bag and further statically crystallized, and then the slurry is pressured and pressed by a stacking press. However, this method has had a problem in that crystallization requires a long time as well as many steps and considerable labor.

[0004]

Patent Document 2 is a method in which a completely melted raw material fat and/or oil is allowed to stand and rapidly cooled and solidified to deposit unstable crystals, then allowed to stand at a temperature lower by 1 to 15°C than the melting point of stable crystals to deposit granular stable crystals. Then, the crystal mass is mechanically slurried and separated by a filter press. However, this method has a complicated process requiring several apparatuses, such as a cooler for rapid cooling and solidification, a storage for stable crystallization, and an apparatus

for slurring the crystal mass, as well as requiring a long time for stable crystallization, which is a problem.

[0005]

Patent Document 3 filed by the present applicant is a method in which a completely melted raw material fat and/or oil is pre-cooled then dispensed into trays arranged in multiple stages, allowed to stand for crystallization by air cooling, and after completion of the crystallization, the crystals are mechanically ground into a slurry and this slurry is separated by a press filter. However, this method is undesirable because the filtrate is held in the crystals, and the fractionation precision is somewhat insufficient for fractionating an SUS-containing fat and/or oil.

[0006]

Patent Document 4 is an improved method of the method of Patent Document 3 by the present applicant, in which a completely melted raw material fat and/or oil is statically crystallized on a tray by air-cooling, then the crystals are mechanically ground into a slurry and press-filtered, and a melted and temperature-adjusted raw material fat and/or oil is added to the pressed cake and mixed, and then the mixture is press-filtered again to obtain a fraction with high SUS content. This method has a complicated process and the air-cooling equipment is large and expensive.

[0007]

On the other hand, a countercurrent dry fractionation method as described in Patent Document 5 has been proposed as a stirring crystallization method in which a fat and/or oil with a large amount of crystals is crystallized with stirring. The method includes at least a two-step dry fractional crystallization process in which a second olein fraction is recirculated to a first olein fraction to reduce the crystal amount and adjust the crystal amount in stirring crystallization to an acceptable range. However, this process is complicated and difficult to control, and applicable fats and/or oils are limited to palm oil, palm kernel oil, beef tallow, butterfat, fish oil, and mixtures of those, or partially hydrogenated oils and interesterified oils of those fats and/or oils. Thus, it has been difficult to apply the method to a fat and/or oil containing a large amount of StOSt.

[0008]

Patent Document 6 is a method for obtaining a crystal fraction rich in SUS in a high yield simply and easily even by a stirring crystallization method. More specifically, Patent Document 6 is a crystallization method in which stirring crystallization is performed in multiple stages.

Citation List

Patent Literature

[0009]

Patent Document 1: JP 60-101197 A

Patent Document 2: JP 2005-60523 A

Patent Document 3: JP 02-14290 A
Patent Document 4: WO 2005/063952
Patent Document 5: JP 03-41195 A
Patent Document 6: WO 2010/089973

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Summary of Invention

Technical Problem

[0010]

10 The method of Patent Document 6 involves performing the crystallization process and filtration process multiple times, and the processes are complicated.

[0011]

15 An object of an embodiment of the present invention is to provide a method for crystallizing a fat and/or oil, the method capable of simply and easily obtaining a crystal fraction in high yield in a fractionation process of a fat and/or oil containing an SUS-type triglyceride.

Solution to Problem

[0012]

20 As a result of diligent studies, the present inventors have found a method for simply and easily obtaining a crystal fraction rich in an SUS-type triglyceride in high yield by combining preparing for crystallization by holding a raw material fat and/or oil at a temperature not lower than its melting point, and performing crystallization by cooling the resulting fat and/or oil to deposit crystals, and completed the present invention.

[0013]

25 That is, the present invention is:

(1) a method for crystallizing a fat and/or oil, the method including:

30 preparing for crystallization by melting a raw material fat and/or oil containing an SUS-type triglyceride, where S represents a saturated fatty acid having from 16 to 18 carbons, and U represents a monounsaturated fatty acid having 18 carbons, then cooling the melted raw material fat and/or oil and holding the melted raw material fat and/or oil at a temperature not lower than the melting point and not higher than the melting point plus 10°C; and

performing crystallization by cooling the resulting fat and/or oil to deposit crystals;

(2) the method for crystallizing a fat and/or oil according to (1), wherein the step of preparing for crystallization is performed for 0.5 hours or more and 30 hours or less;

35 (3) the method for crystallizing a fat and/or oil according to (1) or (2), wherein the step of preparing for crystallization is performed by stirring in a vessel, and the step of performing crystallization is performed by allowing to stand in a vessel;

(4) the method for crystallizing a fat and/or oil according to (1) or (2), wherein shea butter is used as the raw material fat and/or oil;

(5) the method for crystallizing a fat and/or oil according to (3), wherein shea butter is used as the raw material fat and/or oil;

(6) a method for crystallizing a fat and/or oil, wherein a crystal form of a crystal slurry obtained by the method for crystallizing a fat and/or oil described in (1) or (2) is a β form;

5 (7) a method for crystallizing a fat and/or oil, wherein a crystal form of a crystal slurry obtained by the method for crystallizing a fat and/or oil described in (3) is a β form;

(8) a method for crystallizing a fat and/or oil, wherein a crystal form of a crystal slurry obtained by the method for crystallizing a fat and/or oil described in (4) is a β form;

10 (9) a method for crystallizing a fat and/or oil, wherein a crystal form of a crystal slurry obtained by the method for crystallizing a fat and/or oil described in (5) is a β form;

(10) a method for fractionating a fat and/or oil, the method obtaining a crystal part with an StOSt content of 40 mass% to 70 mass%, where St represents stearic acid and O represents oleic acid, from a crystal slurry obtained by the method for crystallizing a fat and/or oil described in (1) or (2);

15 (11) a method for fractionating a fat and/or oil, the method obtaining a crystal part with an StOSt content of 40 mass% to 70 mass%, where St represents stearic acid and O represents oleic acid, from a crystal slurry obtained by the method for crystallizing a fat and/or oil described in (3);

20 (12) a method for fractionating a fat and/or oil, the method obtaining a crystal part with an StOSt content of 40 mass% to 70 mass%, where St represents stearic acid and O represents oleic acid, from a crystal slurry obtained by the method for crystallizing a fat and/or oil described in (4) or (5); and

25 (13) a method for fractionating a fat and/or oil, the method obtaining a crystal part with an StOSt content of 40 mass% to 70 mass%, where St represents stearic acid and O represents oleic acid, from a crystal slurry obtained by the method for crystallizing a fat and/or oil described in any of (6) to (9).

Advantageous Effects of Invention

[0014]

30 According to an embodiment of the present invention, a crystal fraction rich in an SUS-type triglyceride can be simply and easily obtained in high yield.

Dry fractionation of an StOSt-containing fat and/or oil has a strong tendency to cause thickening or solidification of the crystal slurry along with an increase in the amount of crystals and may make it difficult to separate the crystal fraction and the filtrate fraction. However, the
35 present invention enables efficient fractionation of an StOSt-containing fat and/or oil as a preferred embodiment.

Description of Embodiments

[0015]

For a raw material fat and/or oil according to an embodiment of the present invention, a fat and/or oil containing an SUS-type triglyceride, where S represents a saturated fatty acid having from 16 to 18 carbons, and U represents a monounsaturated fatty acid having 18 carbons, is used. Although the SUS concentration is not limited, the SUS is preferably used in a range of 20 mass% or more and 50 mass% or less as a raw material fat and/or oil according to an embodiment of the present invention. The content is more preferably 20 mass% or more and 40 mass% or less.

Examples of the fat and/or oil containing an SUS-type triglyceride include an StOSt-containing fat and/or oil, where St represents stearic acid and O represents oleic acid, and a POP-containing fat and/or oil, where P represents palmitic acid and O represents oleic acid.

Examples of the StOSt-containing fat and/or oil include shea butter, sal fat, Allanblackia fat, or an interesterified oil obtained by selectively introducing stearic acid into the 1- and 3-positions of a fat and/or oil rich in oleic acid in the 2-position of triglyceride. Examples of the POP-containing fat and/or oil include palm oil and palm-based fat and/or oil containing fractionated palm oil. An StOSt-containing fat and/or oil or a POP-containing fat and/or oil of these can be subjected as a raw material fat and/or oil to a method for crystallizing according to an embodiment of the present invention.

The SUS is more preferably a raw material fat and/or oil containing StOSt as a main component. In an embodiment of the present invention, this SUS can be used as a raw material fat and/or oil regardless of whether it is decolorized and/or deodorized.

[0016]

In a more preferred embodiment, shea butter is preferably used as the raw material fat and/or oil containing StOSt as a main component.

The method for producing the shea butter to be used can be used without particular limitation. A degummed shea butter not decolorized or deodorized is more preferably used as the raw material fat and/or oil.

[0017]

In an embodiment of the present invention, a raw material fat and/or oil is melted and then subjected to a step of preparing for crystallization. The raw material fat and/or oil is melted by warming preferably to its melting point plus 20°C or higher, more preferably to its melting point plus 20°C or higher and its melting point plus 50°C or lower, even more preferably to its melting point plus 20°C or higher and its melting point plus 40°C or lower, and still more preferably to its melting point plus 20°C or higher and its melting point plus 35°C or lower.

[0018]

The melting point in an embodiment of the present invention is a numerical value obtained by calculation from an endothermic peak of DSC. An example of the measurement method is collecting approximately from 3 to 7 mg of a sample fat and/or oil in an aluminum container, melting the sample completely at 60°C, cooling the sample fat and/or oil in a completely melted state at 60°C to 15°C at a cooling rate of -5°C/min, then heating the sample

fat and/or oil to a melted state at a heating rate of +5°C/min, and defining the temperature at the intersection of the baseline at which the endotherm is completely eliminated by heating and the rising line returning from the last endotherm to the baseline as the melting point.

[0019]

5 A method for crystallizing a fat and/or oil according to an embodiment of the present invention includes preparing for crystallization by holding the melted raw material fat and/or oil at a temperature not lower than its melting point and not higher than its melting point plus 10°C. The melted raw material fat and/or oil is preferably held and cooled at a temperature not lower than its melting point and not higher than its melting point plus 5°C.

10 [0020]

An embodiment of the present invention includes performing crystallization by cooling the resulting fat and/or oil to deposit crystals after the step of preparing for crystallization. A crystal slurry is obtained by the step of performing crystallization.

15 The holding temperature in the step of performing crystallization is preferably not lower than the melting point minus 20°C and not higher than the melting point, more preferably not lower than the melting point minus 15°C and not higher than the melting point, and even more preferably not lower than the melting point minus 10°C and not higher than the melting point.

[0021]

20 In an embodiment of the present invention, the step of preparing for crystallization is preferably performed for 0.5 hours or more and 30 hours or less, more preferably for 0.5 hours or more and 25 hours or less, and even more preferably for 0.5 hours or more and 20 hours or less.

The step of performing crystallization is preferably performed for 5 hours or more and 30 hours or less and more preferably for 10 hours or more and 25 hours or less.

[0022]

25 In a preferred embodiment of the present invention, the step of preparing for crystallization is performed by stirring in a vessel, and the step of performing crystallization is performed by allowing to stand in a vessel.

30 An example of a production apparatus that can be utilized in the step of preparing for crystallization is a crystallizer equipped with a stirrer and a cooler. In particular, the method eliminates concern about crystal adhesion to the wall surface, and the stirring blade is not limited to a scraping blade. In addition, a known method can be used for cooling, and the cooling may be performed in a vessel, or a fat and/or oil cooled by a heat exchanger outside a vessel may be used. For cooling in a vessel, a jacket type vessel or a coil type vessel can be used.

35 An example of a production apparatus that can be utilized in the step of performing crystallization is an air-cooled tray crystallizer. Additionally, a water-cooled static crystallizer (US 7258846) may be used, although this is not shown in experimental examples.

[0023]

A preferred embodiment of the method for crystallizing of an embodiment of the present invention is preferably a state in which crystals are not deposited after the step of preparing for

crystallization. The phrase "state in which crystals are not deposited" means that the amount of crystals is less than 2% and preferably 1.5% or less in terms of solid fat content. The solid fat content can be simply and easily measured by NMR-pulse technique with a solid fat measuring device available from BRUKER Corporation or the like.

[0024]

In a preferred embodiment, the crystal slurry obtained by the method for crystallizing a fat and/or oil according to an embodiment of the present invention has a β crystal form as measured by X-ray diffraction. It is speculated that controlling the crystal form to the β form would lead to good pressability and enable efficient fractionation of the crystal fraction and the filtrate fraction.

[0025]

In the present specification, the crystal form can be measured and identified by X-ray diffraction. Specifically, when the short interplanar spacing of a fat and/or oil crystal is measured in a range of 2θ : 17 to 26 degrees, and a diffraction peak corresponding to interplanar spacing of 4.5 to 4.7 Å is detected and strong diffraction peaks corresponding to interplanar spacings of 4.1 to 4.3 Å and 3.8 to 3.9 Å are not detected, the fat and/or oil crystal is determined to contain the β crystal. In addition, when strong diffraction peaks corresponding to interplanar spacings of 4.1 to 4.3 Å and 3.8 to 3.9 Å are detected and a diffraction peak corresponding to the interplanar spacing of 4.5 to 4.7 Å is not detected, the fat and/or oil crystal is determined to contain a β prime crystal.

[0026]

The crystal slurry obtained by the method for crystallizing a fat and/or oil according to an embodiment of the present invention is press-filtered, whereby a crystal part containing an SUS-type triglyceride can be obtained. Using a degummed shea butter not decolorized or deodorized can provide a crystal part with an StOSt content of 40 mass% to 70 mass% preferably, and more preferably of 45 mass% to 60 mass% in a yield of 40 mass% to 60 mass%.

[0027]

The press filtration process is exemplified as follows.

- The crystal slurry obtained by the method for crystallizing according to an embodiment of the present invention is pumped to a press filter.

- Press-filtering is performed to separate the crystal slurry into a crystal fraction and a filtrate fraction, and a crystal part containing an SUS-type triglyceride is fractionated. Press filtration is a method in which a crystal slurry is filtered under pressure to achieve solid-liquid separation, where the pressed cake side is the crystal fraction and the filtrate side is the filtrate fraction.

[0028]

For the press filtration, a method using a filter press or a membrane filter is preferably used. In particular, to obtain a fraction with high SUS content, the residual liquid ratio of the filtrate in the crystal fraction is preferably reduced by high-pressure pressing, such as at a

maximum pressure of 30 kg/cm². In addition, to reduce the residual liquid ratio of the filtrate, reducing the thickness of the crystal cake after pressing as much as possible is advantageous, and the thickness is preferably 25 mm or less and more preferably 15 mm or less.

For the calculation method of the residual liquid ratio of the filtrate, using the following equation enables simple and easy calculation, and using the calculated residual liquid ratio in process control causes no trouble in fractionation precision control.

Residual liquid ratio% = SUU content in crystal fraction/SUU content in filtrate fraction x 100,
where S represents a saturated fatty acid having from 16 to 22 carbons, and U represents an unsaturated fatty acid having 18 carbons.

Examples

[0029]

Examples of the present invention will be shown below, and the present invention will be described in more detail. In the examples, % and parts are both meant to be on a mass basis.

[0030]

· The solid fat content was analyzed using a solid fat measuring device available from BRUKER Corporation.

· The crystal form was analyzed under the following conditions.

An X-ray diffraction image of a sample fat and/or oil was measured using an X-ray diffractometer RIGAKU Mini Flex II (available from Rigaku Corporation, a maximum rated power of 450 W, a rated voltage of 30 kV, and a rated current of 15 mA) under the conditions of a 2θ/θ coupled scan mode, a start angle of 2.5°, an end angle of 30.0°, and a measurement speed of 4°/min. The resulting X-ray diffraction image was analyzed, and the presence of the β prime crystal or the β crystal in the fat and/or oil after crystallization was confirmed.

[0031]

In Examples and Comparative Examples, a degummed shea butter that was not decolorized or deodorized and had the following analytical values was used as a raw material fat and/or oil. The triglyceride composition is shown in Table 1.

Iodine value: 58.0

Peroxide value: 3.12

Acid value: 8.58

Unsaponifiable matter and the like: 3.33 mass%

Melting point (DSC method): 26°C

[0032]

Table 1

OOO	StL O	POO	StOO	StLSt	POSt	StOSt	StStSt	SUS
5.3	4.7	2.0	24.5	4.5	4.2	30.6	1.7	39.3

[0033]

Example 1

The raw material fat and/or oil was heated to 60°C and completely melted, placed in a crystallization vessel 200 mm in diameter and 300 mm in height and equipped with a refrigerant jacket, and stirred and cooled while a refrigerant at 33°C was circulated through the refrigerant jacket. A paddle-type stirring blade 100 mm in width and 100 mm in height was used, and the raw material fat and/or oil was cooled at a stirring rate of 30 rpm until the oil temperature dropped from 60°C to 31°C (melting point plus 5°C) and then was held for 1 hour. The solid fat content of the fat and/or oil after the step of preparing for crystallization was 0.1% or less. The fat and/or oil after the step of preparing for crystallization was filled up to a height of 30 mm in a stainless steel tray 220 mm in length and 130 mm in width. The tray was placed in an incubator at 21°C and cooled and held for 16 hours (step of performing crystallization). The oil temperature at this time was 22°C.

The crystal form of a crystal slurry obtained after the step of performing crystallization measured by X-ray diffraction was the β form.

The crystal slurry was then pressed at a room temperature of 30°C. The pressing was performed by increasing the pressure at 2.0 kg/cm²/min to 30 kg/cm² over 15 minutes, and the crystal slurry was press-filtered by further holding at the same pressure for 15 minutes. A crystal fraction with an StOSt content of 51.0 mass% and an iodine value of 44.0 as a pressed crystal fraction in a fractional yield of 48.0% was obtained.

A filtrate fraction had an StOSt content of 12.1 mass%.

[0034]

Example 2

The raw material fat and/or oil was heated to 60°C and completely melted, placed in a crystallization vessel 200 mm in diameter and 300 mm in height and equipped with a refrigerant jacket, and stirred and cooled while a refrigerant at 33°C was circulated through the refrigerant jacket. A paddle-type stirring blade 100 mm in width and 100 mm in height was used, and the raw material fat and/or oil was cooled at a stirring rate of 30 rpm until the oil temperature dropped from 60°C to 31°C (melting point plus 5°C) and then was held for 1 hour. The solid fat content of the fat and/or oil after the step of preparing for crystallization was 0.1% or less. The fat and/or oil after the step of preparing for crystallization was filled up to a height of 30 mm in a stainless steel tray 530 mm in length and 330 mm in width. The tray was placed in an incubator at 21°C and cooled and held for 16 hours (step of performing crystallization). The oil temperature at this time was 22°C.

The crystal form of a crystal slurry obtained after the step of performing crystallization measured by X-ray diffraction was the β form.

The crystal slurry was then pressed at a room temperature of 30°C. The pressing was performed by increasing the pressure at 2.0 kg/cm²/min to 30 kg/cm² over 15 minutes, and the crystal slurry was press-filtered by further holding at the same pressure for 15 minutes. A crystal fraction with an StOSt content of 51.0 mass% and an iodine value of 44.0 as a pressed crystal fraction in a fractional yield of 47.0% was obtained.

[0035]

Example 3

The raw material fat and/or oil was heated to 60°C and completely melted, placed in a crystallization vessel 200 mm in diameter and 300 mm in height and equipped with a refrigerant jacket, and stirred and cooled while a refrigerant at 33°C was circulated through the refrigerant jacket. A paddle-type stirring blade 100 mm in width and 100 mm in height was used, and the raw material fat and/or oil was cooled at a stirring rate of 30 rpm until the oil temperature dropped from 60°C to 31°C (melting point plus 5°C) and then was held for 1 hour. The solid fat content of the fat and/or oil after the step of preparing for crystallization was 0.1% or less. The fat and/or oil after the step of preparing for crystallization was filled up to a height of 30 mm in a stainless steel tray 220 mm in length and 130 mm in width. The tray was placed in an incubator at 21°C and cooled and held for 17 hours (step of performing crystallization). The oil temperature at this time was 21°C. The crystal form of a crystal slurry obtained after the step of performing crystallization measured by X-ray diffraction was the β form.

The crystal slurry was then pressed at a room temperature of 30°C. The pressing was performed by increasing the pressure at 2.0 kg/cm²/min to 30 kg/cm² over 15 minutes, and the crystal slurry was press-filtered by further holding at the same pressure for 15 minutes. A crystal fraction with an StOSt content of 48.0 mass% and an iodine value of 47.0 as a pressed crystal fraction in a fractional yield of 45.0% was obtained.

A filtrate fraction had an StOSt content of 17.6 mass%.

[0036]

Comparative Example 1

The raw material fat and/or oil was heated to 60°C and completely melted, placed in a crystallization vessel 200 mm in diameter and 300 mm in height and equipped with a refrigerant jacket, and stirred while warm water at 60°C was circulated through the refrigerant jacket. After uniformly stirring using a paddle-type stirring blade 100 mm in width and 100 mm in height, the fat and/or oil at an oil temperature of 60°C was filled up to a height of 30 mm in a stainless steel tray 220 mm in length and 130 mm in width. The tray was placed in an incubator at 21°C and cooled and held for 18 hours. The oil temperature at this time was 21°C.

The crystal form of this crystal slurry sampled and measured by X-ray diffraction was the β prime form.

The crystal slurry was then pressed at a room temperature of 30°C. The pressing was performed by increasing the pressure at 2.0 kg/cm²/min to 30 kg/cm² over 15 minutes, and the crystal slurry was press-filtered by further holding at the same pressure for 15 minutes. During pressing, filtration leakage occurred and good solid-liquid separation was not achieved.

[0037]

Comparative Example 2

The raw material fat and/or oil was heated to 60°C and completely melted, placed in a crystallization vessel 200 mm in diameter and 300 mm in height and equipped with a refrigerant

jacket, and stirred and cooled while a refrigerant at 33°C was circulated through the refrigerant jacket. A paddle-type stirring blade 100 mm in width and 100 mm in height was used, and the raw material fat and/or oil was cooled at a stirring rate of 30 rpm until the oil temperature dropped from 60°C to 25°C (melting point minus 1°C) and then was held for 3 hours. The solid fat content of the fat and/or oil after the step of preparing for crystallization was 2% or less. The fat and/or oil after the step of preparing for crystallization was filled up to a height of 30 mm in a stainless steel tray 220 mm in length and 130 mm in width. The tray was placed in an incubator at 21°C and cooled and held for 16 hours (step of performing crystallization). The oil temperature at this time was 21°C.

The crystal form of a crystal slurry obtained after the step of performing crystallization measured by X-ray diffraction was the β prime form.

The crystal slurry was then pressed at a room temperature of 30°C. The pressing was performed by increasing the pressure at 2.0 kg/cm²/min to 30 kg/cm² over 15 minutes, and the crystal slurry was press-filtered by further holding at the same pressure for 15 minutes. During pressing, filtration leakage occurred and good solid-liquid separation was not achieved.

[0038]

Results and Discussion

· In Examples 1 to 3 according to the method for crystallizing a fat and/or oil of an embodiment of the present invention, crystal parts with an StOSt content of 45 mass% to 55 mass% could be obtained in a yield of from 45% to 50%.

· Comparative Example 1, in which the crystallization temperature was 60°C (melting point plus 34°C) in the step of preparing for crystallization, resulted in poor crystallization and failed to achieve solid-liquid separation.

· Comparative Example 2, in which the crystallization temperature was 25°C (melting point minus 1°C) in the step of preparing for crystallization, resulted in poor crystallization and failed to achieve solid-liquid separation.

Industrial Applicability

[0039]

According to an embodiment of the present invention, a crystal fraction rich in an SUS-type triglyceride can be simply and easily obtained in high yield.

Claims

[Claim 1]

A method for crystallizing a fat and/or oil, the method comprising:

5 preparing for crystallization by melting a raw material fat and/or oil comprising an SUS-type triglyceride, where S represents a saturated fatty acid having from 16 to 18 carbons, and U represents a monounsaturated fatty acid having 18 carbons, then cooling the melted raw material fat and/or oil and holding the melted raw material fat and/or oil at a temperature not lower than its melting point and not higher than its melting point plus 10°C; and

10 performing crystallization by cooling the resulting fat and/or oil to deposit crystals.

[Claim 2]

The method for crystallizing a fat and/or oil according to claim 1, wherein the step of preparing for crystallization is performed for 0.5 hours or more and 30 hours or less.

[Claim 3]

The method for crystallizing a fat and/or oil according to claim 1 or 2, wherein the step of preparing for crystallization is performed by stirring in a vessel, and the step of performing crystallization is performed by allowing to stand in a vessel.

[Claim 4]

The method for crystallizing a fat and/or oil according to claim 1 or 2, wherein shea butter is used as the raw material fat and/or oil.

[Claim 5]

The method for crystallizing a fat and/or oil according to claim 3, wherein shea butter is used as the raw material fat and/or oil.

[Claim 6]

30 A method for crystallizing a fat and/or oil, wherein a crystal form of a crystal slurry obtained by the method for crystallizing a fat and/or oil described in claim 1 or 2 is a β form.

[Claim 7]

35 A method for crystallizing a fat and/or oil, wherein a crystal form of a crystal slurry obtained by the method for crystallizing a fat and/or oil described in claim 3 is a β form.

[Claim 8]

A method for crystallizing a fat and/or oil, wherein a crystal form of a crystal slurry obtained by the method for crystallizing a fat and/or oil described in claim 4 is a β form.

[Claim 9]

A method for crystallizing a fat and/or oil, wherein a crystal form of a crystal slurry obtained by the method for crystallizing a fat and/or oil described in claim 5 is a β form.

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[Claim 10]

A method for fractionating a fat and/or oil, the method obtaining a crystal part with an StOSt content of 40 mass% to 70 mass%, where St represents stearic acid and O represents oleic acid, from a crystal slurry obtained by the method for crystallizing a fat and/or oil described in claim 1 or 2.

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[Claim 11]

A method for fractionating a fat and/or oil, the method obtaining a crystal part with an StOSt content of 40 mass% to 70 mass%, where St represents stearic acid and O represents oleic acid, from a crystal slurry obtained by the method for crystallizing a fat and/or oil described in claim 3.

15

[Claim 12]

A method for fractionating a fat and/or oil, the method obtaining a crystal part with an StOSt content of 40 mass% to 70 mass%, where St represents stearic acid and O represents oleic acid, from a crystal slurry obtained by the method for crystallizing a fat and/or oil described in claim 4 or 5.

20

[Claim 13]

A method for fractionating a fat and/or oil, the method obtaining a crystal part with an StOSt content of 40 mass% to 70 mass%, where St represents stearic acid and O represents oleic acid, from a crystal slurry obtained by the method for crystallizing a fat and/or oil described in any one of claims 6 to 9.

25