

Description

Title of Invention: POWDERY FAT OR OIL-CONTAINING ADHESIVE COMPOSITION AND METHOD FOR MANUFACTURING SAME

5

Technical Field

[0001]

The present invention relates to a powdered fat and/or oil-containing adhesive composition, a method for producing the same, and so forth. More specifically, the present invention relates to: a powdered fat and/or oil-containing adhesive composition containing a fat and/or oil ingredient (at least a portion of the fat and/or oil ingredient is a β -form fat and/or oil) containing a XXX triglyceride, the powdered fat and/or oil-containing adhesive composition characterized in that particles of the powdered fat and/or oil-containing adhesive composition have a plate-like (sheet-like) shape, and the powdered fat and/or oil-containing adhesive composition has a loose bulk density of 0.05 to 0.6 g/cm³; a method for producing the powdered fat and/or oil-containing adhesive composition; and so forth.

The present application claims the priority based on Japanese Patent Application No. 2016-186089 filed in Japan on September 23, 2016, the contents of which are incorporated herein by reference.

Background Art

[0002]

Adhesive compositions that are applied to the surface of a food as a base so that foods adhere to each other have been demanded since a long time ago in the field of foods. Examples of the foods containing the adhesive composition include foods, which are assembled like a plastic model for fun, by pasting confections such as biscuits or cookies, and foods exhibiting colors or three-dimensional objects by combining various foods, and the like. In a

conventional technique, for example, there is an adhesive for foods obtained by blending syrup, a thickener, water and pulverized sugar (Patent Literature 1). However, for the adhesive composition, a sufficient adhesiveness is demanded. In addition, the adhesive composition itself
5 needs not to influence the mouthfeel or flavor of foods. More appropriate adhesive compositions have been demanded.

Furthermore, in the fields of foods, feeds, pharmaceuticals, cosmetics, and the like, the covering of a raw material powder with a coating is widely practiced to prevent the deterioration or moisture absorption of the powder
10 without the adhesion of the powder to the outside air or water, and impart the flowability, sustained releasability, masking, elution prevention, acid resistance, and so forth. In a conventional technique, for example, a coating containing triacylglycerol having a fatty acid with a carbon chain length of 8 to 12, and calcium stearate is known (Patent Literature 2). Herein, calcium
15 stearate is a coating widely used, and has been approved as a food additive without limitations on the use thereof under the current restrictions. However, it is unclear whether calcium stearate can be used without limitations in the future. Thus, appropriate coatings have been demanded instead of calcium stearate.

Citation List

Patent Literatures

[0003]

Patent Literature 1: Japanese Patent Application Publication No. Hei
25 1-101849

Patent Literature 2: Japanese Patent Application Publication No.
2013-184888

Summary

30 [0003a] In one aspect of the present disclosure, there is provided a powdered

fat and/or oil-containing adhesive composition comprising a fat and/or oil ingredient comprising at least one type of a XXX triglyceride having fatty acid residues X, each with x carbon atoms, at positions 1 to 3 of glycerin, wherein

x number of carbon atoms is an integer selected from 10 to 22,
the fat and/or oil ingredient comprises a β -form fat and/or oil,
particles of the powdered fat and/or oil-containing adhesive composition have a plate-like shape, and

the powdered fat and/or oil-containing adhesive composition has a loose bulk density of 0.05 to 0.6 g/cm³.

[0003b] In another aspect of the present disclosure, there is provided an adhesive comprising the powdered fat and/or oil-containing adhesive composition disclosed herein.

[0003c] In a further aspect of the present disclosure, there is provided a coating comprising the powdered fat and/or oil-containing adhesive composition disclosed herein.

[0003d] In another aspect of the present disclosure, there is provided a method for producing a powdered fat and/or oil-containing adhesive composition comprising a fat and/or oil ingredient comprising at least one type of a XXX triglyceride having fatty acid residues X, each with x carbon atoms, at positions 1 to 3 of glycerin, wherein

x number of carbon atoms is an integer selected from 10 to 22,
at least a portion of the fat and/or oil ingredient is a β -form fat and/or

oil,
particles of the powdered fat and/or oil-containing adhesive composition have a plate-like shape,

the powdered fat and/or oil-containing adhesive composition has a loose bulk density of 0.05 to 0.6 g/cm³, and

the method comprises the following steps of:

(a) preparing a fat and/or oil composition raw material containing a XXX triglyceride; and

5 (d) cooling and solidifying the fat and/or oil composition raw material to obtain a powdered fat and/or oil-containing adhesive composition comprising a β -form fat and/or oil whose particles have a plate-like shape.

[0003e] In a further aspect of the present disclosure, there is provided a food, a feed, a pharmaceutical, or a cosmetic comprising the powdered fat and/or
10 oil-containing adhesive composition disclosed herein.

[0003f] In another aspect of the present disclosure, there is provided a food, a feed, a pharmaceutical, or a cosmetic comprising the adhesive disclosed herein, or the coating disclosed herein.

[0003g] In another aspect of the present disclosure, there is provided a
15 method for producing a food containing a powdered fat and/or oil-containing adhesive composition comprising a fat and/or oil ingredient comprising at least one type of a XXX triglyceride having fatty acid residues X, each with x carbon atoms, at positions 1 to 3 of glycerin, wherein

x number of carbon atoms is an integer selected from 10 to 22,

20 at least a portion of the fat and/or oil ingredient is a β -form fat and/or oil,

particles of the powdered fat and/or oil-containing adhesive composition have a plate-like shape,

the powdered fat and/or oil-containing adhesive composition has a
25 loose bulk density of 0.05 to 0.6 g/cm³, and

the method comprises the following steps of:

(a) preparing a fat and/or oil composition raw material containing a XXX triglyceride;

(d) cooling and solidifying the fat and/or oil composition raw material in a molten state to obtain a powdered fat and/or oil-containing adhesive composition comprising a β -form fat and/or oil whose particles have a plate-like shape; and

(f) adding the obtained powdered fat and/or oil-containing adhesive composition to a food raw material to obtain a food containing the powdered fat and/or oil-containing adhesive composition.

[0004]

An object of the present invention is to provide a powdered fat and/or oil-containing adhesive composition containing a fat and/or oil ingredient containing a XXX triglyceride and a β -form fat and/or oil, the powdered fat and/or oil-containing adhesive composition particles having a plate-like shape, and the powdered fat and/or oil-containing adhesive composition having a loose bulk density of 0.05 to 0.6 g/cm³.

Another object of the present invention is to provide a method for producing the powdered fat and/or oil-containing adhesive composition, the method including the steps of: preparing a fat and/or oil composition raw material containing a XXX triglyceride; and cooling and solidifying the fat and/or oil composition raw material to obtain a powdered fat and/or oil-containing adhesive composition containing a β -form fat and/or oil whose particles have a plate-like shape.

Still another object of the present invention is to provide an adhesive composition containing a β -form fat and/or oil containing the XXX triglyceride, the adhesive composition containing the β -form fat and/or oil characterized in that x number of carbon atoms is an integer selected from 10 to 22, and particles of the β -form fat and/or oil have a plate-like shape and have a diffraction peak at 4.5 to 4.7 Å in an X-ray diffraction measurement.

In addition, yet another object of the present invention is to provide an adhesive and a coating which contain the adhesive composition.

Solution to Problems

[0005]

To achieve the above objects, the present inventors have found out that when a powdered composition contains a fat and/or oil ingredient which contains a specific XXX triglyceride (at least one type) and a β -form fat and/or oil, the powdered composition has plate-shaped particles and a loose bulk density of 0.05 to 0.6 g/cm³, so that the composition has a suitable

powder form, and also found that the powdered composition has a sufficient adhesiveness. This finding has led to the completion of the present invention. Specifically, the present invention can include the following aspects.

5 [0006]

[1] A powdered fat and/or oil-containing adhesive composition comprising a fat and/or oil ingredient comprising at least one type of a XXX triglyceride having fatty acid residues X, each with x carbon atoms, at positions 1 to 3 of glycerin, wherein

10 x number of carbon atoms is an integer selected from 10 to 22,
the fat and/or oil ingredient comprises a β -form fat and/or oil,
particles of the powdered fat and/or oil-containing adhesive
composition have a plate-like shape, and
the powdered fat and/or oil-containing adhesive composition has a
15 loose bulk density of 0.05 to 0.6 g/cm³.

[2] The powdered fat and/or oil-containing adhesive composition according to [1], wherein the fat and/or oil ingredient is constituted of the β -form fat and/or oil.

[3] The powdered fat and/or oil-containing adhesive composition according to
20 [1] or [2], comprising 50% by mass or more of the XXX triglyceride, given that a total mass of the fat and/or oil ingredient is 100% by mass.

[4] The powdered fat and/or oil-containing adhesive composition according to any one of [1] to [3], wherein the x number of carbon atoms is an integer selected from 16 to 18.

25 [5] The powdered fat and/or oil-containing adhesive composition according to any one of [1] to [4], wherein the plate-like shape of the powdered fat and/or oil-containing adhesive composition has an aspect ratio of 1.1 or more.

[6] The powdered fat and/or oil-containing adhesive composition according to any one of [1] to [5], wherein a peak intensity ratio (a peak intensity at 4.6
30 Å/(the peak intensity at 4.6 Å + a peak intensity at 4.2 Å)) in an X-ray

diffraction measurement of the powdered fat and/or oil-containing adhesive composition is 0.2 or more.

[7] The powdered fat and/or oil-containing adhesive composition according to any one of [1] to [6], wherein the powdered fat and/or oil-containing adhesive composition has a thickness of 4 μm or less.

[8] An adhesive comprising the powdered fat and/or oil-containing adhesive composition according to any one of [1] to [7].

[9] A coating comprising the powdered fat and/or oil-containing adhesive composition according to any one of [1] to [7].

[10] The coating according to [9], wherein an average particle diameter of particles of the powdered fat and/or oil-containing adhesive composition determined by laser diffraction/scattering methods is 20 μm or less.

[11] A method for producing a powdered fat and/or oil-containing adhesive composition comprising a fat and/or oil ingredient comprising at least one type of a XXX triglyceride having fatty acid residues X, each with x carbon atoms, at positions 1 to 3 of glycerin, wherein

x number of carbon atoms is an integer selected from 10 to 22,

at least a portion of the fat and/or oil ingredient is a β -form fat and/or oil,

particles of the powdered fat and/or oil-containing adhesive composition have a plate-like shape,

the powdered fat and/or oil-containing adhesive composition has a loose bulk density of 0.05 to 0.6 g/cm^3 , and

the method comprises the following steps of:

(a) preparing a fat and/or oil composition raw material containing a XXX triglyceride; and

(d) cooling and solidifying the fat and/or oil composition raw material to obtain a powdered fat and/or oil-containing adhesive composition comprising a β -form fat and/or oil whose particles have a plate-like shape.

[12] The method according to [11], comprising, as step (b), a step of heating

the fat and/or oil composition raw material obtained in step (a) to melt the triglyceride incorporated in the fat and/or oil composition raw material, thereby obtaining the fat and/or oil composition raw material in a molten state.

5 [13] The method according to [11] or [12], comprising a seeding step (c1), a tempering step (c2), and/or a pre-cooling step (c3), before step (d), wherein

the seeding step (c1) includes adding 0.1 to 1 part by mass of the β -form fat and/or oil to 100 parts by mass of the fat and/or oil composition raw material during the cooling in step (d),

10 the tempering step (c2) includes, before the cooling in step (d), a step of maintaining a temperature at a temperature lower than a cooling temperature in step (d), and

the pre-cooling step (c3) includes a step of pre-cooling the fat and/or oil composition in the molten state used in step (d) at a temperature higher
15 than the cooling temperature in step (d).

[14] The method according to any one of [11] to [13], wherein the powdered fat and/or oil-containing adhesive composition obtained in step (d) is obtained by a step of (e) pulverizing a solid resulting after the cooling in step (d) to obtain a powdered fat and/or oil-containing adhesive composition.

20 [15] The method according to any one of [11] to [14], wherein the XXX triglyceride is incorporated in an amount of 50% by mass or more, given that a total mass of the fat and/or oil ingredient is 100% by mass.

[16] The method according to any one of [11] to [15], wherein x number of carbon atoms is an integer selected from 16 to 18.

25 [17] The method according to any one of [11] to [16], wherein the cooling in step (d) is performed at a temperature not lower than a cooling temperature obtained from the following formula:

$$\text{cooling temperature (}^{\circ}\text{C)} = x \text{ number of carbon atoms} \times 6.6 - 68.$$

[18] The method according to any one of [11] to [17], wherein the cooling in
30 step (d) is performed at a temperature not lower than a melting point of an

α -form crystal corresponding to the β -form fat and/or oil.

[19] The method according to any one of [11] to [18], wherein the powdered fat and/or oil-containing adhesive composition has a thickness of 4 μm or less.

5 [20] A food, a feed, a pharmaceutical, or a cosmetic comprising the powdered fat and/or oil-containing adhesive composition according to any one of [1] to [7].

[21] A food, a feed, a pharmaceutical, or a cosmetic comprising the adhesive according to [8], or the coating according to [9] or [10].

10 [22] A method for producing a food containing a powdered fat and/or oil-containing adhesive composition comprising a fat and/or oil ingredient comprising at least one type of a XXX triglyceride having fatty acid residues X, each with x carbon atoms, at positions 1 to 3 of glycerin, wherein

x number of carbon atoms is an integer selected from 10 to 22,

15 at least a portion of the fat and/or oil ingredient is a β -form fat and/or oil,

particles of the powdered fat and/or oil-containing adhesive composition have a plate-like shape,

the powdered fat and/or oil-containing adhesive composition has a
20 loose bulk density of 0.05 to 0.6 g/cm^3 , and

the method comprises the following steps of:

(a) preparing a fat and/or oil composition raw material containing a XXX triglyceride;

(d) cooling and solidifying the fat and/or oil composition raw material
25 in a molten state to obtain a powdered fat and/or oil-containing adhesive composition comprising a β -form fat and/or oil whose particles have a plate-like shape; and

(f) adding the obtained powdered fat and/or oil-containing adhesive composition to a food raw material to obtain a food containing the powdered
30 fat and/or oil-containing adhesive composition.

[23] The method for producing a food according to [22], wherein the powdered fat and/or oil-containing adhesive composition has a thickness of 4 μm or less.

5 Advantageous Effects of Invention

[0007]

The present invention makes it possible to provide a powdered fat and/or oil-containing adhesive composition containing a fat and/or oil ingredient containing at least one type of a XXX triglyceride having fatty acid residues X, each with x carbon atoms, at positions 1 to 3 of glycerin, the powdered fat and/or oil-containing adhesive composition characterized in that x number of carbon atoms is an integer selected from 10 to 22, at least a portion of the fat and/or oil ingredient is a β -form fat and/or oil, particles of the powdered fat and/or oil-containing adhesive composition have a plate-like shape, and the powdered fat and/or oil-containing adhesive composition has a loose bulk density of 0.05 to 0.6 g/cm^3 .

The present invention makes it possible to provide a method for producing a powdered fat and/or oil-containing adhesive composition containing a fat and/or oil ingredient containing at least one type of a XXX triglyceride having fatty acid residues X, each with x carbon atoms, at positions 1 to 3 of glycerin, characterized in that x number of carbon atoms is an integer selected from 10 to 22, the fat and/or oil ingredient contains a β -form fat and/or oil, particles of the powdered fat and/or oil-containing adhesive composition have a plate-like shape, and the powdered fat and/or oil-containing adhesive composition has a loose bulk density of 0.05 to 0.6 g/cm^3 , the method including the following steps of: (a) preparing a fat and/or oil composition raw material containing at least one type of a XXX triglyceride having fatty acid residues X, each with x carbon atoms, at positions 1 to 3 of glycerin; and (d) cooling and solidifying the fat and/or oil composition raw material to obtain a powdered fat and/or oil-containing

adhesive composition containing a β -form fat and/or oil whose particles have a plate-like shape.

Further, the present invention makes it possible to provide an adhesive composition containing a β -form fat and/or oil containing at least one type of a
5 XXX triglyceride having fatty acid residues X, each with x carbon atoms, at positions 1 to 3 of glycerin, the adhesive composition containing the β -form fat and/or oil characterized in that x number of carbon atoms is an integer selected from 10 to 22, and particles of the β -form fat and/or oil have a plate-like shape and have a diffraction peak at 4.5 to 4.7 Å in an X-ray diffraction measurement.

10 In addition, the present invention makes it possible to provide an adhesive composition and an adhesive having a sufficient adhesiveness and a coating having a sufficient covering performance.

Brief Description of Drawings

15 [0008]

[Fig. 1] Fig. 1 is micrographs in which 1% by mass of (a) a powdered fat and/or oil-containing composition of Example 1 of the present invention and 1% by mass of (b) calcium stearate of Comparative Example 2 adhere to surfaces of glass beads.

20 [Fig. 2] Fig. 2 is a photograph of an appearance of a powdered fat and/or oil-containing adhesive composition A (β -form fat and/or oil) of Production Example 7 of the present invention.

[Fig. 3] Fig. 3 is a photograph of an appearance of the powdered fat and/or oil-containing adhesive composition A (β -form fat and/or oil) of Production
25 Example 7 of the present invention.

[Fig. 4] Fig. 4 is a photograph of an appearance of a fat and/or oil composition (α -form fat and/or oil) of Comparative Production Example 3 of the present invention.

[Fig. 5] Fig. 5 is a micrograph of the powdered fat and/or oil-containing adhesive
30 composition

A (β -form fat and/or oil) of Production Example 7 of the present invention.

[Fig. 6] Fig. 6 is a micrograph of the fat and/or oil composition (α -form fat and/or oil) of Comparative Production Example 3 of the present invention.

[Fig. 7] Fig. 7 is an X-ray diffractogram of the powdered fat and/or
5 oil-containing adhesive composition A (β -form fat and/or oil) of Production Example 7 of the present invention.

[Fig. 8] Fig. 8 is an X-ray diffractogram of the fat and/or oil composition (α -form fat and/or oil) of Comparative Production Example 3 of the present invention.

10 [Fig. 9] Fig. 9 is a micrograph of the powdered fat and/or oil-containing adhesive composition A (β -form fat and/or oil) before pulverization of Example 7 of the present invention.

[Fig. 10] Fig. 10 is a micrograph of the powdered fat and/or oil-containing adhesive composition A (β -form fat and/or oil) of Example 7 of the present
15 invention.

[Fig. 11] Fig. 11 is a micrograph of a pulverized fat and/or oil (α -form fat and/or oil) of Comparative Example 1 of the present invention.

[Fig. 12] Fig. 12 is a micrograph in which 1% by mass (outer percentage) of the powdered fat and/or oil-containing adhesive composition A (β -form fat
20 and/or oil) of Example 7 of the present invention adheres to surfaces of glass beads by adding and mixing the powdered fat and/or oil-containing adhesive composition A to the glass beads.

[Fig. 13] Fig. 13 is a micrograph in which 1% by mass (outer percentage) of the pulverized fat and/or oil (α -form fat and/or oil) of Comparative Example 1
25 of the present invention adheres to surfaces of glass beads by adding and mixing the pulverized fat and/or oil to the glass beads.

[Fig. 14] Fig. 14 is a micrograph in which 1% by mass (outer percentage) of the calcium stearate of Comparative Example 2 adheres to surfaces of glass beads by adding and mixing the calcium stearate to the glass beads.

30 [Fig. 15] Fig. 15 is a micrograph in which the powdered fat and/or

oil-containing adhesive composition A (β -form fat and/or oil) of Example 7 of the present invention adheres to surfaces of glass beads, and sites measured as thicknesses of particles are indicated by straight lines (3 sites).

[Fig. 16] Fig. 16 is a micrograph in which the pulverized fat and/or oil (α -form fat and/or oil) of Comparative Example 1 of the present invention adheres to surfaces of glass beads, and sites measured as thicknesses of particles are indicated by straight lines (3 sites).

[Fig. 17] Fig. 17 is a diagram schematically showing the micrographs of Figs. 15 and 16. In the diagram, A depicts a core substance, B depicts a coating substance, and a length of line segment ab depicts a value of a thickness of a particle made to adhere to the surface of the core substance.

Description of Embodiments

[0009]

<Powdered Fat and/or Oil-Containing Adhesive Composition>

The present invention relates to a powdered fat and/or oil-containing adhesive composition containing a fat and/or oil ingredient containing at least one type of a XXX triglyceride having fatty acid residues X, each with x carbon atoms, at positions 1 to 3 of glycerin, the powdered fat and/or oil-containing adhesive composition characterized in that x number of carbon atoms is an integer selected from 10 to 22, the fat and/or oil ingredient contains a β -form fat and/or oil, particles of the powdered fat and/or oil-containing adhesive composition have a plate-like shape, and the powdered fat and/or oil-containing adhesive composition has a loose bulk density of 0.05 to 0.6 g/cm³. Hereinafter, the powdered fat and/or oil-containing adhesive composition of the present invention will be described in detail.

[0010]

<Fat and/or Oil Ingredient>

The powdered fat and/or oil-containing adhesive composition of the

present invention contains a fat and/or oil ingredient. The fat and/or oil ingredient contains at least a XXX triglyceride, and optionally contains other triglycerides.

The fat and/or oil ingredient contains a β -form fat and/or oil. Herein,
 5 a β -form fat and/or oil is a fat and/or oil constituted only of a β -form crystal, which is one of polymorphs of the fat and/or oil. Other polymorphs of a fat and/or oil include a β' -form fat and/or oil and an α -form fat and/or oil. A β' -form fat and/or oil is a fat and/or oil constituted only of a β' -form crystal, which is one of polymorphs of the fat and/or oil. An α -form fat and/or oil is a
 10 fat and/or oil constituted only of an α -form crystal, which is one of polymorphs of the fat and/or oil. Some crystals of fats and/or oils have the same composition but have different sub-lattice structures (crystal structures), and are referred to as polymorphs. Polymorphs typically include hexagonal, orthorhombic perpendicular, and triclinic parallel
 15 crystals, respectively referred to as α -form, β' -form, and β -form. Moreover, regarding the melting points of the polymorphs, the melting points increase in the order of α , β' , and β . The melting points of polymorphs vary depending on the type of fatty acid residues X each having x carbon atoms. Hence, Table 1 below shows the melting point ($^{\circ}\text{C}$) of each polymorph of
 20 tricaprin, trilaurin, trimyristin, tripalmitin, tristearin, triarachidin, and tribehenin. Note that Table 1 has been prepared based on Nissim Garti et al., "Crystallization and Polymorphism of Fats and Fatty Acids", Marcel Dekker Inc., 1988, pp. 32-33. Further, in preparing Table 1, each melting point temperature ($^{\circ}\text{C}$) is rounded to the nearest whole number. Moreover,
 25 if the composition of a fat and/or oil and the melting point of each polymorph are found, at least whether a β -form fat and/or oil exists in the fat and/or oil or not can be detected.

[0011]

[Table 1]

	α -form fat and/or oil (°C)	β' -form fat and/or oil (°C)	β -form fat and/or oil (°C)
tricaprin	-9	16	32
trilaurin	15	34	47
trimyristin	33	45	59
tripalmitin	45	57	66
tristearin	55	63	74
triarachidin	62	69	78
tribehenin	68	74	83

[0012]

A general method for identifying these polymorphs includes X-ray diffraction, and the diffraction condition is given according to the following Bragg's equation.

$$2d\sin\theta = n\lambda \quad (n = 1, 2, 3, \dots)$$

A diffraction peak appears at a position satisfying this equation. Here, d is a lattice constant, θ is a diffraction (incident) angle, λ is a wavelength of X-ray, and n is a natural number. From a diffraction peak at $2\theta = 16$ to 27° corresponding to a short spacing, information on packing (sub-lattice) in the crystal side surface is obtained, and the polymorph can be identified. Particularly, in a case of a triacylglycerol, the β -form characteristic peak appears at $2\theta = 19, 23, 24^\circ$ (near $4.6 \text{ \AA}$, near $3.9 \text{ \AA}$, near $3.8 \text{ \AA}$), and the α -form characteristic peak appears near 21° ($4.2 \text{ \AA}$). Note that, in the X-ray diffraction measurement, for example, an X-ray diffraction system (Rigaku Corporation, a horizontal sample mounting-type X-ray diffraction system Ultima IV) maintained at 20°C is used to perform the measurement. As the source of X-rays, $\text{CuK}\alpha$ radiation ($1.54 \text{ \AA}$) is most frequently utilized.

[0013]

Further, the polymorphs of the fats and/or oils can also be predicted by differential scanning calorimetry (DSC method). For example, in the

β -form fat and/or oil prediction, the crystal structure of a fat and/or oil is predicted based on a DSC curve obtained by raising the temperature to 100°C at a rate of temperature rise of 10°C/minute with a differential scanning calorimeter (manufactured by SII NanoTechnology Inc., model: BSC6220). [0014]

Herein, the fat and/or oil ingredient contains the β -form fat and/or oil, or should at least contain the β -form fat and/or oil as a main ingredient (exceeding 50% by mass). In a preferable embodiment, the fat and/or oil ingredient is substantially constituted of the β -form fat and/or oil. In a more preferable embodiment, the fat and/or oil ingredient is constituted of the β -form fat and/or oil. In a particularly preferable embodiment, the fat and/or oil ingredient is constituted only of the β -form fat and/or oil. In the case where all the fat and/or oil ingredient is the β -form fat and/or oil, no α -form fat and/or oil and/or β' -form fat and/or oil are detected by differential scanning calorimetry. In another preferable embodiment, the fat and/or oil ingredient (or the powdered fat and/or oil-containing adhesive composition containing the fat and/or oil ingredient) has a diffraction peak near 4.5 to 4.7 Å, preferably near 4.6 Å, in an X-ray diffraction measurement, but has no X-ray diffraction peak of the short spacings of the α -form fats and/or oils and/or β' -form fats and/or oils in Table 1, particularly has no diffraction peak near 4.2 Å. In such cases also, it can be determined that all the fat and/or oil ingredient is the β -form fat and/or oil. In a further embodiment of the present invention, all the fat and/or oil ingredient is preferably the β -form fat and/or oil, but may contain other forms such as α -form fat and/or oil or β' -form fat and/or oil. Herein, "containing the β -form fat and/or oil" in the fat and/or oil ingredient of the present invention and an indicator of a relative amount of the β -form fat and/or oil to "the α -form fat and/or oil + the β -form fat and/or oil" can be speculated from intensity proportions of the β -form characteristic peak and the α -form characteristic peak among X-ray

diffraction peaks: [β -form characteristic peak intensity/(α -form characteristic peak intensity + β -form characteristic peak intensity)] (hereinafter also referred to as peak intensity ratio). Specifically, based on the finding of the above-described X-ray diffraction measurement, "containing the β -form fat and/or oil" can be understood by calculating proportions of a peak intensity at $2\theta = 19^\circ$ (4.6 Å), which is the β -form characteristic peak, and a peak intensity at $2\theta = 21^\circ$ (4.2 Å), which is the α -form characteristic peak: $19^\circ/(19^\circ + 21^\circ)$ [4.6 Å/(4.6 Å + 4.2 Å)], as the indicator indicating the abundance of the β -form fat and/or oil in the fat and/or oil ingredient. In the present invention, all the fat and/or oil ingredient is preferably the β -form fat and/or oil (i.e., the peak intensity ratio = 1). However, it is appropriate to set, for example, the lower limit value of the peak intensity ratio to, for example, 0.4 or more, preferably 0.5 or more, more preferably 0.6 or more, further preferably 0.7 or more, particularly preferably 0.75 or more, and furthermore preferably 0.8 or more. With the peak intensity of 0.4 or more, the β -form fat and/or oil can be regarded as the main ingredient exceeding 50% by mass. The upper limit value of the peak intensity ratio is preferably 1, but may be 0.99 or less, 0.98 or less, 0.95 or less, 0.93 or less, 0.90 or less, 0.85 or less, or 0.80 or less, for example. The peak intensity ratio can be any one of the above-described lower and upper limit values or any combination thereof.

[0015]

<XXX Triglyceride>

The fat and/or oil ingredient of the present invention contains at least one type of the XXX triglyceride having fatty acid residues X, each with x carbon atoms, at positions 1 to 3 of glycerin. The XXX triglyceride is a triglyceride having fatty acid residues X, each with x carbon atoms, at positions 1 to 3 of glycerin. Each of the fatty acid residues X is the same as the others. Herein, x number of carbon atoms is an integer selected from 10 to 22, preferably an integer selected from 12 to 22, more preferably an integer selected from 14 to 20, and further preferably an integer selected

from 16 to 18.

The fatty acid residues X may be saturated or unsaturated fatty acid residues. Specific examples of the fatty acid residues X include residues such as capric acid, lauric acid, myristic acid, palmitic acid, stearic acid, arachidic acid, and behenic acid, but are not limited thereto.

The fatty acids are more preferably lauric acid, myristic acid, palmitic acid, stearic acid, arachidic acid, and behenic acid, further preferably myristic acid, palmitic acid, stearic acid, and arachidic acid, and furthermore preferably palmitic acid and stearic acid.

The content range of the XXX triglyceride is as follows. Given that a total mass of the fat and/or oil ingredient is 100% by mass, the lower limit is, for example, 50% by mass or more, preferably 60% by mass or more, more preferably 70% by mass or more, and further preferably 80% by mass or more; meanwhile, the upper limit is, for example, 100% by mass or less, preferably 99% by mass or less, and more preferably 95% by mass or less. One type or at least two types of the XXX triglyceride can be used, preferably one type or two types, and more preferably one type thereof is used. In the case where two or more types of the XXX triglycerides are used, the content is a total value of the XXX triglycerides.

[0016]

<Other Triglycerides>

The fat and/or oil ingredient of the present invention may contain other triglycerides than the above-described XXX triglyceride, as long as the effects of the present invention are not impaired. The other triglycerides may be multiple types of triglycerides, or may be synthetic fats and/or oils or natural fats and/or oils. The synthetic fats and/or oils include glyceryl tricaprilate and the like. Examples of the natural fats and/or oils include cocoa butter, sunflower seed oil, rapeseed oil, soybean oil, cottonseed oil, and the like. The other triglycerides may be contained in an amount of 1% by mass or more, for example, approximately 5 to 50% by mass relative to 100%

by mass of all the triglycerides in the fat and/or oil ingredient of the present invention without problems. The content of the other triglycerides is, for example, 0 to 30% by mass, preferably 0 to 18% by mass, more preferably 0 to 15% by mass, and further preferably 0 to 8% by mass.

5 [0017]

<Other Ingredients>

The powdered fat and/or oil-containing adhesive composition of the present invention may optionally contain other ingredients (additives), such as an emulsifier, a flavor, a skim milk powder, a whole milk powder, a cocoa
10 powder, sugar, dextrin, a sweetener, and a coloring agent, than the fat and/or oil ingredient such as the triglyceride. These optional ingredients can also be externally added to the powdered fat and/or oil-containing composition of the present invention. However, incorporating the optional ingredients into the fat and/or oil composition raw material containing a XXX triglyceride in
15 advance enables these optional ingredients to be reliably and easily contained and adhered. The amount of these other ingredients can be any amount, as long as the effects of the present invention are not impaired. For example, the amount is 0 to 70% by mass, preferably 0 to 65% by mass, and more preferably 0 to 30% by mass, given that a total mass of the
20 powdered fat and/or oil-containing adhesive composition is 100% by mass. Preferably, 90% by mass or more of the other ingredients are a powder having an average particle diameter of 1000 μm or less, and more preferably a powder having an average particle diameter of 500 μm or less. Further, since it is difficult for human to sense and perceive particles as fine as 20 μm
25 or less, a powder having an average particle diameter of for example 20 μm or less, preferably 0.1 to 20 μm , and more preferably 1 to 10 μm , is preferable because the coarse, gritty perception of the powder disappears when the powder is put into the mouth. Note that, unless otherwise particularly stated, the term average particle diameter in the present Description is a
30 value measured according to laser diffraction/scattering methods

(ISO133201 and ISO9276-1).

However, a preferable powdered fat and/or oil-containing adhesive composition of the present invention is preferably substantially constituted only of the fat and/or oil ingredient, and the fat and/or oil ingredient is preferably substantially constituted only of the triglyceride. In addition, the term "substantially" means that the content of an ingredient(s) other than the fat and/or oil ingredient incorporated in the powdered fat and/or oil-containing adhesive composition or of an ingredient(s) other than the triglyceride incorporated in the fat and/or oil ingredient is, for example, 0 to 15% by mass, preferably 0 to 10% by mass, and more preferably 0 to 5% by mass, relative to 100% by mass of the powdered fat and/or oil-containing adhesive composition or the fat and/or oil ingredient.

[0018]

<Powdered Fat and/or Oil-Containing Adhesive Composition>

The powdered fat and/or oil-containing composition of the present invention can be obtained by: melting a fat and/or oil composition raw material containing at least one type of a XXX triglyceride having fatty acid residues X, each with x carbon atoms, at positions 1 to 3 of glycerin; and keeping the fat and/or oil composition raw material in the molten state at a specific cooling temperature for the cooling and solidification, so that a fat and/or oil composition in a powder form having an adhesiveness (powdered fat and/or oil-containing composition) is obtained without adopting special processing means such as spraying and mechanical pulverization with a pulverizer such as a mill. More specifically, the powdered fat and/or oil-containing composition can be obtained through steps of: (a) preparing the fat and/or oil composition raw material containing a XXX triglyceride; optionally, (b) heating the fat and/or oil composition raw material obtained in step (a) to melt the triglyceride incorporated in the fat and/or oil composition raw material, thereby obtaining the fat and/or oil composition raw material in a molten state; and (d) cooling and solidifying the fat and/or oil

composition raw material to obtain a powdered fat and/or oil-containing adhesive composition containing a β -form fat and/or oil whose particles have a plate-like shape and having an adhesiveness. Note that the powdered fat and/or oil-containing composition can also be produced by subjecting a solid
 5 resulting after the cooling to known pulverization means such as a hammer mill or a cutter mill.

[0019]

In step (d), the fat and/or oil composition raw material in the molten state is cooled, for example, at a temperature which is lower than a melting
 10 point of the β -form fat and/or oil of the fat and/or oil ingredient incorporated in the fat and/or oil composition raw material, and which is not lower than a cooling temperature obtained from the following formula:

cooling temperature ($^{\circ}\text{C}$) = x number of carbon atoms $\times$ 6.6 - 68.

By cooling within such a temperature range, the β -form fat and/or oil can be
 15 efficiently produced, forming fine crystals, so that the powdered fat and/or oil-containing adhesive composition can be easily obtained. Note that the term "fine" refers to having primary particles (the smallest crystal) of for example 20 μm or less, preferably 15 μm or less, and more preferably 10 μm . Meanwhile, if the cooling is not performed within the temperature range, the
 20 β -form fat and/or oil is not formed, a solid having voids with a larger volume than the fat and/or oil composition raw material cannot be formed in some cases (Comparative Production Examples 1, 3). Further, in the present invention, the cooling within the temperature range forms the β -form fat and/or oil in a still state, and makes particles of the powdered fat and/or
 25 oil-containing adhesive composition have a plate-like shape. The cooling method is useful for specifying the powdered fat and/or oil-containing adhesive composition of the present invention.

[0020]

<Properties of Powdered Fat and/or Oil-Containing Adhesive Composition>

30 The powdered fat and/or oil-containing composition of the present

invention has an adhesiveness and is a powdered solid at normal temperature (20°C).

The powdered fat and/or oil-containing adhesive composition of the present invention, for example, if substantially constituted only of a fat and/or oil ingredient, has a loose bulk density of 0.05 to 0.6 g/cm³, preferably 0.1 to 0.5 g/cm³, more preferably 0.1 to 0.4 g/cm³ or 0.15 to 0.4 g/cm³, and further preferably 0.2 to 0.3 g/cm³. Herein, a "loose bulk density" refers to a packing density determined by letting a powder naturally fall. A loose bulk density (g/cm³) is measured, for example, by: letting an appropriate amount of a powdered fat and/or oil-containing adhesive composition fall approximately 2 cm above an upper opening end of a graduated cylinder with an inner diameter 15 mm × 25 mL to loosely fill the graduated cylinder; measuring a mass (g) and reading a volume (mL) thus filled; and calculating a mass (g) of the powdered fat and/or oil-containing adhesive composition per mL to determine the loose bulk density. Alternatively, a loose bulk density can also be calculated from a bulk specific gravity measured based on JIS K-6720 (or ISO 1060-1 and 2) by using a bulk specific gravity measuring device manufactured by Kuramochi Kagaku Kikai Seisakusho Co. Specifically, 120 mL of a sample is let fall toward a receiver (a 100-mL cylindrical container with an inner diameter of 40 mm × a height of 85 mm) from a height position 38 mm above an upper opening of the receiver. The sample protruding from the receiver is slid off, and a mass (A g) of the sample corresponding to the internal capacity (100 mL) of the receiver is weighed, so that a loose bulk density can be determined from the following formula:

$$\text{Loose bulk density (g/mL)} = A \text{ (g)} / 100 \text{ (mL)}$$

The measurement is preferably performed three times to obtain the average.

[0021]

Moreover, the particles of the powdered fat and/or oil-containing

composition of the present invention normally have a plate-like shape and have an average particle diameter (effective diameter) of for example 0.5 to 100 μm , preferably 1 to 50 μm , more preferably 2 to 20 μm , and furthermore preferably 2 to 15 μm .

5 Herein, the average particle diameter (effective diameter) can be determined based on laser diffraction/scattering methods (ISO133201, ISO9276-1) using a particle size distribution measuring apparatus (for example, Microtrac MT3300ExII manufactured by Nikkiso Co., Ltd.). The term effective diameter means a spherical particle diameter when a
10 measured diffraction pattern of a measurement-target crystal fits to a theoretical diffraction pattern obtained under an assumption that the measurement target is spherical. In this manner, in the laser diffraction/scattering methods, an effective diameter is calculated by fitting a measured diffraction pattern to a theoretical diffraction pattern obtained
15 under the assumption that the measurement target is spherical. For this reason, even when a measurement target has a plate-like shape or a spherical shape, the measurement can be performed according to the same principle. Herein, the plate-like shape preferably has an aspect ratio of 1.1 or more, more preferably an aspect ratio of 1.2 or more, further preferably an
20 aspect ratio of 1.2 to 3.0, particularly preferably 1.3 to 2.5, and furthermore preferably 1.4 to 2.0. Note that the term aspect ratio herein is defined as a ratio of the length of a longer side to the length of a shorter side of a rectangle which is circumscribed about a particle representation in such a manner that the area is minimum. Moreover, in the case where the
25 particles have a spherical shape, the aspect ratio is smaller than 1.1. In a conventional technique, that is, a method in which a fat and/or oil such as a highly hydrogenated oil having a high solid fat content at normal temperature is melted and directly sprayed, the particles of a powdered fat and/or oil-containing adhesive composition have a spherical shape due to the
30 surface tension, and the aspect ratio is less than 1.1. Then, for example,

arbitrarily selected particles are directly observed with an optical microscope, a scanning electron microscope, or the like, and the lengths in the major-axis and minor-axis directions of the particles are measured, so that the aspect ratio can be determined as the average of the measured particles.

Further, in a case where the powdered fat and/or oil-containing composition of the present invention adheres, for example as an additive, to the surface of a food or the like, or the powdered fat and/or oil-containing composition of the present invention is used as a coating by itself, it is appropriate to have an average particle diameter (effective diameter) of for example 20 μm or less, preferably 15 μm or less, more preferably 10 μm or less, and further preferably 8 μm or less. The lower limit value of the average particle diameter is not particularly limited and can be for example 0.1 μm or more, 1 μm or more, 2 μm or more, or 4 μm or more. The method for measuring the average particle diameter (effective diameter) is the same as described above. Particularly, the average particle diameter of 20 μm or less is preferable because the coarse, gritty perception of the powder disappears when the powder is put into the mouth.

[0022]

The thickness, as defined below, of the powdered fat and/or oil-containing composition of the present invention is preferably 4 μm or less, more preferably 0.5 to 4 μm , furthermore preferably 0.5 to 3.5 μm , and most preferably 0.5 to 3 μm .

This is because within the range, an effect as a coating (covering) described later can be further exerted.

The thickness was determined by: taking a micrograph of a coating substance (the powdered fat and/or oil-containing composition of the present invention, a pulverized fat and/or oil, and the like) made to adhere to the surface of a core substance; and measuring, as the thickness of one sample, the length in the vertical direction from the adhesion face of the coating substance made to adhere to the surface of the core substance. In the

present invention, the thicknesses of 12 samples were measured, and the average thereof was used as the value of the thickness of the sample. A site corresponding to the actually measured thickness of the powdered fat and/or oil-containing composition or the pulverized fat and/or oil will be described with reference to Figs. 15 and 16. The lengths of sites (3 sites each) indicated by straight lines in the photographs are thicknesses. Further description will be made with reference to Fig. 17 which schematically shows the micrographs of Figs. 15 and 16. In Fig. 17, A depicts the core substance, B depicts the coating substance, and the length of line segment ab depicts the value of the thickness of a particle made to adhere to the surface of the core substance.

[0023]

<Method for Producing Powdered Fat and/or Oil-Containing Adhesive Composition>

The powdered fat and/or oil-containing adhesive composition of the present invention can be produced by a method including the following steps of:

(a) preparing a fat and/or oil composition raw material containing a XXX triglyceride;

(b) optionally, for example, heating the fat and/or oil composition raw material obtained in step (a) to melt the triglyceride incorporated in the fat and/or oil composition raw material, thereby obtaining the fat and/or oil composition raw material in a molten state; and

(d) cooling and solidifying the fat and/or oil composition raw material to obtain a powdered fat and/or oil-containing adhesive composition containing a β -form fat and/or oil whose particles have a plate-like shape.

Additionally, the method may include, as step (c), an optional step(s) for promoting the powder formation, for example, a seeding step (c1), a tempering step (c2), and/or a pre-cooling step (c3), between steps (b) and (d).

Further, the powdered fat and/or oil-containing adhesive composition

obtained in step (d) may be obtained by a step of (e) pulverizing a solid resulting after the cooling in step (d) to obtain a powdered fat and/or oil-containing adhesive composition. Hereinafter, steps (a) to (e) will be described.

5 [0024]

(a) Step of Preparing Raw Material

The fat and/or oil composition raw material containing a XXX triglyceride prepared in step (a) can be produced based on methods for producing fats and/or oils such as normal XXX triglycerides including at least one type of a XXX triglyceride having fatty acid residues X, each with x carbon atoms, at positions 1 to 3 of glycerin, or easily obtained from the market. Herein, the XXX triglyceride specified by x carbon atoms and fatty acid residues X is the same as the finally-obtained target fat and/or oil ingredient except for the polymorphs. The raw material may contain the β -form fat and/or oil, and may contain the β -form fat and/or oil in an amount of, for example, 0.1% by mass or less, 0.05% by mass or less, or 0.01% by mass or less. However, the β -form fat and/or oil disappears when the raw material is melted by heating or the like, and hence the raw material may be a raw material in a molten state. In the case where the raw material is, for example, in a molten state, substantially containing no β -form fat and/or oil means to include cases where not only the XXX triglyceride but also substantially all the fat and/or oil ingredient is not the β -form fat and/or oil. The presence of the β -form fat and/or oil can be confirmed by checking a diffraction peak derived from the β -form fat and/or oil by the above-described X-ray diffraction measurement, the β -form fat and/or oil by differential scanning calorimetry, and so forth. In the case of "substantially containing no β -form fat and/or oil," the abundance of the β -form fat and/or oil can be speculated from the intensity proportions of the β -form characteristic peak and the α -form characteristic peak among X-ray diffraction peaks: [β -form characteristic peak intensity/(α -form characteristic peak intensity + β -form

10
15
20
25
30

characteristic peak intensity)] (peak intensity ratio). The peak intensity ratio of the fat and/or oil composition raw material is, for example, 0.2 or less, preferably 0.15 or less, and more preferably 0.10 or less. The fat and/or oil composition raw material may contain one type or at least two types, preferably one type or two types, and more preferably one type, of the XXX triglyceride as described above.

Specifically, for example, the XXX triglyceride can be produced through direct synthesis using fatty acids or fatty acid derivatives and glycerin. The method for directly synthesizing the XXX triglyceride includes: (i) a method in which fatty acids each with X carbon atoms and glycerin are directly esterified (direct esterification); (ii) a method in which a fatty acid alkyl ester (for example, fatty acid methyl ester and fatty acid ethyl ester) having an alkoxyl group bonded to a carboxyl group of a fatty acid X with x carbon atoms is reacted with glycerin under a base or acid catalyst condition (transesterification synthesis using a fatty acid alkyl ester); and (iii) a method in which a fatty acid halide (for example, fatty acid chloride and fatty acid bromide) having a halogen substituting for a hydroxyl group of a carboxyl group of a fatty acid X with x carbon atoms is reacted with glycerin under a base catalyst (acid halide synthesis).

The XXX triglyceride can be produced by any of the above-described methods (i) to (iii). However, from the viewpoint of the ease of the production, direct esterification (i) or the transesterification synthesis (ii) using a fatty acid alkyl ester is preferable, and the direct esterification (i) is more preferable.

[0025]

To produce the XXX triglyceride by the direct esterification (i), preferably 3 to 5 moles, more preferably 3 to 4 moles, of the fatty acid X or fatty acid Y is used relative to 1 mole of glycerin from the viewpoint of the production efficiency.

The reaction temperature in the direct esterification (i) for the XXX

triglyceride should be a temperature at which water formed by the esterification can be removed to the outside of the system. For example, the reaction temperature is preferably 120°C to 300°C, more preferably 150°C to 270°C, and further preferably 180°C to 250°C. When the reaction is carried out at 180 to 250°C, the XXX triglyceride can be produced particularly efficiently.

[0026]

In the direct esterification (i) for the XXX triglyceride, a catalyst may be used to promote the esterification. The catalyst includes acid catalysts, alkaline earth metal alkoxides, and the like. The amount of the catalyst used is preferably approximately 0.001 to 1% by mass relative to a total mass of the reaction raw materials.

In the direct esterification (i) for the XXX triglyceride, the catalyst and unreacted raw materials can be removed by a known purification treatment such as water washing, alkaline neutralization (deacidification), and/or deacidification under reduced pressure, and adsorption treatment, after the reaction. Further, the obtained product can be further purified by decolorization and deodorization treatments.

[0027]

The amount of the XXX triglyceride incorporated in the fat and/or oil composition raw material is, for example, 100 to 50% by mass, preferably 95 to 55% by mass, and more preferably 90 to 60% by mass, given that a total mass of all the triglycerides incorporated in the raw material is 100% by mass. Further, the amount is furthermore preferably 85 to 65% by mass.

[0028]

<Other Triglycerides>

As other triglycerides constituting the fat and/or oil composition raw material containing a XXX triglyceride, various triglycerides may be incorporated in addition to the XXX triglyceride, as long as the effects of the present invention are not impaired. Examples of the other triglycerides

include: X₂Y triglycerides each having a fatty acid residue Y in place of one of the fatty acid residues X of the XXX triglyceride; XY₂ triglycerides each having fatty acid residues Y in place of two of the fatty acid residues X of the XXX triglyceride; and the like.

5 The amount of the other triglycerides is, for example, 0 to 100% by mass, preferably 0 to 70% by mass, and more preferably 1 to 40% by mass, given that a total mass of the XXX triglycerides is 100% by mass.

[0029]

 Moreover, as the fat and/or oil composition raw material of the
10 present invention, naturally-derived triglyceride compositions having been subjected to hydrogenation, interesterification, or fractionation may be used instead of directly synthesizing the XXX triglyceride. Examples of the naturally-derived triglyceride compositions include rapeseed oil, soybean oil, sunflower seed oil, high oleic sunflower seed oil, safflower oil, palm stearin,
15 mixtures thereof, and the like. Particularly, preferable examples include hydrogenated oils, partially hydrogenated oils, and highly hydrogenated oils of these naturally-derived triglyceride compositions. Further preferable examples include hard palm stearin, high oleic sunflower seed oil, highly hydrogenated oil, highly hydrogenated rapeseed oil, and highly
20 hydrogenated soybean oil.

[0030]

 Further, the fat and/or oil composition raw material of the present invention includes commercially-available triglyceride compositions or synthetic fats and/or oils. Examples of the triglyceride compositions include
25 hard palm stearin (manufactured by The Nisshin OilliO Group, Ltd.), highly hydrogenated rapeseed oil (manufactured by Yokozeki Oil & Fat Industries Co.), and highly hydrogenated soybean oil (manufactured by Yokozeki Oil & Fat Industries Co.). Moreover, the synthetic fats and/or oils include tripalmitin (manufactured by Tokyo Chemical Industry Co., Ltd.), tristearin
30 (manufactured by Sigma-Aldrich Corporation), tristearin (manufactured by

Tokyo Chemical Industry Co., Ltd.), triarachidin (manufactured by Tokyo Chemical Industry Co., Ltd.), and tribehenin (manufactured by Tokyo Chemical Industry Co., Ltd.).

Besides, since highly hydrogenated palm oil has a low
5 XXX-triglyceride content, highly hydrogenated palm oil can be used as an ingredient for diluting the triglyceride.

[0031]

<Other Ingredients>

The fat and/or oil composition raw material may optionally contain
10 other ingredients such as a partial glyceride, a fatty acid, an antioxidant, an emulsifier, and a solvent such as water, in addition to the above-described triglyceride. The amount of these other ingredients coil-containing. For example, the amount is 0 to 5% by mass, preferably 0 to 2% by mass, and more preferably 0 to 1% by mass, given that the total mass of the XXX
15 triglycerides is 100% by mass.

[0032]

In a case where the fat and/or oil composition raw material contains multiple ingredients, these may be mixed optionally. The mixing may be performed by adopting any known mixing method, as long as a uniform
20 reaction substrate is obtained. For example, the mixing can be performed with a paddle mixer, an agi-homo mixer, a disper mixer, or the like.

The mixing may be performed under heating as necessary. The heating is preferably performed at a heating temperature comparable to that in step (b) to be described below. For example, the heating is performed at
25 50 to 120°C, preferably 60 to 100°C, more preferably 70 to 90°C, and further preferably 80°C.

[0033]

(b) Step of Obtaining the Fat and/or Oil Composition in Molten State

Before step (d), if the fat and/or oil composition raw material
30 prepared in step (a) is in a molten state when prepared, the fat and/or oil

composition raw material is directly cooled without heating. Meanwhile, if the fat and/or oil composition raw material is not in a molten state when prepared, the fat and/or oil composition raw material is optionally heated to melt the triglyceride incorporated in the fat and/or oil composition raw material, so that the fat and/or oil composition raw material in the molten state is obtained.

Herein, it is appropriate to heat the fat and/or oil composition raw material at a temperature not lower than a melting point of the triglyceride incorporated in the fat and/or oil composition raw material, particularly at a temperature at which the XXX triglyceride can be melted, for example, 70 to 200°C, preferably 75 to 150°C, and more preferably 80 to 100°C. Moreover, it is appropriate to continue the heating for, for example, 0.1 to 3 hours, preferably 0.3 to 2 hours, and more preferably 0.5 to 1 hour.

[0034]

(d) Step of Cooling Fat and/or Oil Composition in Molten State to Obtain Powdered Fat and/or Oil-Containing Adhesive Composition

The fat and/or oil composition raw material in the molten state prepared in step (a) or (b) is further cooled and solidified to form a powdered fat and/or oil-containing adhesive composition containing a β -form fat and/or oil whose particles have a plate-like shape.

Herein, in order to "cool and solidify the fat and/or oil composition raw material in the molten state," it is necessary to keep the fat and/or oil composition raw material in the molten state at a temperature, as the upper limit value of the cooling temperature, which is lower than the melting point of the β -form fat and/or oil of the fat and/or oil ingredient incorporated in the fat and/or oil composition raw material. In a case where the XXX triglyceride has three stearic acid residues each having 18 carbon atoms, the melting point of the β -form fat and/or oil is 74°C (Table 1). Hence, in this case, the "temperature lower than the melting point of the β -form fat and/or oil of the fat and/or oil ingredient incorporated in the fat and/or oil

composition raw material" is, for example, a temperature lower by 1 to 30°C than the melting point (i.e., 44 to 73°C), preferably a temperature lower by 1 to 20°C than the melting point (i.e., 54 to 73°C), more preferably a temperature lower by 1 to 15°C than the melting point (i.e., 59 to 73°C), and particularly preferably a temperature lower by 1°C, 2°C, 3°C, 4°C, 5°C, 6°C, 7°C, 8°C, 9°C, or 10°C.

More preferably, in order to obtain the β -form fat and/or oil, it is appropriate to keep the fat and/or oil composition raw material in the molten state at no lower than the cooling temperature obtained from the following formula as the lower limit value of the cooling temperature:

cooling temperature (°C) = x number of carbon atoms $\times$ 6.6 - 68.

(in the formula, the x number of carbon atoms is x number of carbon atoms of the XXX triglyceride incorporated in the fat and/or oil composition raw material) The temperature is kept at no lower than the cooling temperature as described above because, in order to obtain the β -form fat and/or oil containing the XXX triglyceride, when the fat and/or oil is crystallized, the cooling temperature needs to be set to a temperature at which α -form fat and/or oil and β' -form fat and/or oil other than the β -form fat and/or oil are not crystallized. Since the cooling temperature depends mainly on the size of the XXX triglyceride molecules, it can be understood that there is a certain correlation between the x number of carbon atoms and the optimal lower limit value of the cooling temperature.

For example, in the case where the XXX triglyceride incorporated in the fat and/or oil composition raw material is a XXX triglyceride having three stearic acid residues each having 18 carbon atoms, the lower limit value of the cooling temperature is 50.8°C or more. Thus, in the case where the XXX triglyceride has three stearic acid residues each having 18 carbon atoms, the temperature of "cooling and solidifying the fat and/or oil composition raw material in the molten state" is more preferably 50.8°C or more to 72°C or less.

Meanwhile, in a case where the XXX triglyceride is a mixture of two or more types, the lower limit value can be determined in accordance with the cooling temperature of the type having smaller x number of carbon atoms. For example, in a case where the XXX triglyceride incorporated in the fat and/or oil composition raw material is a mixture of a XXX triglyceride having three palmitic acid residues each having 16 carbon atoms and a XXX triglyceride having three stearic acid residues each having 18 carbon atoms, the lower limit value of the cooling temperature is 37.6°C or more in accordance with that of smaller number of carbon atoms, that is, 16.

[0035]

In another embodiment, the lower limit value of the cooling temperature is appropriately a temperature not lower than a melting point of the α -form fat and/or oil corresponding to the β -form fat and/or oil in the fat and/or oil composition raw material containing the XXX triglyceride. For example, in the case where the XXX triglyceride incorporated in the fat and/or oil composition raw material is a XXX triglyceride having three stearic acid residues each having 18 carbon atoms, the melting point of the α -form fat and/or oil of the XXX triglyceride having three stearic acid residues is 55°C (Table 1). Hence, in this case, the temperature of "cooling and solidifying the fat and/or oil composition raw material in the molten state" is preferably 55°C or more to 72°C or less.

[0036]

In still another embodiment, the fat and/or oil composition raw material in the molten state is cooled such that, for example, when x is 10 to 12, the cooling makes the final temperature reach a temperature of preferably -2 to 46°C, more preferably 12 to 44°C, and further preferably 14 to 42°C. The final temperature in the cooling is, for example, when x is 13 or 14, preferably 24 to 56°C, more preferably 32 to 54°C, and further preferably 40 to 52°C; when x is 15 or 16, preferably 36 to 66°C, more preferably 44 to 64°C, and further preferably 52 to 62°C; when x is 17 or 18,

preferably 50 to 72°C, more preferably 54 to 70°C, and further preferably 58 to 68°C; when x is 19 or 20, preferably 62 to 80°C, more preferably 66 to 78°C, and further preferably 70 to 77°C; when x is 21 or 22, preferably 66 to 84°C, more preferably 70 to 82°C, and further preferably 74 to 80°C. At the final temperature, it is appropriate to leave standing the fat and/or oil composition raw material for, for example, preferably 2 hours or more, more preferably 4 hours or more, and further preferably 6 hours or more, but preferably 2 days or less, more preferably 24 hours or less, and further preferably 12 hours or less.

[0037]

(c) Step of Promoting Powder Formation

Further, as the optional step (c) for promoting the powder formation between steps (a) or (b) and (d), the fat and/or oil composition raw material in the molten state to be used in step (d) may be treated by a seeding process (c1), a tempering process (c2), and/or a pre-cooling process (c3), before step (d). Any one of these optional steps (c1) to (c3) may be performed alone or in some combinations of the multiple steps. Herein, between step (a) or (b) and step (d) and similar phrases mean to include: during step (a) or (b); after step (a) or (b) but before step (d); and during step (d).

The seeding process (c1) and the tempering process (c2) in the production of the powdered fat and/or oil-containing adhesive composition of the present invention are powder-formation promoting methods for processing the fat and/or oil composition raw material in the molten state before the cooling to the final temperature so that the fat and/or oil composition raw material in the molten state can be powdered more reliably.

Herein, the seeding process (c1) is a method for promoting powdering by adding a small amount of an ingredient, which serves as a powder core (seed), during the cooling of the fat and/or oil composition raw material in the molten state. Specifically, for example, targeting the fat and/or oil composition raw material in the molten state obtained in step (b), a fat

and/or oil powder containing preferably 80% by mass or more, more preferably 90% by mass or more, of a XXX triglyceride with the same number of carbon atoms as the XXX triglyceride in the fat and/or oil composition raw material is prepared as the ingredient which serves as the core (seed).

5 This fat and/or oil powder serving as the core is added in an amount of 0.1 to 1 part by mass, preferably 0.2 to 0.8 parts by mass, to 100 parts by mass of the fat and/or oil composition raw material in the molten state when the temperature of the fat and/or oil composition raw material reaches a temperature of, for example, the final cooling temperature ± 0 to $+10^{\circ}\text{C}$,
10 preferably $+5$ to $+10^{\circ}\text{C}$, during the cooling of the fat and/or oil composition raw material in the molten state. In this manner, this method promotes powdering of the fat and/or oil composition.

 Moreover, the tempering process (c2) is a method for promoting powdering of the fat and/or oil composition by one-time cooling before the fat
15 and/or oil composition raw material in the molten state is left standing at the final cooling temperature in cooling the fat and/or oil composition raw material in the molten state. In this process, the fat and/or oil composition raw material in the molten state is cooled to a temperature lower than the cooling temperature in step (d), for example, a temperature lower by 5 to
20 20°C , preferably a temperature lower by 7 to 15°C , and more preferably a temperature lower by approximately 10°C , for preferably 10 to 120 minutes, more preferably approximately 30 to 90 minutes.

 Further, the pre-cooling process (c3) is a method for temporarily cooling, before the cooling in step (d), the fat and/or oil composition raw
25 material in the molten state obtained in step (a) or (b) at a temperature between the temperature in preparing the fat and/or oil composition raw material containing the XXX triglyceride and the cooling temperature in cooling the fat and/or oil composition raw material; in other words, a method for temporarily pre-cooling at a temperature which is lower than the
30 temperature in the molten state in step (a) or (b), but which is higher than

the cooling temperature in step (d). After the pre-cooling process (c3), the cooling in step (d) is performed at the cooling temperature in cooling the fat and/or oil composition raw material. The temperature higher than the cooling temperature in step (d) may be, for example, a temperature higher by 2 to 40°C than the cooling temperature in step (d), preferably a temperature higher by 3 to 30°C, more preferably a temperature higher by 4 to 30°C, and further preferably a temperature higher by approximately 5 to 10°C. Setting a lower temperature for the pre-cooling makes it possible to further shorten the cooling time at the cooling temperature in step (d). Thus, unlike the seeding process and the tempering process, the pre-cooling process is a method for allowing the promotion of powdering of the fat and/or oil composition only by decreasing the cooling temperature stepwise, and has a great advantage in industrial production.

[0038]

(e) Step of Pulverizing Solid to Powdered Fat and/or Oil-Containing Adhesive Composition

Step (d) of obtaining the powdered fat and/or oil-containing adhesive composition by cooling may be performed more specifically by step (e) of pulverizing a solid resulting from the cooling in step (d) to obtain a powdered fat and/or oil-containing adhesive composition.

The detail will be described. First, the fat and/or oil composition raw material is melted to obtain a fat and/or oil composition in a molten state, which is then cooled to form a solid having voids with a larger volume than the fat and/or oil composition raw material in the molten state. The fat and/or oil composition in the form of solid having voids can be pulverized by adding a light impact, so that the solid easily collapses into a powder form.

Herein, the means for adding a light impact is not particularly specified. For example, a pulverization (loosening) method by gently vibrating (applying an impact to) the solid by shaking, sieving, or the like, is simple and preferable.

Note that the solid may be pulverized with known pulverization means. Examples of such pulverization means include a hammer mill, a cutter mill, and the like.

[0039]

5 <Usage of Powdered Fat and/or Oil-Containing Adhesive Composition>

The powdered fat and/or oil-containing adhesive composition of the present invention can be used as an adhesive for adhesion of foods, feeds, pharmaceuticals, cosmetics, or the like to each other by taking the advantage of the adhesiveness. The powdered fat and/or oil-containing adhesive
10 composition of the present invention can be used to produce, for example, foods, which are assembled like a plastic model for fun, by pasting confections such as biscuits or cookies, and foods exhibiting colors or three-dimensional objects by combining various foods. Moreover, the powdered fat and/or oil-containing adhesive composition of the present
15 invention can also be used to produce a solid preparation by compression-molding a food together with a coloring agent, a flavor, or the like. Further, the powdered fat and/or oil-containing adhesive composition of the present invention can be used as a coating applied on the surface of a powder of raw materials of a food, a feed, a pharmaceutical, a cosmetic, or
20 the like. For example, such a coating can be used to coat the food surface to prevent deterioration or moisture absorption due to contact with the outside air or water, improve the flowability, and impart the sustained releasability, masking, elution prevention, acid resistance, and so forth. The powdered fat and/or oil-containing adhesive composition of the present invention is
25 edible by itself, is a food per se, and thus easily usable unlike a food additive such as calcium stearate conventionally used as an adhesive for food. Furthermore, by incorporating the aforementioned various additives into the powdered fat and/or oil-containing adhesive composition of the present invention, the resultant can be utilized as a food additive having an
30 adhesiveness. The powdered fat and/or oil-containing adhesive composition

of the present invention containing the fat and/or oil ingredient as a raw material does not need to contain another known adhesive, and thus can be used with ensured safety as a food.

[0040]

5 <Usage as Adhesive>

The powdered fat and/or oil-containing adhesive composition of the present invention can be utilized as an adhesive or as a portion of an adhesive. For example, the powdered fat and/or oil-containing adhesive composition of the present invention can be used when two articles (foods,
10 feeds, pharmaceuticals, cosmetics, or the like) are made to adhere to each other. Particularly, since the particles of the powdered fat and/or oil-containing adhesive composition of the present invention have a plate-like shape, the area where the particles adhere to an article is large, so that the particles have a stronger adhesive force in comparison with
15 spherical particles. There is such a trend that the finer the average particle diameter of the powdered fat and/or oil-containing adhesive composition of the present invention as an adhesive, the stronger the adhesive force. The particles of the powdered fat and/or oil-containing adhesive composition have an average particle diameter of for example 20 μm or less, preferably 0.1 to
20 20 μm , more preferably 10 μm or less, and further preferably 1 to 10 μm , in view of the adhesive force. For example, when measured under Adhesion Test Condition 1 to a stainless plate described in the following Examples, the adhesive composition containing the powdered fat and/or oil of the present invention having an average particle diameter of 6.4 to 10.4 μm has an
25 adhesive force of preferably 5.0 nN or more, more preferably 10.0 nN or more, and further preferably 15.0 nN or more. A suitable range of this adhesive force is, for example, 5 to 50.0 nN, preferably 10.0 to 40.0 nN, and more preferably 15.0 to 35.0 nN. Moreover, for example, when measured under Adhesion Test Condition 2 to a stainless plate described in the following
30 Examples, the adhesive composition containing the powdered fat and/or oil of

the present invention having an average particle diameter of 7.2 to 7.9 μm has an adhesive force of preferably 0.1 nN or more, more preferably 0.3 nN or more, and further preferably 0.5 nN or more. A suitable range of this adhesive force is, for example, 0.1 to 10.0 nN, preferably 0.3 to 5.0 nN, more preferably 0.5 to 3.0 nN. The amount of the adhesive of the present invention relative to a food is the same as the content of the powdered fat and/or oil-containing adhesive composition in the food containing the fat and/or oil composition described above.

Relative to, for example, 100% by mass of the adhesive, the content of the powdered fat and/or oil-containing composition in the adhesive of the present invention may be, for example, 1% by mass or more, 5% by mass or more, 10% by mass or more, 30% by mass or more, 50% by mass or more, 70% by mass or more, 80% by mass or more, and 90% by mass or more, and may be 100% or less, 90% by mass or less, 80% by mass or less, 70% by mass or less, 50% by mass or less, 40% by mass or less, 30% by mass or less, and 10% by mass or less, or may be 100% by mass. The content of the powdered fat and/or oil-containing adhesive composition in the adhesive of the present invention may be, for example, 1 to 99% by mass, preferably 10 to 90% by mass, more preferably 15 to 85% by mass, and further preferably 20 to 80% by mass.

[0041]

<Usage as Coating>

The powdered fat and/or oil-containing composition of the present invention can also be utilized as a coating (covering). For example, the powdered fat and/or oil-containing adhesive composition of the present invention can be used when the surface of a powder of raw materials of a food, a feed, a pharmaceutical, a cosmetic, or the like is coated. Particularly, since the powdered fat and/or oil-containing adhesive composition of the present invention has an adhesiveness by itself, the surface of a powder can be coated with a sufficient adhesive force without using another adhesive.

For example, the surface of a powder, such as caster sugar, which is likely to absorb moisture is coated therewith, making it possible to prevent the moisture absorption and the caking. Moreover, in a case where the powdered fat and/or oil-containing adhesive composition of the present invention is applied onto the surface of an article, such as jelly, which has a flowability, the coating has such a self-restoration ability that even when the coating on the surface is partially removed by applying an impact to or cutting the surface of the jelly, the removed site is again coated through the assembly of the powdered fat and/or oil-containing adhesive composition therearound. Further, since the particles of the powdered fat and/or oil-containing adhesive composition of the present invention have a plate-like shape, the coated area is large when the particles adhere to an article in comparison with spherical (or circular) particles, making it possible to minimize the uncoated surface of the article.

A coating percentage on the surface of the article can be adjusted by the amount of the added powdered fat and/or oil-containing composition of the present invention. Therefore, the coating percentage can be appropriately changed depending on the usage thereof.

For example, in the case where, for example, glass beads are used as the core substance, one having a coating percentage of approximately 25 to 35% can be produced by adding approximately 1% by mass (outer percentage) to the glass beads.

As the amount of the added powdered fat and/or oil-containing composition of the present invention is increased, for example, approximately 80% or more, preferably 85% or more, and more preferably 90% or more, of the surface area of an article can be coated with the powdered fat and/or oil-containing composition of the present invention; the coating may be, for example, approximately 98% or less, preferably 99% or less, and more preferably 99.5% or less, of the surface area.

Relative to, for example, 100% by mass of the adhesive, the content of

the powdered fat and/or oil-containing adhesive composition in the coating of the present invention may be, for example, 1% by mass or more, 5% by mass or more, 10% by mass or more, 30% by mass or more, 50% by mass or more, 70% by mass or more, 80% by mass or more, and 90% by mass or more, and may be 100% or less, 90% by mass or less, 80% by mass or less, 70% by mass or less, 50% by mass or less, 40% by mass or less, 30% by mass or less, and 10% by mass or less, or may be 100% by mass. The content of the powdered fat and/or oil-containing adhesive composition in the coating of the present invention may be, for example, 1 to 99% by mass, preferably 10 to 90% by mass, more preferably 15 to 85% by mass, and further preferably 20 to 80% by mass.

[0042]

<Measurement Method for Adhesion Force>

Herein, although not bound by any theory, the adhesion force acting between two particles includes van der Waals force, electrostatic force, and liquid bridge force. It is said that the magnitudes of electrostatic force, van der Waals force, and liquid bridge force increase in this order. The method for measuring the adhesion force is roughly classified into cases of measuring the adhesion force of individual particles or of a powder layer. The measurement method for individual particles includes a spring balance method, a pendulum method, a centrifugation method, an impact method, a vibration method, a method using an atomic force microscope, and the like (Reference Literature 1: Process Design and Trouble Shooting in Powder & Nanoparticle Processing, Technosystem Co., Ltd., PP. 137-139; Reference Literature 2: "*Hajimetenno Funtai Gijutsu* (Introduction to Powder Technology)" Kogyo Chosakai Publishing Co., Ltd., PP. 27-29). Among these, a centrifugation method has a simple principle and is applicable under wide measurement conditions and easy to perform, and the measurement method is preferably utilizable as the evaluation method of the present invention.

An example of a specific centrifugation method includes a method for

testing an adhesion to a stainless plate.

For example, in the method, using an adhesion-force measurement system (such as NS-C300-HK manufactured by Nano Seeds Corporation), a powder sample is made to adhere onto the surface of a standard stainless plate, and centrifuged at a specific centrifugal force; then, the centrifugal force is plotted on the vertical axis, while the residual percentage of the powder on the plate is plotted on the horizontal axis to calculate a centrifugal force at the residual percentage of 50% by mass as an adhesion force. The specific measurement conditions include the following Condition 1 and Condition 2 under which the centrifugal force is increased stepwise. Note that the unit of the centrifugal force is expressed by the ratio to gravitational acceleration of the earth and "Relative Centrifugal Force" (RCF) is used. It is normally expressed with "G".

Condition 1

Centrifugal forces: 1000, 2000, 4000, 8000, 12000, and 16000 (G)
(centrifuged at each centrifugal force for 1 minute)

Condition 2

Centrifugal forces: 100, 200, 400, 800, 1600, 3200, and 6400 (G)
(centrifuged at each centrifugal force for 1 minute)

[0043]

<Relation between Adhesion Force and Particle Diameter>

Although the present invention is not intended to be taken in a limited sense by any theory, the adhesion force of the powdered fat and/or oil-containing adhesive composition of the present invention is said to be proportional to approximately the first power of the particle diameter (average particle diameter) of the composition, and the gravity is said to be proportional to the third power of the particle diameter. Moreover, it is said that the balance is achieved when the particle diameter is approximately 30 μm (Reference Literature 3: Process Design and Trouble Shooting in Powder & Nanoparticle Processing, Technosystem Co., Ltd., PP. 137-139; Reference

Literature 4: "*Hajimeteno Funtai Gijutsu* (Introduction to Powder Technology)" Kogyo Chosakai Publishing Co., Ltd., PP. 27-29; Reference

Literature 5: "*Fushigina Konano Sekai* (Marvelous Powder World)" *Konawo Kagakusuru* (Scientifically Study Powders), edited by the Association of

5 Powder Process Industry and Engineering, JAPAN, the Nikkan Kogyo Shimbun, Ltd., PP. 36-37). To be put it differently, normally, if the particle

diameter is 30 μm or less, the adhesion force is stronger than the gravity, so that the particles do not fall due to the own weight and are likely to adhere to a substance. Thus, in order to obtain the particle diameter with a strong

10 adhesion force, the particle diameter should be as small as possible.

However, it goes without saying that there has been a problem to be solved particularly in fat and/or oil powders that it is quite difficult to industrially produce particles having small particle diameters. The present invention

has revealed that even when the above-described electrostatic force and
15 liquid bridge force cannot be expected, a high adhesion force can be obtained from a powdered fat and/or oil composition (particles) containing a fat and/or oil ingredient containing a specific XXX triglyceride and a β -form fat and/or oil and having a plate-like shape and specific particle diameters.

[0044]

20 <Food Containing Powdered Fat and/or Oil-Containing Adhesive Composition>

The powdered fat and/or oil-containing composition of the present invention can be incorporated in various foods. The foods to which the powdered fat and/or oil-containing composition is added are not particularly

25 limited and can include cake mixes, creams, shortenings, chocolates, baked confectionery products, and the like. The content of the powdered fat and/or oil-containing composition in the food of the present invention varies depending on the type of a target food. For example, the content is 0.1 to 99% by mass, preferably 1 to 90% by mass, more preferably 5 to 85% by mass,
30 and further preferably 10 to 80% by mass, relative to, for example, 100% by

mass of the finally obtained food.

[0045]

<Method for Producing Food Containing Powdered Fat and/or Oil-Containing Adhesive Composition>

5 The present invention also relates to a method for producing a food containing the above-described powdered fat and/or oil-containing composition.

Specifically, the method can include the above-described step of

10 (d) cooling and solidifying the fat and/or oil composition raw material in a molten state to obtain a powdered fat and/or oil-containing composition containing a β -form fat and/or oil whose particles have a plate-like shape, or
 (e) pulverizing a solid to obtain a powdered fat and/or oil-containing composition, followed by

 a step of adding the obtained powdered fat and/or oil-containing
15 composition to a food raw material, that is,

 (f) adding the obtained powdered fat and/or oil-containing composition to a food raw material to obtain a food containing the powdered fat and/or oil-containing composition.

 In step (f), the adding method is not particularly limited. In the
20 case where the powdered fat and/or oil-containing composition is used as, for example, an adhesive or a coating, step (f) includes a method in which the obtained powdered fat and/or oil-containing composition is added to the food raw material (the adding includes, for example, not only applying the composition to or coating the food surface therewith, but also incorporating
25 the composition into the food thoroughly). It is also possible that a food having an adhesiveness or coatability is produced by adding the obtained powdered fat and/or oil-containing composition into the food raw material.

Examples

30 [0046]

Next, the present invention will be described in detail based on Comparative Examples and Examples.

[Analysis Methods]

- Triglyceride Composition

5 Gas chromatography analysis conditions

DB1-ht (0.32 mm × 0.1 μm × 5 m) Agilent Technologies Inc. (123-1131)

Injected amount: 1.0 μL

Injection inlet: 370°C

Detector: 370°C

10 Split ratio: 50/1, 35.1 kPa constant pressure

Column CT: 200°C (0 min hold) to (15°C/min) to 370°C (4 min hold)

- Loose Bulk Density

The loose bulk densities (g/cm³) of powdered fat and/or oil-containing adhesive compositions obtained in Examples and so forth were determined by:
 15 letting each powdered fat and/or oil-containing adhesive composition fall approximately 2 cm above an upper opening end of a graduated cylinder with an inner diameter 15 mm × 25 mL to loosely fill the graduated cylinder; measuring a mass (g) and reading a volume (mL) thus filled; and calculating a mass (g) of the powdered fat and/or oil-containing adhesive composition per mL.

20 [0047]

- Aspect Ratio

Particles were directly observed with a scanning electron microscope S-3400N (manufactured by Hitachi High-Technologies Corporation). Using software for measuring particle size distribution through image analysis
 25 (Mac-View manufactured by Mountech Co., Ltd.), arbitrarily selected particles were measured for lengths in the major-axis and minor-axis directions, and the average of the measured particles was obtained.

- Average Particle Diameter

The average particle diameters were measured based on laser
 30 diffraction/scattering methods (ISO133201, ISO9276-1) using a particle size

distribution measuring apparatus (Microtrac MT3300ExII manufactured by Nikkiso Co., Ltd.).

- X-ray diffraction measurement

The measurement was performed using an X-ray diffraction system
 5 Ultima IV (manufactured by Rigaku Corporation), CuK α ($\lambda = 1.542 \text{ \AA}$) as the radiation source and a filter for Cu under conditions of: an output of 1.6 kW, an operation angle of 0.96 to 30.0°, and a measurement speed of 2°/minute. This measurement confirmed the existences of an α -form fat and/or oil, a β' -form fat and/or oil, and a β -form fat and/or oil in a fat and/or oil ingredient
 10 containing a XXX triglyceride. If there was a peak only near 4.6 $\text{\AA}$ and no peak near 4.1 to 4.2 $\text{\AA}$, all the fat and/or oil ingredient was determined as a β -form fat and/or oil.

Note that, from the X-ray diffraction measurement result, a peak intensity ratio = [β -form characteristic peak intensity ($2\theta = 19^\circ$ (4.6
 15 $\text{\AA}$))]/(α -form characteristic peak intensity ($2\theta = 21^\circ$ (4.2 $\text{\AA}$)) + β -form characteristic peak intensity ($2\theta = 19^\circ$ (4.6 $\text{\AA}$))) was measured as the indicator indicating the abundance of the β -form fat and/or oil.

- Crystal (Micrograph)

Images of crystals of the obtained powdered fat and/or oil-containing
 20 adhesive compositions were captured using a 3D real surface view microscope VE-8800 (manufactured by Keyence Corporation). The obtained micrographs are shown in Fig. 4 (Example 7) and Fig. 5 (Comparative Example 3).

[0048]

25 <Preparation of Compositions of Examples and Comparative Examples>

(1) Powdered Fat and/or Oil-Containing Adhesive Composition A Used in Examples 1 to 9

First, 25 g of a triglyceride having stearic acid residues (each having 18 carbon atoms) at positions 1 to 3 (XXX type: 79.1% by mass, highly
 30 hydrogenated rapeseed oil, manufactured by Yokozeki Oil & Fat Industries

Co.) was maintained at 80°C for 0.5 hours and completely melted. The resultant was cooled in a thermostatic chamber at 60°C for 12 hours. Thereby, a solid having void with an increased volume was formed. After the crystallization was completed, the cooling was performed until a room temperature (25°C) condition. The obtained solid was pulverized with a hammer mill (pulverizer) to obtain a powdered crystalline composition. This operation was repeated nine times in order to obtain various average particle diameters. In accordance with the order, powdered fat and/or oil-containing adhesive compositions A of Examples 1 to 9 (loose bulk densities: 0.185 to 0.24 g/cm³, aspect ratios of 1.6, average particle diameters of 6.4 to 10.4 μm, X-ray diffraction measurement diffraction peaks: 4.6 Å, peak intensity ratios: 0.89) were obtained

Also, the thicknesses of the powdered fat and/or oil-containing adhesive compositions A of Examples 1, 2, 6, and 7 were measured. As a result, the thicknesses of the powdered fat and/or oil-containing adhesive compositions A of Examples 1, 2, 6, and 7 were 1.64 μm, 1.64 μm, 2.00 μm, and 2.11 μm, respectively.

Note that the thickness was determined by: taking a micrograph of a coating substance (the powdered fat and/or oil-containing composition of the present invention, a pulverized fat and/or oil, and the like) made to adhere to the surface of a core substance; and measuring, as the thickness of one sample, the length in the vertical direction from the adhesion face of the coating substance made to adhere to the surface of the core substance. The thicknesses of 12 samples were measured, and the average thereof was used as the value of the thickness of the sample. A site corresponding to the actually measured thickness of the powdered fat and/or oil-containing composition or the pulverized fat and/or oil will be described with reference to Fig. 15. The lengths of sites (3 sites each) indicated by straight lines in the photographs are thicknesses.

Fig. 9 is a micrograph of the powdered fat and/or oil-containing

adhesive composition A (β -form fat and/or oil) before pulverization of Example 7, and Fig. 10 is a micrograph of the powdered fat and/or oil-containing adhesive composition A (β -form fat and/or oil) of Example 7.

(2) Highly Hydrogenated Rapeseed Oil Used in Comparative Example 1

First, 25 g of a triglyceride having stearic acid residues (each having 18 carbon atoms) at positions 1 to 3 (XXX type: 79.1% by mass, highly hydrogenated rapeseed oil, manufactured by Yokozeki Oil & Fat Industries Co.) was maintained at 80°C for 0.5 hours and completely melted. The resultant was cooled in a thermostatic chamber at 40°C for 3 hours, and pulverized with a hammer mill. Thus, a powdered composition (loose bulk density: 0.3 g/cm³, aspect ratio of 1.4, average particle diameter of 21.6 μ m, X-ray diffraction measurement diffraction peak: 4.1 Å, peak intensity ratio: 0.11) was obtained (Comparative Example 1 contains no β -form fat and/or oil).

Also, the thickness of the pulverized fat and/or oil of Comparative Example 1 was measured. As a result, the thickness was 5.46 μ m. A method for measuring the thickness is as described above.

Fig. 11 is a micrograph of the pulverized fat and/or oil (α -form fat and/or oil) of Comparative Example 1.

(3) Calcium Stearate Used in Comparative Example 2

As calcium stearate used in Comparative Example 2, Parteck LUB CST manufactured by Merck KGaA (loose bulk density: 0.13 g/cm³, aspect ratio of 1.4, average particle diameter of 6.5 μ m) was prepared.

(4) Hydrogenated Palm Oil Used in Comparative Example 3

Using a hydrogenated palm oil (manufactured by Yokozeki Oil & Fat Industries Co.) as the raw material, a fat and/or oil powder (loose bulk density: 0.5 g/cm³, aspect ratio of 1.0, average particle diameter of 162 μ m) was obtained by spray-cooling with a spray cooler.

[0049]

<Adhesion Test to Stainless Plate>

Using an adhesion-force measurement system (manufactured by Nano Seeds Corporation NS-C300-HK), each composition of Examples 1 to 9 and Comparative Examples 1 and 2 was made to adhere to the surface of a stainless plate (dimensions of 30 mm × 20 mm) to conduct an experiment in which the composition was separated from the top of the plate by a centrifugal force. More specifically, the centrifugal force was increased stepwise according to Condition 1 or 2, and the composition was centrifuged at each centrifugal force for 1 minute. Then, the composition in a state remaining on the plate was recorded in an image, and compared with the original state before the centrifugation to thereby calculate the residual percentage. The centrifugal force was plotted on the vertical axis, while the residual percentage of the composition on the plate was plotted on the horizontal axis to calculate a centrifugal force at the residual percentage of 50% as an adhesion force. Note that, as measurement conditions in the adhesion force measurement, the following two were adopted.

Condition 1

Centrifugal forces: 1000, 2000, 4000, 8000, 12000, and 16000 (G)

Condition 2

Centrifugal forces: 100, 200, 400, 800, 1600, 3200, and 6400 (G)

[0050]

[Table 2]

Table 2. Examples 1 to 7 and Comparative Example 1

	Loose bulk density (g/cm ³)	Average particle diameter (μm)	Adhesion force (nN)	Adhesion force measurement condition
Example 1	0.185	6.4	32.4	Condition 1
Example 2	0.186	6.5	17.6	Condition 1
Example 3	0.194	7.9	23.0	Condition 1
Example 4	0.198	8.9	26.0	Condition 1
Example 5	0.188	7.0	15.9	Condition 1
Example 6	0.240	10.4	15.0	Condition 1
Example 7	0.193	7.4	19.0	Condition 1
Comparative Example 1	0.300	21.6	1.0	Condition 1

[0051]

- 5 As shown in Table 2 above, when the powdered fat and/or oil-containing adhesive compositions A of the present invention were used (Examples 1 to 7), favorable adhesion forces were obtained. The composition of Comparative Example 1 was a coarse powder but a composition in an aggregate form, and the adhesion force was inferior in
- 10 comparison with Examples 1 to 7.

[0052]

[Table 3]

Table 3 Example 8, Example 9, and Comparative Example 2

	Loose bulk density (g/cm ³)	Average particle diameter (μm)	Adhesion force (nN)	Adhesion force measurement condition
Example 8	0.189	7.2	2.1	Condition 2
Example 9	0.193	7.9	1.1	Condition 2
Comparative Example 2	0.130	6.5	2.9	Condition 2

- 15 [0053]

As shown in Table 3 above, when the powdered fat and/or oil-containing adhesive compositions A of the present invention were used (Examples 8 and 9), favorable adhesion forces were obtained which were equivalent to that of calcium stearate conventionally used as an adhesive for food. Thus, it was found out that the powdered fat and/or oil-containing adhesive composition of the present invention is widely utilizable in foods, while keeping the property equivalent to that of the conventional adhesive for food.

[0054]

10 <Adhesion Test to Glass Beads>

The compositions of Example 1 and Comparative Example 2 were made to adhere to glass beads (manufactured by AS ONE Corporation, cat. no. BZ-01, dimension of 0.105 to 0.125 mm ϕ), and observed with an electron microscope. In Fig. 1, 1% by mass of each composition adhered relative to 100% by mass of the glass beads.

The test result revealed that the coating properties of the powdered fat and/or oil-containing adhesive composition A of Example 1 of the present invention were excellent and comparable to the coating properties of Comparative Example 2. To put it differently, it was found out that the powdered fat and/or oil-containing adhesive composition A of the present invention substitutes for a well-known adhesive of calcium stearate.

[0055]

<Moisture-Absorption Suppression and Caking Prevention Test>

According to the formula table of Table 4 below, powders of Example 10, Comparative Example 3, and Reference Example 1 (which include the following powders coated) were prepared. The raw materials in Table 4 were weighed, then put in a 100-ml beaker, and well mixed, so that a powder (caster sugar, average particle diameter of 100 μ m: manufactured by Mitsui Sugar Co., Ltd.) was coated with the powdered fat and/or oil-containing adhesive composition A or a hydrogenated palm oil. Thus, the

aforementioned powders were produced. After left standing at room temperature (20°C) for 30 minutes, the content of each beaker was transferred to a funnel (mouth diameter: 90 mm, the height of the conical portion: 70 mm, stem diameter: 10 mm, stem length: 90 mm) to measure a time (seconds) until all the powder fell from the funnel. Table 4 shows the evaluation result. It can be understood that the shorter the time until all the powder fell, the more the moisture absorption is suppressed and the caking is prevented.

[0056]

10 [Table 4]

Table 4	Example 10	Comparative Example 3	Reference Example 1
	(g)	(g)	(g)
Powdered fat and/or oil-containing adhesive composition A (that in Example 6 was used)	1.0	—	
Hydrogenated palm oil	—	1.0	
Powder (caster sugar)	9.0	9.0	10.0
Total	10.0	10.0	10.0

[0057]

[Table 5]

Table 5	Time (sec.) until all fell
Example 10	1.6
Comparative Example 3	6.0
Reference Example 1	*

* solidified in an upper portion of the funnel and did not fall.

[0058]

As apparent from the result of Table 5, it was found out that the powder produced by using the powdered fat and/or oil-containing adhesive composition A of the present invention suppressed the moisture absorption and prevented the caking in comparison with the powder produced by using the normal hydrogenated palm oil powder. To put it differently, it was verified that the powdered fat and/or oil-containing adhesive composition A of the present invention acts as a coating and has excellent functions of preventing moisture absorption and caking.

[0059]

<Powder Production and Storage Test>

The powders of Example 10, Comparative Example 3, and Reference Example 1 were produced according to the formulas in Table 4 again by weighing each raw material, then putting and mixing the materials in a beaker. After left standing at room temperature of 20°C for 1 day, 4 days, and 7 days (after the storage test), each beaker was gripped by a hand, and gently shaken right and left six times. Such states were visually observed according to the following evaluation method. Table 6 shows the result of the storage test.

[0060]

(Powder State Evaluation Method)

5: not solidified and felt smooth.

4: relative to 100% by mass of the entire powder, 10 to 30% by mass was solidified.

3: relative to 100% by mass of the entire powder, 30 to 60% by mass was solidified.

5 2: relative to 100% by mass of the entire powder, 60 to 90% by mass was solidified.

1: mostly solidified.

[0061]

[Table 6]

Table 6	Example 10	Comparative Example 3	Reference Example 1
After 1 day	5	2	1
After 4 days	4	2	1
After 7 days	4	1	1

10

[0062]

As apparent from the result of Table 6, it was found out that the powder produced by using the powdered fat and/or oil-containing adhesive composition A of the present invention suppressed the moisture absorption and prevented the caking in comparison with the powder produced by using the normal hydrogenated palm oil powder, like the result in Table 5. To put it differently, the storage test also verified that the powdered fat and/or oil-containing adhesive composition A of the present invention acts as a coating and has excellent functions of preventing moisture absorption and caking.

20

[0063]

Hereinafter, Production Examples of the powdered fat and/or oil-containing adhesive composition of the present invention will be further shown. The compositions in a powder form obtained by these Production Examples also produce an excellent adhesiveness and coating properties, as in Examples described above.

25

(Production Example 1): $x = 16$

First, 25 g of a triglyceride having palmitic acid residues (each having 16 carbon atoms) at positions 1 to 3 (XXX type: 89.7% by mass, tripalmitin, manufactured by Tokyo Chemical Industry Co., Ltd.) was maintained at 80°C for 0.5 hours and completely melted. The resultant was cooled in a thermostatic chamber at 50°C for 12 hours. Thereby, a solid having voids with an increased volume was formed. After the crystallization was completed, the cooling was performed until a room temperature (25°C) condition. The obtained solid was loosened. Thus, a powdered crystalline composition (loose bulk density: 0.2 g/cm³, aspect ratio: 2.0, average particle diameter: 119 μm, X-ray diffraction measurement diffraction peak: 4.6 Å, peak intensity ratio: 0.90) was obtained.

[0064]

(Production Example 2): $x = 16$

First, 25 g of a triglyceride having palmitic acid residues (each having 16 carbon atoms) at positions 1 to 3 (XXX type: 69.9% by mass, hard palm stearin, manufactured by The Nisshin OilliO Group, Ltd.) was maintained at 80°C for 0.5 hours and completely melted. The resultant was cooled in a thermostatic chamber at 50°C for 12 hours. Thereby, a solid having voids with an increased volume was formed. After the crystallization was completed, the cooling was performed until a room temperature (25°C) condition. The obtained solid was loosened. Thus, a powdered crystalline composition (loose bulk density: 0.3 g/cm³, aspect ratio of 1.4, average particle diameter of 99 μm, X-ray diffraction measurement diffraction peak: 4.6 Å, peak intensity ratio: 0.88) was obtained.

[0065]

(Production Example 3): $x = 16$, Tempering Process (c2)

First, 15 g of a triglyceride having palmitic acid residues (each having 16 carbon atoms) at positions 1 to 3 (XXX type: 89.7% by mass, tripalmitin, manufactured by Tokyo Chemical Industry Co., Ltd.) was

maintained at 80°C for 0.5 hours and completely melted. The resultant was cooled in a thermostatic chamber at 30°C for 0.01 hours, and then left standing in the thermostatic chamber at 60°C for 2 hours. Thereby, a solid having voids with an increased volume was formed. After the
 5 crystallization was completed, the cooling was performed until a room temperature (25°C) condition. The obtained solid was loosened. Thus, a powdered crystalline composition (loose bulk density: 0.2 g/cm³, aspect ratio of 2.0, average particle diameter of 87 μm, X-ray diffraction measurement diffraction peak: 4.6 Å, peak intensity ratio: 0.89) was obtained.

10 [0066]

(Production Example 4): x = 16, Seeding Process (c1)

First, 15 g of a triglyceride having palmitic acid residues (each having 16 carbon atoms) at positions 1 to 3 (XXX type: 89.7% by mass, tripalmitin, manufactured by Tokyo Chemical Industry Co., Ltd.) was
 15 maintained at 80°C for 0.5 hours and completely melted. The resultant was cooled in a thermostatic chamber at 60°C until the product temperature reached 60°C. Then, the tripalmitin fat and/or oil powder was added in an amount of 0.1% by mass to the raw material fat and/or oil, and left standing in the thermostatic chamber at 60°C for 2 hours. Thereby, a solid having
 20 voids with an increased volume was formed. After the crystallization was completed, the cooling was performed until a room temperature (25°C) condition. The obtained solid was loosened. Thus, a powdered crystalline composition (loose bulk density: 0.2 g/cm³, aspect ratio of 2.0, average particle diameter of 92 μm, X-ray diffraction measurement diffraction peak:
 25 4.6 Å, peak intensity ratio: 0.89) was obtained.

[0067]

(Production Example 5): x = 18

First, 3 g of a triglyceride having stearic acid residues (each having 18 carbon atoms) at positions 1 to 3 (XXX type: 99.6% by mass, tristearin,
 30 manufactured by Sigma-Aldrich Corporation) was maintained at 80°C for 0.5

hours and completely melted. The resultant was cooled in a thermostatic chamber at 60°C for 12 hours. Thereby, a solid having voids with an increased volume was formed. After the crystallization was completed, the cooling was performed until a room temperature (25°C) condition. The
5 obtained solid was loosened. Thus, a powdered crystalline composition (loose bulk density: 0.2 g/cm³, aspect ratio of 2.0, average particle diameter of 30 μm, X-ray diffraction measurement diffraction peak: 4.6 Å, peak intensity ratio: 0.93) was obtained.

[0068]

10 (Production Example 6): x = 18

First, 25 g of a triglyceride having stearic acid residues (each having 18 carbon atoms) at positions 1 to 3 (XXX type: 96.0% by mass, tristearin, manufactured by Tokyo Chemical Industry Co., Ltd.) was maintained at 80°C for 0.5 hours and completely melted. The resultant was cooled in a
15 thermostatic chamber at 55°C for 12 hours. Thereby, a solid having voids with an increased volume was formed. After the crystallization was completed, the cooling was performed until a room temperature (25°C) condition. The obtained solid was loosened. Thus, a powdered crystalline composition (loose bulk density: 0.2 g/cm³, aspect ratio of 2.0, average
20 particle diameter of 31 μm, X-ray diffraction measurement diffraction peak: 4.6 Å, peak intensity ratio: 0.88) was obtained.

[0069]

(Production Example 7): x = 18

First, 25 g of a triglyceride having stearic acid residues (each having
25 18 carbon atoms) at positions 1 to 3 (XXX type: 79.1% by mass, highly hydrogenated rapeseed oil, manufactured by Yokozeki Oil & Fat Industries Co.) was maintained at 80°C for 0.5 hours and completely melted. The resultant was cooled in a thermostatic chamber at 55°C for 12 hours. Thereby, a solid having voids with an increased volume was formed. After
30 the crystallization was completed, the cooling was performed until a room

temperature (25°C) condition. The obtained solid was loosened. Thus, a powdered crystalline composition (loose bulk density: 0.2 g/cm³, aspect ratio of 1.6, average particle diameter of 54 µm, X-ray diffraction measurement diffraction peak: 4.6 Å, peak intensity ratio: 0.89) was obtained.

5 [0070]

(Production Example 8): x = 18

First, 25 g of a triglyceride having stearic acid residues (each having 18 carbon atoms) at positions 1 to 3 (XXX type: 66.7% by mass, highly hydrogenated soybean oil, manufactured by Yokozeki Oil & Fat Industries
10 Co.) was maintained at 80°C for 0.5 hours and completely melted. The resultant was cooled in a thermostatic chamber at 55°C for 12 hours. Thereby, a solid having voids with an increased volume was formed. After the crystallization was completed, the cooling was performed until a room temperature (25°C) condition. The obtained solid was loosened. Thus, a
15 powdered crystalline composition (loose bulk density: 0.3 g/cm³, aspect ratio of 1.4, average particle diameter of 60 µm, X-ray diffraction measurement diffraction peak: 4.6 Å, peak intensity ratio: 0.91) was obtained.

[0071]

(Production Example 9): x = 18

20 First, a triglyceride having stearic acid residues (each having 18 carbon atoms) at positions 1 to 3 (XXX type: 84.1% by mass, Nisshin sunflower seed oil (S) (high oleic sunflower seed oil), manufactured by The Nisshin Oil Group, Ltd.) was completely hydrogenated according to a conventional method. Thereby, a hydrogenated product (XXX type: 83.9%
25 by mass) was obtained. Then, 25 g of the obtained highly hydrogenated oil of the high oleic sunflower seed oil was maintained at 80°C for 0.5 hours and completely melted. The resultant was cooled in a thermostatic chamber at 55°C for 12 hours. Thereby, a solid having voids with an increased volume was formed. After the crystallization was completed, the cooling was
30 performed until a room temperature (25°C) condition. The obtained solid

was loosened. Thus, a powdered crystalline composition (loose bulk density: 0.2 g/cm³, aspect ratio of 1.6, average particle diameter of 48 μm, X-ray diffraction measurement diffraction peak: 4.6 Å, peak intensity ratio: 0.89) was obtained.

5 [0072]

(Production Example 10): x = 18

First, 18.75 g of a triglyceride having stearic acid residues (each having 18 carbon atoms) at positions 1 to 3 (XXX type: 66.7% by mass, highly hydrogenated soybean oil, manufactured by Yokozeki Oil & Fat Industries
10 Co.) was mixed with 6.25 g of another triglyceride having stearic acid residues (each having 18 carbon atoms) at positions 1 to 3 (XXX type: 11.1% by mass, highly hydrogenated palm oil, manufactured by Yokozeki Oil & Fat Industries Co.). Thereby, a raw material fat and/or oil was prepared (XXX type: 53.6% by mass). The raw material fat and/or oil was maintained at
15 80°C for 0.5 hours and completely melted. The resultant was cooled in a thermostatic chamber at 55°C for 12 hours. Thereby, a solid having voids with an increased volume was formed. After the crystallization was completed, the cooling was performed until a room temperature (25°C) condition. The obtained solid was loosened. Thus, a powdered crystalline
20 composition (loose bulk density: 0.3 g/cm³, aspect ratio of 1.4, average particle diameter of 63 μm, X-ray diffraction measurement diffraction peak: 4.6 Å, peak intensity ratio: 0.78) was obtained. Note that the highly hydrogenated palm oil has a very low XXX triglyceride content, and thus used as an ingredient for dilution (hereinafter the same).

25 [0073]

(Production Example 11): x = 18, Seeding Process (c1)

First, 25 g of a triglyceride having stearic acid residues (each having 18 carbon atoms) at positions 1 to 3 (XXX type: 96.0% by mass, tristearin, manufactured by Tokyo Chemical Industry Co., Ltd.) was maintained at
30 80°C for 0.5 hours and completely melted. The resultant was cooled in a

thermostatic chamber at 70°C until the product temperature reached 70°C. Then, the tristearin fat and/or oil powder was added in an amount of 0.1% by mass to the raw material fat and/or oil, and left standing in the thermostatic chamber at 70°C for 12 hours. Thereby, a solid having voids with an increased volume was formed. After the crystallization was completed, the cooling was performed until a room temperature (25°C) condition. The obtained solid was loosened. Thus, a powdered crystalline composition (loose bulk density: 0.2 g/cm³, aspect ratio of 2.0, average particle diameter of 36 μm, X-ray diffraction measurement diffraction peak: 4.6 Å, peak intensity ratio: 0.88) was obtained.

[0074]

(Production Example 12): x = 18, Tempering Process (c2)

First, 15 g of a triglyceride having stearic acid residues (each having 18 carbon atoms) at positions 1 to 3 (XXX type: 79.1% by mass, highly hydrogenated rapeseed oil, manufactured by Yokozeki Oil & Fat Industries Co.) was maintained at 80°C for 0.5 hours and completely melted. The resultant was cooled in a thermostatic chamber at 50°C for 0.1 hours, and then left standing in the thermostatic chamber at 65°C for 6 hours. Thereby, a solid having voids with an increased volume was formed. After the crystallization was completed, the cooling was performed until a room temperature (25°C) condition. The obtained solid was loosened. Thus, a powdered crystalline composition (loose bulk density: 0.2 g/cm³, aspect ratio of 1.6, average particle diameter of 50 μm, X-ray diffraction measurement diffraction peak: 4.6 Å, peak intensity ratio: 0.90) was obtained.

[0075]

(Production Example 13): x = 18, Tempering Process (c2)

First, 15 g of a triglyceride having stearic acid residues (each having 18 carbon atoms) at positions 1 to 3 (XXX type: 79.1% by mass, highly hydrogenated rapeseed oil, manufactured by Yokozeki Oil & Fat Industries Co.) was maintained at 80°C for 0.5 hours and completely melted. The

resultant was cooled in a thermostatic chamber at 40°C for 0.01 hours, and then left standing in the thermostatic chamber at 65°C for 2 hours. Thereby, a solid having voids with an increased volume was formed. After the crystallization was completed, the cooling was performed until a room temperature (25°C) condition. The obtained solid was loosened. Thus, a powdered crystalline composition (loose bulk density: 0.2 g/cm³, aspect ratio of 1.6, average particle diameter of 52 μm, X-ray diffraction measurement diffraction peak: 4.6 Å, peak intensity ratio: 0.89) was obtained.

[0076]

10 (Production Example 14): x = 18, Pre-Cooling Process (c3)

First, 25 g of a triglyceride having stearic acid residues (each having 18 carbon atoms) at positions 1 to 3 (XXX type: 79.1% by mass, highly hydrogenated rapeseed oil, manufactured by Yokozeki Oil & Fat Industries Co.) was maintained at 80°C for 0.5 hours and completely melted. The raw material fat and/or oil was kept until 70°C in a thermostatic chamber at 70°C, and cooled in the thermostatic chamber at 65°C for 8 hours. Thereby, a solid having voids with an increased volume was formed. After the crystallization was completed, the cooling was performed until a room temperature (25°C) condition. The obtained solid was loosened. Thus, a powdered crystalline composition (loose bulk density: 0.2 g/cm³, aspect ratio of 1.6, average particle diameter of 60 μm, X-ray diffraction measurement diffraction peak: 4.6 Å, peak intensity ratio: 0.89) was obtained.

[0077]

(Production Example 15): x = 20

25 First, 10 g of a triglyceride having arachidic acid residues (each having 20 carbon atoms) at positions 1 to 3 (XXX type: 99.5% by mass, triarachidin, manufactured by Tokyo Chemical Industry Co., Ltd.) was maintained at 90°C for 0.5 hours and completely melted. The resultant was cooled in a thermostatic chamber at 72°C for 12 hours. Thereby, a solid having voids with an increased volume was formed. After the

30

crystallization was completed, the cooling was performed until a room temperature (25°C) condition. The obtained solid was loosened. Thus, a powdered crystalline composition (loose bulk density: 0.2 g/cm³, aspect ratio of 2.0, average particle diameter of 42 μm, X-ray diffraction measurement

5 diffraction peak: 4.6 Å, peak intensity ratio: 0.92) was obtained.

[0078]

(Production Example 16): x = 22

First, 10 g of a triglyceride having behenic acid residues (each having 22 carbon atoms) at positions 1 to 3 (XXX type: 97.4% by mass, tribehenin, manufactured by Tokyo Chemical Industry Co., Ltd.) was maintained at 90°C for 0.5 hours and completely melted. The resultant was cooled in a thermostatic chamber at 79°C for 12 hours. Thereby, a solid having voids with an increased volume was formed. After the crystallization was completed, the cooling was performed until a room temperature (25°C)

15 condition. The obtained solid was loosened. Thus, a powdered crystalline composition (loose bulk density: 0.2 g/cm³, aspect ratio of 2.0, average particle diameter of 52 μm, X-ray diffraction measurement diffraction peak: 4.6 Å, peak intensity ratio: 0.93) was obtained.

[0079]

20 (Production Example 17): x = 16, 18

First 12.5 g of a triglyceride having palmitic acid residues (each having 16 carbon atoms) at positions 1 to 3 (XXX type: 89.7% by mass, tripalmitin, manufactured by Tokyo Chemical Industry Co., Ltd.) was mixed with 12.5 g of a triglyceride having stearic acid residues (each having 18 carbon atoms) at positions 1 to 3 (XXX type: 96.0% by mass, tristearin, Tokyo Chemical Industry Co., Ltd.). Thereby, a raw material fat and/or oil was prepared (XXX type: 93.8%). The raw material fat and/or oil was maintained at 80°C for 0.5 hours and completely melted. The resultant was cooled in a thermostatic chamber at 55°C for 16 hours. Thereby, a solid

30 having voids with an increased volume was formed and then loosened.

Thus, a powdered crystalline composition (loose bulk density: 0.2 g/cm³, aspect ratio of 1.6, average particle diameter of 74 μm, X-ray diffraction measurement diffraction peak: 4.6 Å, peak intensity ratio: 0.90) was obtained.

5 [0080]

(Production Example 18): x = 16, 18

First, 12.5 g of a triglyceride having palmitic acid residues (each having 16 carbon atoms) at positions 1 to 3 (XXX type: 69.9% by mass, hard palm stearin, manufactured by The Nisshin OilliO Group, Ltd.) was mixed
 10 with 12.5 g of a triglyceride having stearic acid residues (each having 18 carbon atoms) at positions 1 to 3 (XXX type: 79.1% by mass, highly hydrogenated rapeseed oil, manufactured by Yokozeki Oil & Fat Industries Co.). Thereby, a raw material fat and/or oil was prepared (XXX type: 75.3%). The raw material fat and/or oil was maintained at 80°C for 0.5 hours and
 15 completely melted. The resultant was cooled in a thermostatic chamber at 55°C for 16 hours. Thereby, a solid having voids with an increased volume was formed and then loosened. Thus, a powdered crystalline composition (loose bulk density: 0.3 g/cm³, aspect ratio of 1.4, average particle diameter of 77 μm, X-ray diffraction measurement diffraction peak: 4.6 Å, peak intensity
 20 ratio: 0.88) was obtained.

[0081]

(Comparative Production Example 1): x = 16

First, 25 g of a triglyceride having palmitic acid residues (each having 16 carbon atoms) at positions 1 to 3 (XXX type: 89.7% by mass,
 25 tripalmitin, manufactured by Tokyo Chemical Industry Co., Ltd.) was maintained at 80°C for 0.5 hours and completely melted. The resultant was cooled in a thermostatic chamber at 25°C for 4 hours, and completely solidified (X-ray diffraction measurement diffraction peak: 4.1 Å, peak intensity ratio: 0.10). Thus, a powdered crystalline composition was not
 30 obtained.

[0082]

(Comparative Production Example 2): $x = 16, 18$

First, 12.5 g of a triglyceride having palmitic acid residues (each having 16 carbon atoms) at positions 1 to 3 (XXX type: 69.9% by mass, hard palm stearin, manufactured by The Nisshin OilliO Group, Ltd.) was mixed with 12.5 g of a triglyceride having stearic acid residues (each having 18 carbon atoms) at positions 1 to 3 (XXX type: 11.1% by mass, highly hydrogenated palm oil, manufactured by Yokozeki Oil & Fat Industries Co.). Thereby, a raw material fat and/or oil was prepared (XXX type: 39.6% by mass). The raw material fat and/or oil was maintained at 80°C for 0.5 hours and completely melted. The resultant was cooled in a thermostatic chamber at 40°C for 12 hours, and completely solidified (X-ray diffraction measurement diffraction peak: 4.2 Å, peak intensity ratio: 0.12). Thus, a powdered crystalline composition was not obtained.

[0083]

(Comparative Production Example 3): $x = 18$

First, 25 g of a triglyceride having stearic acid residues (each having 18 carbon atoms) at positions 1 to 3 (XXX type: 79.1% by mass, highly hydrogenated rapeseed oil, manufactured by Yokozeki Oil & Fat Industries Co.) was maintained at 80°C for 0.5 hours and completely melted. The resultant was cooled in a thermostatic chamber at 40°C for 3 hours, and completely solidified (X-ray diffraction measurement diffraction peak: 4.1 Å, peak intensity ratio: 0.11). Thus, a powdered crystalline composition was not obtained.

[0084]

(Comparative Production Example 4): $x = 18$

First, 12.5 g of a triglyceride having stearic acid residues (each having 18 carbon atoms) at positions 1 to 3 (XXX type: 66.7% by mass, highly hydrogenated soybean oil, manufactured by Yokozeki Oil & Fat Industries Co.) was mixed with 12.5 g of another triglyceride having stearic acid

residues (each having 18 carbon atoms) at positions 1 to 3 (XXX type: 11.1% by mass, highly hydrogenated palm oil, manufactured by Yokozeki Oil & Fat Industries Co.). Thereby, a raw material fat and/or oil was prepared (XXX type: 39.7% by mass). The raw material fat and/or oil was maintained at
5 80°C for 0.5 hours and completely melted. The resultant was cooled in a thermostatic chamber at 55°C for 12 hours, and completely solidified (X-ray diffraction measurement diffraction peak: 4.2 Å, peak intensity ratio: 0.12). Thus, a powdered crystalline composition was not obtained.

Table 7 summarizes the results of Production Examples and
10 Comparative Production Examples described above.
[0085]

[Table 7]

	Fat and/or oil ingredient	X number of carbon atoms	XXX type triglyceride (% by mass)	Loose bulk density (g/cm ³)	Aspect ratio	Average particle diameter (μm)	X-ray diffraction measurement diffraction peak (Å)	Peak intensity ratio	Tempering temperature/hour	Cooling final temperature/hour
Production Example 1	tripalmitin	16	89.7	0.2	2.0	119	4.6	0.90	-	50°C/12 hours
Production Example 2	hard palm stearin	16	69.9	0.3	1.4	99	4.6	0.88	-	50°C/12 hours
Production Example 3	tripalmitin	16	89.7	0.2	2.0	87	4.6	0.89	30°C/0.01 hours	60°C/2 hours
Production Example 4	tripalmitin	16	89.7	0.2	2.0	92	4.6	0.89	-	60°C/2 hours
Production Example 5	tristearin	18	99.6	0.2	2.0	30	4.6	0.93	-	60°C/12 hours
Production Example 6	tristearin	18	96.0	0.2	2.0	31	4.6	0.88	-	55°C/12 hours
Production Example 7	highly hydrogenated rapeseed oil	18	79.1	0.2	1.6	54	4.6	0.89	-	55°C/12 hours
Production Example 8	highly hydrogenated soybean oil	18	66.7	0.3	1.4	60	4.6	0.91	-	55°C/12 hours
Production Example 9	highly hydrogenated high oleic sunflower seed oil	18	83.9	0.2	1.6	48	4.6	0.89	-	55°C/12 hours
Production Example 10	highly hydrogenated soybean oil, highly hydrogenated palm oil	18	53.6	0.3	1.4	63	4.6	0.78	-	55°C/12 hours
Production Example 11	tristearin	18	96.0	0.2	2.0	36	4.6	0.88	-	70°C/12 hours
Production Example 12	highly hydrogenated rapeseed oil	18	79.1	0.2	1.6	50	4.6	0.90	50°C/0.1 hours	65°C/6 hours
Production Example 13	highly hydrogenated rapeseed oil	18	79.1	0.2	1.6	52	4.6	0.89	40°C/0.01 hours	65°C/2 hours
Production Example 14	highly hydrogenated rapeseed oil	18	79.1	0.2	1.6	60	4.6	0.89	-	65°C/8 hours
Production Example 15	triarachidin	20	99.5	0.2	2.0	42	4.6	0.92	-	72°C/12 hours
Production Example 16	tribehenin	22	97.4	0.2	2.0	52	4.6	0.93	-	79°C/12 hours
Production Example 17	tripalmitin, tristearin	16, 18	93.8	0.2	1.6	74	4.6	0.90	-	55°C/16 hours
Production Example 18	hard palm stearin, highly hydrogenated rapeseed oil	16, 18	75.3	0.3	1.4	77	4.6	0.88	-	55°C/16 hours
Comparative Production Example 1	tripalmitin	16	89.7	-	-	-	4.1	0.10	-	25°C/4 hours
Comparative Production Example 2	hard palm stearin, highly hydrogenated palm oil	16, 18	39.6	-	-	-	4.2	0.12	-	40°C/12 hours
Comparative Production Example 3	highly hydrogenated rapeseed oil	18	79.1	-	-	-	4.1	0.11	-	40°C/3 hours
Comparative Production Example 4	highly hydrogenated soybean oil, highly hydrogenated palm oil	18	39.7	-	-	-	4.2	0.12	-	55°C/12 hours

[0086]

<Caking Prevention Test of Caster Sugar>

To 19.4 g of caster sugar (distributed by Seiyu GK), 0.6 g (inner percentage of 3% by mass) of the powdered fat and/or oil-containing adhesive composition A of Examples 1, 2, 6, and 7 was added. After well mixing in a beaker for 3 minutes, 10 g of the obtained mixture was put in a petri dish and stored without a lid at a temperature of 20°C for 72 hours in an atmosphere of 70% humidity. The powder in the petri dish thus stored was placed in a 10-mesh screen and shake-sifted for 10 seconds in a screen shaker (manufactured by AS ONE Corporation). The caking percentage of the caster sugar was calculated according to the equation given below. The result is shown in Table 8.

Caking percentage (% by mass) of caster sugar = the mass of the powder remaining on the screen/the mass of the sifted powder $\times$ 100

For comparison, 10 g each of a powder consisting of caster sugar and a powder obtained by adding 0.6 g (inner percentage of 3% by mass) of the pulverized fat and/or oil of Comparative Example 1 or calcium stearate (manufactured by Merck KGaA, Parteck LUB CST (loose bulk density: 0.13 g/cm³, aspect ratio of 1.4, average particle diameter of 6.5 μ m)) to 19.4 g of caster sugar were stored in the same way as above, and the caking percentage of the caster sugar was calculated. The result is shown in Table 8.

[0087]

[Table 8]

Table 8 Caking Prevention Test Result of Caster Sugar							
	Test 1	Test 2	Test 3	Test 4	Test 5	Test 6	Test 7
Additive	None	Powdered fat and/or oil-containin g adhesive composition A of Example 1	Powdered fat and/or oil-containin g adhesive composition A of Example 2	Powdered fat and/or oil-containin g adhesive composition A of Example 6	Powdered fat and/or oil-containin g adhesive composition A of Example 7	Pulverized fat and/or oil of Comparative Example 1	Calcium stearate
Caking percentage	72.2	2.1	2.2	2.1	2.1	14.9	0.4

[0088]

From the result in Table 8, it was found that the caking of caster
 5 sugar can be prevented by adding the powdered fat and/or oil-containing
 composition of the present invention to the caster sugar.

[0089]

<Caking Prevention Test of Common Salt>

To 19.4 g of common salt (manufactured by Hakata Salt Co., Ltd.),
 10 0.6 g (inner percentage of 3% by mass) of the powdered fat and/or
 oil-containing adhesive composition A of Example 7 was added. After well
 mixing in a beaker for 3 minutes, 10 g of the obtained mixture was put in a
 petri dish and stored without a lid at a temperature of 20°C for 120 hours in
 an atmosphere of 70% humidity. The powder in the petri dish thus stored
 15 was placed in a 10-mesh screen and shake-sifted for 60 seconds in a screen
 shaker (manufactured by AS ONE Corporation). The caking percentage of
 the common salt was calculated according to the equation given below. The
 result is shown in Table 9.

Caking percentage (% by mass) of common salt = the mass of the

powder remaining on the screen/the mass of the sifted powder $\times 100$

For comparison, the caking percentage of common salt was calculated in the same way as above as to a powder consisting of common salt and pulverized fat and/or oil of Comparative Example 1. The result is shown in Table 9.

5 [0090]
[Table 9]

Table 9 Caking Prevention Test Result of Common Salt			
	Test 8	Test 9	Test 10
Additive	None	Powdered fat and/or oil-containing adhesive composition A of Example 7	Pulverized fat and/or oil of Comparative Example 1
Caking percentage	99.4	57.2	99.8

[0091]

10 From the result in Table 9, it was found that the caking of common salt can be prevented by adding the powdered fat and/or oil-containing composition of the present invention to the common salt, as compared with the case of adding the pulverized fat and/or oil of Comparative Example 1.

[0092]

<Coating Percentage Analysis Test Using Glass Beads (Core Substance Model)>

15 Each of evaluation samples of the powdered fat and/or oil-containing adhesive compositions A of Examples 1, 2, 6, and 7, the pulverized fat and/or oil of Comparative Example 1, and calcium stearate (manufactured by Merck KGaA, Parateck LUB CST (loose bulk density: 0.13 g/cm³, aspect ratio of 1.4, average particle diameter of 6.5 μ m)) was evaluated for the coating percentage
20 on surfaces of glass beads (BZ-01, average particle diameter of 105 μ m, AS ONE Corporation) when the evaluation sample was mixed with

the glass beads.

Specifically, 10 g of the glass beads was put in a sample bottle, to which 1% by mass (outer percentage) of each evaluation sample was then added, followed by well mixing for 3 minutes in the sample bottle. An
5 electron micrograph was taken for the surface appearance of the glass beads to which the sample adhered. From the image, the percentage at which the surfaces of the glass beads (core substance) were coated with the evaluation sample (the coating percentage of the glass beads with the evaluation sample) was analyzed using software Image J.

10 The coating percentage analysis result is shown in Table 10.

Fig. 12 is a micrograph in which 1% by mass (outer percentage) of the powdered fat and/or oil-containing adhesive composition A (β -form fat and/or oil) of Example 7 of the present invention adhered to surfaces of glass beads by adding and mixing the powdered fat and/or oil-containing adhesive
15 composition A to the glass beads, Fig. 13 is a micrograph in which 1% by mass (outer percentage) of the pulverized fat and/or oil (α -form fat and/or oil) of Comparative Example 1 of the present invention adhered to surfaces of glass beads by adding and mixing the pulverized fat and/or oil to the glass beads, and Fig. 14 is a micrograph in which 1% by mass (outer percentage) of
20 the calcium stearate of Comparative Example 2 adhered to surfaces of glass beads by adding and mixing the calcium stearate to the glass beads.

[0093]

[Table 10]

Table 10 Coating Percentage Analysis Test Result						
	Test 11	Test 12	Test 13	Test 14	Test 15	Test 16
Evaluation sample	Powdered fat and/or oil-containing adhesive composition A of Example 1	Powdered fat and/or oil-containing adhesive composition A of Example 2	Powdered fat and/or oil-containing adhesive composition A of Example 6	Powdered fat and/or oil-containing adhesive composition A of Example 7	Pulverized fat and/or oil of Comparative Example 1	Calcium stearate
Coating percentage (%)	29.0	27.0	24.6	34.2	15.6	32.0

[0094]

From the result in Table 10, the coating percentage of the powdered fat and/or oil-containing composition of the present invention on the surfaces of glass beads was higher than that of the pulverized fat and/or oil of Comparative Example 1 and was equivalent to that of calcium stearate generally widely utilized as a coating.

Claims

[Claim 1]

A powdered fat and/or oil-containing adhesive composition
5 comprising a fat and/or oil ingredient comprising at least one type of a XXX
triglyceride having fatty acid residues X, each with x carbon atoms, at
positions 1 to 3 of glycerin, wherein

x number of carbon atoms is an integer selected from 10 to 22,

the fat and/or oil ingredient comprises a β -form fat and/or oil,

10 particles of the powdered fat and/or oil-containing adhesive
composition have a plate-like shape, and

the powdered fat and/or oil-containing adhesive composition has a
loose bulk density of 0.05 to 0.6 g/cm³.

[Claim 2]

15 The powdered fat and/or oil-containing adhesive composition
according to claim 1, wherein the fat and/or oil ingredient is constituted of
the β -form fat and/or oil.

[Claim 3]

The powdered fat and/or oil-containing adhesive composition
20 according to claim 1 or 2, comprising 50% by mass or more of the XXX
triglyceride, given that a total mass of the fat and/or oil ingredient is 100%
by mass.

[Claim 4]

The powdered fat and/or oil-containing adhesive composition
25 according to any one of claims 1 to 3, wherein the x number of carbon atoms
is an integer selected from 16 to 18.

[Claim 5]

The powdered fat and/or oil-containing adhesive composition
according to any one of claims 1 to 4, wherein the plate-like shape of the
30 powdered fat and/or oil-containing adhesive composition has an aspect ratio

of 1.1 or more.

[Claim 6]

The powdered fat and/or oil-containing adhesive composition according to any one of claims 1 to 5, wherein a peak intensity ratio (a peak intensity at 4.6 Å/(the peak intensity at 4.6 Å + a peak intensity at 4.2 Å)) in an X-ray diffraction measurement of the powdered fat and/or oil-containing adhesive composition is 0.2 or more.

[Claim 7]

The powdered fat and/or oil-containing adhesive composition according to any one of claims 1 to 6, wherein the powdered fat and/or oil-containing adhesive composition has a thickness of 4 μm or less.

[Claim 8]

An adhesive comprising the powdered fat and/or oil-containing adhesive composition according to any one of claims 1 to 7.

[Claim 9]

A coating comprising the powdered fat and/or oil-containing adhesive composition according to any one of claims 1 to 7.

[Claim 10]

The coating according to claim 9, wherein an average particle diameter of particles of the powdered fat and/or oil-containing adhesive composition determined by laser diffraction/scattering methods is 20 μm or less.

[Claim 11]

A method for producing a powdered fat and/or oil-containing adhesive composition comprising a fat and/or oil ingredient comprising at least one type of a XXX triglyceride having fatty acid residues X, each with x carbon atoms, at positions 1 to 3 of glycerin, wherein

x number of carbon atoms is an integer selected from 10 to 22,

at least a portion of the fat and/or oil ingredient is a β-form fat and/or oil,
particles of the powdered fat and/or oil-containing adhesive

composition have a plate-like shape,

the powdered fat and/or oil-containing adhesive composition has a loose bulk density of 0.05 to 0.6 g/cm³, and

the method comprises the following steps of:

5 (a) preparing a fat and/or oil composition raw material containing a XXX triglyceride; and

(d) cooling and solidifying the fat and/or oil composition raw material to obtain a powdered fat and/or oil-containing adhesive composition comprising a β -form fat and/or oil whose particles have a plate-like shape.

10 [Claim 12]

The method according to claim 11, comprising, as step (b), a step of heating the fat and/or oil composition raw material obtained in step (a) to melt the triglyceride incorporated in the fat and/or oil composition raw material, thereby obtaining the fat and/or oil composition raw material in a molten state.

[Claim 13]

The method according to claim 11 or 12, comprising a seeding step (c1), a tempering step (c2), and/or a pre-cooling step (c3), before step (d), wherein

20 the seeding step (c1) includes adding 0.1 to 1 part by mass of the β -form fat and/or oil to 100 parts by mass of the fat and/or oil composition raw material during the cooling in step (d),

the tempering step (c2) includes, before the cooling in step (d), a step of maintaining a temperature at a temperature lower than a cooling temperature in step (d), and

the pre-cooling step (c3) includes a step of pre-cooling the fat and/or oil composition in the molten state used in step (d) at a temperature higher than the cooling temperature in step (d).

[Claim 14]

30 The method according to any one of claims 11 to 13, wherein the

powdered fat and/or oil-containing adhesive composition obtained in step (d) is obtained by a step of (e) pulverizing a solid resulting after the cooling in step (d) to obtain a powdered fat and/or oil-containing adhesive composition.

[Claim 15]

5 The method according to any one of claims 11 to 14, wherein the XXX triglyceride is incorporated in an amount of 50% by mass or more, given that a total mass of the fat and/or oil ingredient is 100% by mass.

[Claim 16]

10 The method according to any one of claims 11 to 15, wherein x number of carbon atoms is an integer selected from 16 to 18.

[Claim 17]

 The method according to any one of claims 11 to 16, wherein the cooling in step (d) is performed at a temperature not lower than a cooling temperature obtained from the following formula:

15 cooling temperature (°C) = x number of carbon atoms $\times$ 6.6 - 68.

[Claim 18]

 The method according to any one of claims 11 to 17, wherein the cooling in step (d) is performed at a temperature not lower than a melting point of an α -form crystal corresponding to the β -form fat and/or oil.

20 [Claim 19]

 The method according to any one of claims 11 to 18, wherein the powdered fat and/or oil-containing adhesive composition has a thickness of 4 μ m or less.

[Claim 20]

25 A food, a feed, a pharmaceutical, or a cosmetic comprising the powdered fat and/or oil-containing adhesive composition according to any one of claims 1 to 7.

[Claim 21]

30 A food, a feed, a pharmaceutical, or a cosmetic comprising the adhesive according to claim 8, or the coating according to claim 9 or 10.

[Claim 22]

A method for producing a food containing a powdered fat and/or oil-containing adhesive composition comprising a fat and/or oil ingredient comprising at least one type of a XXX triglyceride having fatty acid residues

5 X, each with x carbon atoms, at positions 1 to 3 of glycerin, wherein

x number of carbon atoms is an integer selected from 10 to 22,

at least a portion of the fat and/or oil ingredient is a β -form fat and/or oil,

10 particles of the powdered fat and/or oil-containing adhesive composition have a plate-like shape,

the powdered fat and/or oil-containing adhesive composition has a loose bulk density of 0.05 to 0.6 g/cm³, and

the method comprises the following steps of:

15 (a) preparing a fat and/or oil composition raw material containing a XXX triglyceride;

(d) cooling and solidifying the fat and/or oil composition raw material in a molten state to obtain a powdered fat and/or oil-containing adhesive composition comprising a β -form fat and/or oil whose particles have a plate-like shape; and

20 (f) adding the obtained powdered fat and/or oil-containing adhesive composition to a food raw material to obtain a food containing the powdered fat and/or oil-containing adhesive composition.

[Claim 23]

25 The method for producing a food according to claim 22, wherein the powdered fat and/or oil-containing adhesive composition has a thickness of 4 μ m or less.

POWDERY FAT OR OIL-CONTAINING ADHESIVE COMPOSITION AND METHOD FOR MANUFACTURING SAME

Abstract

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The present invention provides a powdered fat and/or oil-containing composition, an adhesive composition containing a fat and/or oil for producing the powdered fat and/or oil-containing composition, and methods for producing these. Specifically, provided is a powdered fat and/or oil-containing composition
10 containing a fat and/or oil ingredient containing a XXX triglyceride. At least a portion of the fat and/or oil ingredient is a β -form fat and/or oil, particles of the powdered fat and/or oil-containing composition have a plate-like shape, and the powdered fat and/or oil-containing composition has a loose bulk density of 0.05 to 0.6 g/cm³. Moreover, provided is a method for producing a powdered fat and/or
15 oil-containing composition, the method including the steps of: preparing a fat and/or oil composition raw material containing a XXX triglyceride; and cooling and solidifying the fat and/or oil composition raw material to obtain a powdered fat and/or oil-containing composition containing a β -form fat and/or oil whose particles have a plate-like shape.

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[No suitable figure]