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(54) Titre : HUILE ET GRAISSE PERMETTANT DE SUPPRIMER LE BLANCHIMENT
 (54) Title: OIL AND FAT FOR SUPPRESSING BLOOM

(57) **Abrégé/Abstract:**

The present invention provides an oil and fat for suppressing bloom in a chocolate-like food product obtained by a simple method, or a chocolate-like food product in which said oil and fat is used. It was discovered that an oil and fat containing prescribed amounts of an SSU fat and extremely hardened high-erucic-acid rapeseed oil exhibits strong bloom resistance properties. Furthermore, it was confirmed that this effect is further enhanced by the combined use of a sorbitan fatty acid ester.

[ABSTRACT]

The present invention provides an oil and fat for suppressing bloom in a chocolate-like food product obtained by a simple method, or a chocolate-like food product in which said oil and fat is used. It was discovered that an oil and fat
5 containing prescribed amounts of an SSU fat and extremely hardened high-erucic-acid rapeseed oil exhibits strong bloom resistance properties. Furthermore, it was confirmed that this effect is further enhanced by the combined use of a sorbitan fatty acid ester.

[DESCRIPTION]

[TITLE OF INVENTION]

OIL AND FAT FOR SUPPRESSING BLOOM

[Technical Field]

5 [0001]

The present invention relates to a technique for suppressing generation of bloom in a chocolate-like food product.

[Background Art]

[0002]

10 Examples of applications regarding an anti-bloom agent include Patent Literature 1 which discloses that agents satisfying requirements such as inclusion of a predetermined amount of a predetermined mono-U-di-S-type triglyceride (SSU) are used as an anti-bloom agent. In addition, Patent Literature 2 discloses that blooming resistance at the time of slow cooling can be recognized when combining an extremely
15 hardened high-erucic-acid rapeseed oil with a USU fat.

Patent Literature 3 is an application referred to as an “oil and fat composition containing a fat bloom inhibitor, and chocolate containing the same,” and discloses that “at least one kind selected from the group consisting of glycerin organic acid fatty acid esters, polyglycerin saturated fatty acid esters, and sorbitan saturated fatty acid esters” is
20 contained as the fat bloom inhibitor.

[Reference List]

[Patent Literature]

[0003]

[Patent Literature 1]

25 Japanese Patent Laid-open No. H02-138937

[Patent Literature 2]

PCT International Publication No. WO2016/125791

[Patent Literature 3]

Japanese Patent Laid-open No. 2006-271328

5 [Summary of Invention]

[Technical Problem]

[0004]

An object of the present invention is to provide an oil and fat for suppressing bloom in a chocolate-like food product, or a chocolate-like food product in which the oil and fat is used by a simple method.

[Solution to Problem]

[0005]

The inventors of the present inventions carried out intensive studies to solve the above-described problems.

15 According to the examples, the anti-bloom agent disclosed in Patent Literature 1 needs to be prepared by interesterification of predetermined oils and fats and then fractionation using hexane, which makes the manufacture complicated.

Patent Literature 2 discloses a chocolate-like oil and fat composition characterized by containing 20 to 99% by mass of USU triglycerides and 1 to 20% by mass of SSS triglycerides (Claim 1), and discloses that a content of SSU triglycerides is less than 5% by mass (Claim 3). Also in Patent Literature 2, according to the examples, a separation operation is necessary in the preparation of a USU fat, and the preparation is complicated.

25 Patent Literature 3 discloses a plurality of named emulsifying agents as a fat bloom inhibitor, but all of the agents have a large number of types, and substantially

which emulsifying agent show strong effects has not been disclosed sufficiently.

[0006]

The inventors of the present invention conducted further intensive research. As a result, the inventors of the present invention have found that an oil and fat containing a predetermined amount of an SSU fat (S representing a saturated fatty acid having 16 to 22 carbon atoms and U representing an unsaturated fatty acid having 16 to 22 carbon atoms) and an extremely hardened high-erucic-acid rapeseed oil exhibits strong anti-bloom resistance, and therefore have completed the present invention. In addition, the inventors of the present invention have found that this effect becomes stronger by combined use of a sorbitan fatty acid ester, and therefore have completed the present invention.

[0007]

In other words, the present invention relates to the following aspects.

(1) An oil and fat for suppressing bloom in a chocolate-like food product, the oil and fat containing: 1% by mass or more of an extremely hardened high-erucic-acid rapeseed oil, in which the extremely hardened high-erucic-acid rapeseed oil and an SSU-type triglyceride are contained at any ratio between 5:95 and 40:60, where S represents a saturated fatty acid having 16 to 22 carbon atoms, and U represents an unsaturated fatty acid having 16 to 22 carbon atoms.

(2) The oil and fat for suppressing bloom in a chocolate-like food product according to (1), further containing 0.5 to 5% by mass of a sorbitan fatty acid ester.

(3) A chocolate-like food product, containing 1 to 10% by mass of the oil and fat for suppressing bloom according to (1) or (2) in the chocolate-like food product.

(4) A chocolate-like food product, containing 0.1 to 10% by mass of an SSU-type triglyceride and 0.01 to 3% by mass of an extremely hardened high-erucic-acid

rapeseed oil, where S represents a saturated fatty acid having 16 to 22 carbon atoms, and U represents an unsaturated fatty acid having 16 to 22 carbon atoms.

(5) The chocolate-like food product according to (4), further containing 0.01 to 0.3% by mass of a sorbitan fatty acid ester.

5 (6) A method for manufacturing a chocolate-like food product, including blending in of the oil and fat for suppressing bloom according to (1) or (2) such that 0.1 to 10% by mass of an SSU-type triglyceride and 0.01 to 3% by mass of an extremely hardened high-erucic-acid rapeseed oil are contained.

[Advantageous Effects of Invention]

10 [0008]

According to the present invention, it is possible to obtain an oil and fat for suppressing bloom in a chocolate-like food product by a simple method.

[Description of Embodiments]

[0009]

15 The present invention relates to an oil and fat for suppressing bloom in a chocolate-like food product. One example of the chocolate-like food product mentioned herein is chocolate. The chocolate mentioned herein include not only chocolate, quasi chocolate, and chocolate-utilizing food products which are defined by The Fair Trade Council of the National Chocolate Industry and The Fair Trade Council of
20 Chocolate-Utilizing Food Products, but also products that contain oils and fats as essential ingredients, and in which auxiliary raw materials are blended in at arbitrary proportions as necessary, such as saccharides, powdered milk, cocoa raw materials (cocoa mass, cocoa, cocoa butter), fruit juice powders, fruit powders, flavoring agents, emulsifying agents, flavors, and coloring agents.

25 Typical examples of chocolate include sweet chocolate, milk chocolate, and

white chocolate. Examples thereof further include strawberry chocolate and the like to which fruit components are added to the above examples.

[0010]

The oil and fat for suppressing bloom referred to in the present invention is an oil and fat having an effect of suppressing generation of bloom in a case where the oil and fat for suppressing bloom is used in the chocolate-like food product. A specific evaluation method is described in the examples.

It is preferable that 1 to 10% by mass of the oil and fat for suppressing bloom be contained in the chocolate-like food product. An amount thereof is more preferably 1 to 8% by mass, and is even more preferably 1.5 to 6% by mass. The generation of bloom in the chocolate-like food product can be efficiently suppressed by incorporating an appropriate amount of the oil and fat for suppressing bloom in the chocolate-like food product.

[0011]

The oil and fat for suppressing bloom according to the present invention is required to contain 1% by mass or more of an extremely hardened high-erucic-acid rapeseed oil. An amount thereof is more preferably 1.5 to 15% by mass, and is even more preferably 2.5 to 14% by mass. The generation of bloom in the chocolate-like food product can be efficiently suppressed by incorporating an appropriate amount of the extremely hardened high-erucic-acid rapeseed oil.

[0012]

In the present invention, it is necessary to incorporate the extremely hardened high-erucic-acid rapeseed oil and an SSU-type triglyceride at any ratio between 5:95 and 40:60. The ratio is more preferably 7:93 to 35:65, and is even more preferably 9:91 to 30:70. The generation of bloom in the chocolate-like food product can be efficiently

suppressed by incorporating the extremely hardened high-erucic-acid rapeseed oil and the SSU-type triglyceride at an appropriate ratio. S represents a saturated fatty acid having 16 to 22 carbon atoms, and U represents an unsaturated fatty acid having 16 to 22 carbon atoms.

5 [0013]

The oil and fat for suppressing bloom according to the present invention preferably contains 0.5 to 5% by mass of a sorbitan fatty acid ester. An amount thereof is more preferably 0.7 to 4.5% by mass, and is even more preferably 1 to 4% by mass.

As the sorbitan fatty acid ester, a sorbitan saturated fatty acid ester is preferable.

10 The sorbitan fatty acid ester is more preferably one or more kinds selected from sorbitan tristearate and sorbitan tribehenate, and is more preferably sorbitan tristearate.

By adding an appropriate amount of an appropriate sorbitan fatty acid ester, the bloom-suppressing effect is dramatically enhanced.

[0014]

15 When considered from the chocolate-like food product of the present invention, it is preferable to incorporate 0.1 to 10% by weight of the SSU-type triglyceride and 0.01 to 3% by weight of the extremely hardened high-erucic-acid rapeseed oil in order to suppress generation of bloom in the chocolate-like food product. An amount of the SSU-type triglyceride is more preferably 0.2 to 5% by mass, and is even more preferably
20 0.3 to 1.5% by mass. In addition, an amount of the extremely hardened high-erucic-acid rapeseed oil is more preferably 0.02 to 1% by mass, and is even more preferably 0.05 to 0.2% by mass. It is obvious that a ratio of these amounts is preferably any ratio between 5:95 and 30:70 of the extremely hardened high-erucic-acid rapeseed oil to the SSU-type triglyceride.

25 In the chocolate-like food product, the generation of bloom in the chocolate-like

food product can be efficiently suppressed by incorporating an appropriate amount of the extremely hardened high-erucic-acid rapeseed oil and the SSU-type triglyceride.

[0015]

The SSU-type triglyceride is a triglyceride containing two saturated fatty acids
5 having 16 to 22 carbon atoms and one unsaturated fatty acid having 16 to 22 carbon atoms, and the unsaturated fatty acids having 16 to 22 carbon atoms are present in the 1-position or the 3-position.

[0016]

An amount of sorbitan fatty acid esters in the chocolate-like food product is
10 preferably 0.01 to 0.3% by mass, is more preferably 0.02 to 0.27% by mass, and is even more preferably 0.05 to 0.23% by mass.

The type of sorbitan fatty acid ester is the same as that in the oil and fat for suppressing bloom.

By adding an appropriate amount of an appropriate sorbitan fatty acid ester,
15 bloom is effectively suppressed in the chocolate-like food product.

Examples are shown below.

[Examples]

[0017]

Examination 1

20 A sample was prepared according to the formulation in Table 1. A preparation method was performed according to a “○ Preparation method of sample of oil and fat for suppressing bloom.”

The effect of suppressing bloom generation of the obtained sample was evaluated. A method was performed according to a “○ Evaluation method of effect of
25 suppressing bloom generation.”

The obtained results are shown in Table 2. In addition, amounts (calculated values) of an SSU-type triglyceride and an extremely hardened high-erucic-acid rapeseed oil in the obtained samples (a chocolate-like food product) are shown in Table 3.

[0018]

5 Table 1: Formulation

		SSU amount	Comparative Example 1	Comparative Example 2	Comparative Example 3	Comparative Example 4	Comparative Example 5	Example 1	Example 2
Cocoa butter		0.0	100.0	-	-	96.0	-	-	-
Oil and fat 1		32.6	-	100.0	-	-	-	96.0	-
Extremely hardened high-erucic-acid rapeseed oil		0.0	-	-	-	4.0	-	4.0	4.0
Oil and fat 2		21.2	-	-	-	-	100.0	-	96.0
Total		-	100.0	100.0	100.0	100.0	100.0	100.0	100.0
SSU amount in formulation		-	-	32.6	27.2	-	21.2	31.3	20.4
Percentage	Extremely hardened high-erucic-acid rapeseed oil	-	-	-	-	100.0	-	11.3	16.4
	SSU	-	-	100.0	100.0	-	100.0	88.7	83.6

		SSU amount	Example 3	Example 4	Example 5	Example 6	Example 7	Example 8
Oil and fat 1		32.6	-	-	-	94.0	92.0	90.0
Extremely hardened high-erucic-acid rapeseed oil		0.0	4.0	4.0	4.0	6.0	8.0	10.0
Oil and fat 2		21.2	48.0	-	-	-	-	-
Oil and fat 3		0.0	48.0	30.0	-	-	-	-
Oil and fat 4		18.4	-	66.0	96.0	-	-	-
Total		-	100.0	100.0	100.0	100.0	100.0	100.0
SSU amount in formulation		-	10.2	12.1	17.7	30.6	30.0	29.3
Percentage	Extremely hardened high-erucic-acid rapeseed oil	-	28.2	24.8	18.5	16.4	21.1	25.4
	SSU	-	71.8	75.2	81.5	83.6	78.9	74.6

(A unit in the formulation is % by mass)

· As cocoa butter, “Cacao butter 201” manufactured by FUJI OIL CO., LTD., which is cocoa butter was used.

10 · As an oil and fat 1, “Melano NT-R” manufactured by FUJI OIL CO., LTD. was used. This oil and fat was a not-tempered hard butter composed of an interesterified and fractionated oil containing palm as a main component, and was an oil and fat containing a large amount of SSU.

· An oil and fat 2 was an interesterified oil and fat which was obtained by performing random interesterification of a combined oil including 90% by mass of a high-oleic sunflower oil and 10% by mass of an extremely hardened rapeseed oil with sodium methylate, and which contained a predetermined amount of SSU.

5 · As an oil and fat 3, “Melano SS-400” manufactured by FUJI OIL CO., LTD., which is a tempered-type hard butter, was used.

· As an oil and fat 4, an interesterified oil and fat which was obtained by performing random interesterification of a high-oleic sunflower oil with sodium methylate, and which contained a predetermined amount of SSU was used.

10 · An amount of SSU of the oil and fat 1 was measured by a “○ Method 1 for measuring SSU amount.”

· An amount of SSU of the oil and fat 2, the oil and fat 3, and the oil and fat 4 was measured by a “○ Method 2 for measuring SSU amount.”

[0019]

15 ○ Preparation method of sample of oil and fat for suppressing bloom

1. According to the formulation, an oil and fat part used and an emulsifying agent were melted at 50 to 60°C.

2. Each of oil and fat parts was mixed in according to the formulation, and gently stirred such that they became uniformized.

20 [0020]

○ Evaluation method of effect of suppressing bloom generation

1) 3% by mass of a sample oil and fat was added to 97% by mass of “Sweet chocolate E” manufactured by FUJI OIL CO., LTD., which is chocolate dough, and the mixture were melted at 50 to 60°C and mixed. The “Sweet chocolate E” did not contain
25 SSU nor an extremely hardened high-erucic-acid rapeseed oil.

2) A temperature was adjusted to 31°C.

3) 0.2% by mass of “Chocoseed A” manufactured by FUJI OIL CO., LTD. was added to the chocolate and tempered.

4) A mold was filled, cooled at 10°C for 30 minutes, and then demolded.

5) After aging for 1 week at 20°C, storage was performed under temperature cycles (17 to 30.5°C) every 1 day. (Temperature decrease to 17°C for 2 h → 10 h at 17°C → temperature increase to 30.5°C for 2 h → 10 h at 30.5°C →)

6) Generation of bloom on a surface of the chocolate was checked every day, and the number of days until the generation of bloom was confirmed was recorded. The number of days until the generation of the bloom was confirmed of 26 days or longer after the start of the temperature cycle was considered as a pass level.

[0021]

Table 2: Results

	Comparative Example 1	Comparative Example 2	Comparative Example 3	Comparative Example 4	Comparative Example 5	Example 1	Example 2
Number of days until generation of bloom was confirmed (days)	11	23	25	18	19	36	36

	Example 3	Example 4	Example 5	Example 6	Example 7	Example 8
Number of days until generation of bloom was confirmed (days)	27	26	31	31	32 days or longer	32 days or longer

15

[0022]

Table 3: Amount of SSU-type triglyceride and extremely hardened high-erucic-acid rapeseed oil in chocolate-like food product

	Comparative Example 1	Comparative Example 2	Comparative Example 3	Comparative Example 4	Comparative Example 5	Example 1	Example 2
SSU-type triglyceride	-	0.98	0.82	-	0.64	0.94	0.61
Extremely hardened high-erucic-acid rapeseed oil	-	-	-	0.12	-	0.12	0.12

	Example 3	Example 4	Example 5	Example 6	Example 7	Example 8
SSU-type triglyceride	0.31	0.36	0.53	0.92	0.90	0.88
Extremely hardened high-erucic-acid rapeseed oil	0.12	0.12	0.12	0.18	0.24	0.30

(A unit in the formulation is % by mass)

[0023]

- Method 1 for measuring SSU amount

Measurement was performed by using HPLC under the following conditions.

5 Device: “UltiMate 3000” manufactured by Thermo Fisher Scientific

Column: “Meteoric Core C18” manufactured by YMC CO., LTD. was used.

Column oven temperature: 5°C

Detector: Charged particle detector (CAD)

Mobile phase: Acetonitrile, acetone, tetrahydrofuran

10 Flow rate: 0.4 ml/min

[0024]

- Method 2 for measuring SSU amount

Measurement was performed by using HPLC under the following conditions.

Device: High-performance liquid chromatography instrument manufactured by

15 Shimadzu Corporation

Column: ODS “LICHROSORB RP18-5” manufactured by Chemco Plus

Scientific Co., Ltd. was used.

Column temperature: 25°C

Detector: Differential refractometer

20 Eluent: acetone/acetonitrile = 80/20

Liquid volume: 0.9 ml/min

[0025]

Conclusions

· In Comparative Example 2 containing 32.6% by mass of SSU, which is known to have the effect of suppressing bloom generation in the related art, the number of days until bloom was confirmed was relatively long, but Comparative Example 2 did not pass the examination.

5 · In Example 1 according to the present invention, despite the fact that the amount of SSU was the same as that of Comparative Example 2, the number of days until generation of the bloom was confirmed could be greatly extended by using the extremely hardened high-erucic-acid rapeseed oil in combination.

· In the case of simply adding the extremely hardened high-erucic-acid rapeseed
10 oil to cocoa butter, it was not possible to extend the number of days until generation of bloom was confirmed to a pass level (Comparative Example 4).

[0026]

Examination 2

An effect of using an emulsifying agent in combination was verified.

15 A sample was prepared according to the formulation in Table 4. A preparation method was performed according to the “○ Preparation method of sample of oil and fat for suppressing bloom.”

The effect of suppressing bloom generation of the obtained sample was evaluated. A method was performed according to a “○ Evaluation method 2 of effect of
20 suppressing bloom generation.”

The obtained results are shown in Table 5. In addition, amounts (calculated values) of an SSU-type triglyceride and an extremely hardened high-erucic-acid rapeseed oil in the obtained sample (a chocolate-like food product) are shown in Table 6.

[0027]

Table 4: Formulation

	SSU amount	Comparative Example 2-1	Comparative Example 2-2	Example 2-1	Example 2-2	Example 2-3	Example 2-4	Example 2-5	Example 2-6	
Cocoa butter	-	100	97	-	-	-	-	-	-	
Oil and fat 2	21.2	-	-	48	46.5	40	-	-	-	
Extremely hardened high-erucic-acid rapeseed oil	0	-	-	4	4	4	4	4	4	
Oil and fat 3	0	-	-	48	46.5	53	53	56	53	
Oil and fat 4	18.4	-	-	-	-	-	40	40	40	
Sorbitan tristearate	-	-	3	-	3	3	3	-	-	
Sorbitan tribehenate	-	-	-	-	-	-	-	-	3	
Total	-	100	100	100	100	100	100	100	100	
SSU amount in formulation	-	-	-	10.18	9.858	8.48	7.36	7.36	7.36	
Percentage										
	Extremely hardened high-erucic-acid rapeseed oil	-	-	-	28.2	28.9	32.1	35.2	35.2	35.2
	SSU	-	-	-	71.8	71.1	67.9	64.8	64.8	64.8

(A unit in the formulation is % by mass)

- As cocoa butter, “Cacao butter 201” manufactured by FUJI OIL CO., LTD., which is cocoa butter was used.
- 5
- An oil and fat 2 was an interesterified oil and fat which was obtained by performing random interesterification of a combined oil including 90% by mass of a high-oleic sunflower oil and 10% by mass of an extremely hardened rapeseed oil with sodium methylate, and which contained a predetermined amount of SSU.
- As an oil and fat 3, “Melano SS-400” manufactured by FUJI OIL CO., LTD.,
- 10
- which is a tempered-type hard butter, was used.
- As an oil and fat 4, an interesterified oil and fat which was obtained by performing random interesterification of a high-oleic sunflower oil with sodium methylate, and which contained a predetermined amount of SSU was used.
- As sorbitan tristearate, “POEM S-65V” manufactured by RIKEN VITAMIN
- 15
- Co., Ltd. was used.
- As sorbitan tribehenate, “POEM B-150” manufactured by RIKEN VITAMIN Co., Ltd. was used.

[0028]

high-erucic-acid rapeseed oil								
Sorbitan fatty acid ester	-	-	-	0.09	0.09	0.09	-	0.09

(A unit in the formulation is % by mass)

[0031]

Conclusions

As shown in Tables 5 and 6, in the system to which the sorbitan fatty acid ester
5 was added, the number of days until bloom was confirmed was further extended, and the
effect of suppressing bloom generation was shown to be higher.

[CLAIMS]

1. An oil and fat for suppressing bloom in a chocolate-like food product, the oil and fat comprising:

1% by mass or more of an extremely hardened high-erucic-acid rapeseed oil without
5 being interesterified,

wherein the extremely hardened high-erucic-acid rapeseed oil and an SSU-type triglyceride are contained at any ratio between 5:95 and 40:60,

wherein S represents a saturated fatty acid having 16 to 22 carbon atoms, and U represents an unsaturated fatty acid having 16 to 22 carbon atoms, and

10 wherein the SSU-type triglyceride comprises only an SSU triglyceride.

2. The oil and fat for suppressing bloom in a chocolate-like food product according to claim 1, further comprising 0.5 to 5% by mass of a sorbitan fatty acid ester.

3. A chocolate-like food product, comprising 1 to 10% by mass of the oil and fat for suppressing bloom according to claim 1 or 2 in the chocolate-like food product.

15 4. A chocolate-like food product, comprising 0.1 to 10% by mass of an SSU-type triglyceride and 0.01 to 3% by mass of an extremely hardened high-erucic-acid rapeseed oil without being interesterified, the extremely hardened high-erucic-acid rapeseed oil and the SSU-type triglyceride being at any ratio between 5:95 and 40:60, and the SSU-type triglyceride comprising only an SSU triglyceride,

20 wherein S represents a saturated fatty acid having 16 to 22 carbon atoms, and U represents an unsaturated fatty acid having 16 to 22 carbon atoms.

5. The chocolate-like food product according to claim 4, further comprising 0.01 to 0.3% by mass of a sorbitan fatty acid ester.

6. A method for manufacturing a chocolate-like food product, comprising blending in of the oil and fat for suppressing bloom according to claim 1 or 2 such that 0.1 to 10% by mass of an SSU-type triglyceride and 0.01 to 3% by mass of an extremely hardened high-erucic-acid rapeseed oil are contained, the extremely hardened high-erucic-acid rapeseed oil and the SSU-
5 type triglyceride being at any ratio between 5:95 and 40:60, and the SSU-type triglyceride comprising only an SSU triglyceride.