

HEAT-RESISTANT FILLING AND PROCESS FOR PRODUCING THE SAME

BACKGROUND OF THE INVENTION

5

Field of the Invention

[0001] The present invention relates to a filling containing a fat composition with superior heat resistance and in a foaming status. More particularly, the present invention relates to a heat-resistant filling and a process for producing the same, even under high
10 temperature as in summer, the heat-resistant filling still has satisfactory meltability in the mouth, so as to avoid deformation or fat exudation.

Description of Related Art

[0002] Generally, main products of fat, for example, butter, margarine, or shortening
15 are considered as a continuous phase; and solids such as sugar powder, syrup powder, seed and so on, and liquids such as liquid sugar, syrup and so on, and gases such as air, nitrogen and so on in the state of bubbles are considered as discontinuous phase to be dispersed therein, so as to serve as filling and topping for desserts. Solid fats in the main products of fat such as butter and margarine are maintained in the shape of filling and
20 topping and include aqueous ingredient and bubbles. However, as the temperature rises, the solid fat melts into liquid form. Therefore, the solid fat with satisfactory meltability in the mouth cannot maintain the shape of the fat composition at high temperature as in summer, thus losing the product value as filling, topping and so on. Accordingly, till now, fat compositions used in summer are imparted with heat resistance by raising the

melting point of margarine and shortening and increasing the content of solid fats at high temperature. However, the above process makes the meltability in the mouth deteriorated, so the degree of satisfaction of the product is not high though the shape is maintained. In order to solve the problem, to improve the heat resistance or taste and the meltability in the mouth, various solutions have been proposed.

A method is proposed in Patent Document 1, in which fat ingredients with a melting point lower than or equal to 35°C and satisfactory meltability in the mouth and fat ingredients containing heat-resistant extremely-hard fat are respectively prepared and then mixed together, but the mixture is not whipped. Moreover, a method is proposed in Patent Document 2, in which an inert gas is injected compulsorily into a mixture obtained by dispersing solid materials in a completely-melted fat, and meanwhile, the mixture was quenched and kneaded. However, the production process in Patent Document 1 is complex, whereas a special apparatus is required in Patent Document 2, so both will cause an economic burden.

Patent Document 3 proposes to add an edible wax into a fat to impart the cream filling with the heat resistant and shape retention features. However, the bubble containing capability is not clearly indicated, and waxes are generally expensive, in order to achieve sufficient effects, the cost will become a constraint.

Patent Document 4 proposes to add an emulsifier into a fat with lesser crystals at 10°C to obtain an air-containing fat composition having a soft taste, but the heat resistant and shape retention features are not clearly indicated.

[0003] Patent Document 1: Japanese Patent Publication No. (1987)22547

Patent Document 2: Japanese Patent Publication No. (1991)292858

Patent Document 3: Japanese Patent Publication No. (1994)7087

Patent Document 4: Japanese Patent Publication No. (1998)276672

SUMMARY OF THE INVENTION

Problems to be Solved in the Invention

[0004] The present invention is directed to a filling having a heat resistance superior
5 to conventional products and satisfactory meltability in the mouth and a process for producing the same.

Methods for Solving the Problems

[0005] After intensively researching, the inventers found that, even without special
apparatuses or emulsifiers, it is possible to achieve a filling with superior heat resistance
10 and satisfactory meltability in the mouth, and thus completing the present invention.

That is to say, a first item of the present invention is a heat-resistant filling,
which is a fat composition (A) obtained by mixing a fat with a melting point not higher
than the body temperature with a saturated fatty acid triglyceride and whipping the
mixture or is a fat composition (B) containing the fat composition further containing a
15 non-fat ingredient. A second item of the present invention is the heat-resistant filling as
mentioned in the first item, in which the fat composition (A) has a specific gravity of 0.2-
0.5 or the fat composition (B) has a specific gravity of 0.2-0.9. A third item of the
present invention is the heat-resistant filling as mentioned in the first or second item, in
which the fat with a melting point not higher than the body temperature is a fat being
20 liquid at 20°C and/or a hard fat. A fourth item of the present invention is the heat-
resistant filling as mentioned in any one of the first to third items, in which the saturated
fatty acid triglyceride is a saturated fatty acid triglyceride containing behenic acid. A
fifth item of the present invention is the heat-resistant filling as mentioned in fourth item,
in which the saturated fatty acid triglyceride containing behenic acid is a fat of saturated
25 fatty acid containing behenic acid of more than or equal to 30 wt%. A sixth item of the

present invention is the heat-resistant filling as mentioned in the fourth item, in which the content of behenic acid is 2.0-10.0 wt% under the circumstance of the fat composition (A) and is 0.15-10.0 wt% under the circumstance of the fat composition (B), with respect to the total amount of the filling. A seventh item of the present invention is the heat-resistant filling as mentioned in the first item, which further includes an aqueous ingredient. An eighth item of the present invention is a process for producing a heat-resistant filling, which includes the following steps: heating a mixture of a fat with a melting point not higher than the body temperature and a saturated fatty acid triglyceride to melt crystals, and then cooling to precipitate the crystals of the saturated fatty acid triglyceride, and under this condition, whipping the mixture of the fat with a melting point not higher than the body temperature and the saturated fatty acid triglyceride.

Effects of the Invention

[0006] The fat composition of present invention makes the crystals of the mixture of a saturated fatty acid triglyceride and an edible fat in various fixed ratios be precipitated under specific conditions, and the materials after the crystals are precipitated are whipped with a simple apparatus to obtain a filling with satisfactory meltability in the mouth and capable of maintaining the shape even in a region at high temperature.

DESCRIPTION OF EMBODIMENTS

[0007] The heat-resistant filling of the present invention may be a fat composition (A) obtained by mixing a fat with a melting point not higher than the body temperature and a saturated fatty acid triglyceride and whipping the mixture or a fat composition (B) containing the fat composition that further contains a non-fat ingredient.

The fat with a melting point not higher than the body temperature of the present invention is, for example, vegetable oils, such as rapeseed oil, bean oil, sunflower seed oil, cotton oil, groundnut oil, rice bran oil, corn oil, safflower oil, olive oil, kapok

oil, sesame oil, evening primrose oil, palm oil, shea butter, borno tallow, cacao butter, coconut oil, palm kernel oil and so on; or animal fats, such as fish oil, beef fat, pig fat and so on; as well as processed fats obtained by hardening, fractionating, and ester exchanging the above described materials. As the vegetable oils have superior flavor to animal fats, such as fish oil, the vegetable oils are preferred.

A fat being liquid at 20°C and/or a hard fat is more desirable, which preferably achieves better effects in crystallizing and dispersing the saturated fatty acid triglyceride.

[0008] When whipping the mixture of the fat being liquid at 20°C with the saturated fatty acid triglyceride, a saturated fatty acid triglyceride containing behenic acid is preferred, that is because even in crystalline state, the fat has flowability in a wider temperature range, such that the processibility is relatively high and silky taste can be achieved. Furthermore, a hard fat is preferred, for example, tempering fats, such as cocoa butter, cocoa butter equivalent; trans form hard fats that make elaidic acids compose fatty acids; and lauric fats, such as coconut oil, palm kernel oil, and hardened oil of coconut oil and palm kernel oil. A filling obtained by whipping the mixture of the hard fat and the saturated fatty acid triglyceride containing behenic acid is preferred, since a better satisfactory meltability in the mouth can be achieved.

[0009] The saturated fatty acid triglyceride of the present invention can be an extremely hardened oil of a fat or a stearin fraction obtained by fractionating the fat. Preferably, a saturated fatty acid is myristic acid, palmitic acid, stearic acid, arachidic acid, behenic acid, and lignoceric acid, for example, the extremely hardened oil of high erucic acid rapeseed oil, extremely hardened oil of palm oil, and the extremely hardened oil of rice bran oil.

A saturated fatty acid triglyceride containing behenic acid is preferred. Specifically, the saturated fatty acid triglyceride containing behenic acid is obtained

by adding hydrogen in the erucic acid-containing fat, such that the iodine value of the fat is lower than or equal to normal iodine value 1 and making the melting point higher than or equal to 60°C, (if unsaturated erucic acid is hardened, saturated behenic acid can be obtained.) A fat that contains erucic acid higher than or equal to 30% is, for example, high erucic acid rapeseed oil, mustard oil, crambe oil, 5 uzenbaren oil, and the easily-obtained high erucic acid rapeseed oil is preferred.

[0010] According to the present invention, when mixing the fat with a melting point not higher than the body temperature and the saturated fatty acid triglyceride and then whipping the mixture, the mixing ratio is preferably 85: 15-95: 5. When the ratio of the 10 saturated fatty acid triglyceride is higher than the mixing ratio, the flowability of the mixture becomes deteriorated and is difficult be processed, and the foaming property, namely, the whipping property tends to be deteriorated. Moreover, when the ratio of the saturated fatty acid triglyceride is lower than the mixing ratio, the whipping property and the heat resistant and shape retention are deteriorated.

15 [0011] A process of foaming, namely, whipping, includes: pre-tempering the fat composition to a temperature range that the fat with a melting point not higher than the body temperature is melt and tempering the saturated fatty acid triglyceride to a temperature range that the saturated fatty acid triglyceride remains in crystalline form, and preferably, a temperature range of 25-45°C; and whipping the fat composition with a 20 continuous whipper and a simple vertical mixer.

The foaming state of the present invention refers to a state that the fat composition has generated bubbles stably and has proper plasticity during the operation, for example, extrusion.

[0012] According to the method, the heat-resistant filling of the present invention 25 can be obtained through the following processes: mixing the fat with a melting point not

higher than the body temperature with the saturated fatty acid triglyceride and then whipping the mixture, to prepare a fat composition (A); or using a non-fat ingredient in the fat composition, to prepare a fat composition (B). At this time, there are two states: a state formed upon adding the non-fat ingredient after mixing the fat with a melting point
5 not higher than the body temperature with the saturated fatty acid triglyceride and whipping the mixture; a state formed upon whipping the mixture after mixing the fat with a melting point not higher than the body temperature with the saturated fatty acid triglyceride and adding the non-fat ingredient.

The non-fat ingredient can be solid materials, such as sugar, especially
10 granulated sugar, milk powder, syrup powder, cacao powder, coffee powder, cheese powder, eggshell powder, spice, powder seasoning, dried fruit, seeds, freeze dry food, or various taste components or flavoring components, for example, chocolate or spice, formulated by two or more of the above solid materials.

The amount of the non-fat ingredient is 1-80 wt%, and preferably 2-70 wt% of
15 the total amount of the filling. If the non-fat ingredient is less than 1 wt%, the fat composition (A) can be formed containing the non-fat ingredient.

The usage of the heat-resistant filling of the present invention is not limited especially, as filling material for cooking desserts or breads, it can be used in the same manner or the known manner as using flour paste, custard cream, whipping cream or the
20 filling of the major fat with the conventional shortenings. Especially, the heat-resistant filling of the present invention can further exert the effects as described above when being used in the baked products circulated at normal temperature for a long circulation period from several months to about 1 year and are sold on the market under high temperature in summer. That is to say, the filling of the present invention has superior
25 heat resistance. Therefore, after whipping the fat composition, the filling is filled or

sandwiched therein when cooking desserts or breads, such that even the desserts or the breads are placed at 40°C in summer, the filling will not flow out or be de-foamed, but retain the shape, and small amount of fat is exuded. Therefore, the value of the product can be maintained at a desirable state.

5 [0013] In the heat-resistant filling of the present invention, preferably, the content of behenic acid is 2.0-10.0 wt% under the circumstance of the fat composition (A) and is 0.15-10.0 wt% under the circumstance of the fat composition (B), with respect to the total amount of the filling. When the content of behenic acid is relatively high, the melting point is too high, and when whipping the product, the viscosity of the filling is increased sharply in the middle of the whipping process, and the filling is solidified due to the temperature during the whipping process. Additionally, even if the whipping process can be performed, as the filling has the heat resistant feature, the meltability in the mouth is deteriorated. On the contrary, when the content of behenic acid is relatively low, the specific gravity of the filling is not reduced, thus the adaptability of operations, such as filling and sandwiching, as well as the heat resistant and shape retention features cannot be achieved.

[0014] Preferably, the fat composition (A) has a specific gravity of 0.2-0.5 or the fat composition (B) added with non-fat ingredient has a specific gravity of 0.2-0.9. If the specific gravity is higher than the above described specific gravity, not only the taste is oily and the flavor is poor, but also the heat resistant and shape retention features cannot be sufficiently achieved. Furthermore, when the specific gravity is lower than the above described specific gravity, the mechanical process or process using apparatus, such as compulsive stirring and reduction of the pressure are required.

In this manner, by whipping the mixture of the heat-resistant filling of the present invention, the processibility of the filling is improved and the problem of

contradictory between the heat resistance and the meltability in the mouth is solved.

[0015] In addition, by using the aqueous ingredient in the heat-resistant filling of the present invention, the fresh flavor can be diversified. The aqueous ingredient is, for example, fresh cream, compound cream, vegetable cream, condensed milk, syrup, jam, sauce, juice, liquid sugar, maple syrup, honey, alcohol, and essence.

The usage amount of the aqueous ingredient is the amount of water in such a range that maintains the oil in water (O/W) emulsified system; that is, it is lower than or equal to 30 wt% of the total amount of the filling, and preferably lower than or equal to 20 wt%.

[0016] The fats obtained through the following processes are preferably used in the present invention: mixing the fat with a melting point not higher than the body temperature with the saturated fatty acid triglyceride containing behenic acid, and completely melting the mixture, and reducing the initial temperature of the mixture to 30-45°C, so as to crystallize, and then cooled and adjusted. In this manner, the crystals of the saturated fatty acid triglyceride containing behenic acid are dispersed in a low melting point fat with the melting point lower than that of the saturated fatty acid triglyceride to form a fat composition, which can be preferably used as the fat composition for the filling. Alternatively, the fat composition can also be obtained by mixing the fat with a melting point not higher than the body temperature with the saturated fatty acid triglyceride containing behenic acid and completely melting the mixture, and then stirring with an apparatus with stirring function, such as, onlator, to reduce the initial temperature to 30-45°C to crystallize, then cooled and adjusted, which can also be preferably used in the present invention. Additionally, other methods, for example, merely cooling at room temperature will make the crystal size too large and make the fat composition have bubbles, which are not suitable. On the contrary, if a

combinator is used for quenching, the crystallization systems are not equivalent, and at this time, it is not suitable for making the fat composition contain bubbles.

[0017] According to the present invention, a mixture of the fat with a melting point not higher than the body temperature and the saturated fatty acid triglyceride containing behenic acid is preferably whipped at a temperature that the crystals of the saturated fatty acid triglyceride containing behenic acid are not melted. Especially, the saturated fatty acid triglyceride containing behenic acid must exist as crystals, such that the saturated fatty acid triglyceride containing behenic acid will not interact with other fats, for example, hard fat, and thus the meltability in the mouth of the filling will not become deteriorated. However, if the saturated fatty acid triglyceride containing behenic acid is in a completely melted form, not only the specific gravity of the filling is not reduced due to the insufficient amount of crystals, but also the saturated fatty acid triglyceride containing behenic acid is interacted with hard fat, such that the melting point of fat is increased, and as a result, the heat resistance of the final filling is improved and the meltability in the mouth is severely deteriorated. Therefore, the initial temperature of the mixture of the fat with a melting point not higher than the body temperature and the saturated fatty acid triglyceride containing behenic acid must be adjusted to be in a range of 25-45°C and the fat with a melting point not higher than the body temperature and the saturated fatty acid triglyceride containing behenic acid are first mixed together and then whipped. In case of using a tempering hard fat, the filling after being adjusted in temperature must be adjusted to such as temperature that the filling is not deteriorated, for example, 31°C and then being whipped.

Embodiments

[0018] The present invention is illustrated in detail with reference to the embodiments, but the spirits of the present invention are not limited thereby.

Furthermore, percentages (%) and parts refer to weight basis in the embodiments.

Melting point is measured according to the method stated in 2.2.4.2 Melting Point (increased melting point) of Standard Method for the Analysis of Fats, Oils and Related Materials (Japan Oil Chemists' Society, 1996 Edition). Furthermore, fatty acid compositions are measured through the same method as stated in 2.4.1.2 Methyl Esterification (Boron Trifluoride-Methanol).

[0019] The filling of the present invention is evaluated according to the following methods and standards, such as the specific gravity, stirring adaptability, heat resistant and shape retention features (height retention at 40°C, edge retention at 40°C, fat exudation), and meltability in the mouth.

Specific Gravity

Specific gravity is measured by filling the filling into a container and then weighting the content, and then it is calculated by dividing the weight of the content by the weight of water.

Stirring adaptability

Upon being extruded by a star sleeve workpiece and pastry bag, the filling still has the shape retention feature, and all the details of the edges (corners) are clear and distinct, the stirring adaptability is evaluated as good.

Heat resistant and shape retention features

The filling is extruded into a transparent resin container as a configuration of 4 cm in height and about 9 g in weight, and it is evaluated after allowing the filling to stand still at 20°C for 1 day and then subjected to a temperature of 40°C for 1 day. Namely, the height retention at 40°C is calculated by dividing the height after subjecting it to 40°C for 1 day by the height obtained after 0 hours. The edge retention at 40°C is evaluated by visually observing the fat exudation.

·Meltability in the mouth

Perform taste evaluation

[0020] (The adjusting method for a fat composition formed by dispersing the crystals of the saturated fatty acid triglyceride in the fat with a melting point not higher than the
5 body temperature)

After the mixture of the fat with a melting point not higher than the body temperature and the saturated fatty acid triglyceride is completely melted at 80°C temporarily, in a water tank at 15°C, the initial temperature of the fat is reduced to 30-45°C by stirring to crystallize the fat, thereby obtaining a fat composition formed by
10 dispersing the crystals of the saturated fatty acid triglyceride in the fat with a melting point not higher than the body temperature. Then, the fat composition is stored below 20°C.

[0021] Embodiment 1

According to the method described above (Paragraph [0020]), 89 parts of
15 slightly hydrogenated oil of low erucic acid rapeseed oil (iodine value 95, melting point 10°C) as the fat with a melting point not higher than the body temperature and 11 parts of extremely hardened oil of high erucic acid rapeseed oil (iodine value lower than or equal to 1, melting point of 62°C, containing 45% of behenic acid) as saturated fatty acid triglyceride containing behenic acid were mixed, to obtain a fat composition to be stored
20 at 20°C. After raising the temperature of the fat composition to 40°C, the fat composition was stirred by a Kenwood mixer (using a whipper) at high speed for 5 min, to obtain the filling of the present invention in a foam state. The specific gravity was measured to be 0.28, and the stirring adaptability, the heat resistant and shape retention features (height retention at 40°C, edge retention at 40°C, fat exudation), and the
25 meltability in the mouth of the filling were evaluated. The results are listed in Table 1.

[0022] Embodiment 2

According to the same method as Embodiment 1, 89 parts of fractionated palm oil (iodine value 45, melting point 26°C, made by Fuji Oil Co., Ltd, trade name "Parmel 26") as fat with a melting point not higher than the body temperature and 11 parts of extremely hardened oil of high erucic acid rapeseed oil (iodine value lower than or equal to 1, melting point 62°C, containing 45% of behenic acid) as saturated fatty acid triglyceride containing behenic acid were mixed, to obtain a fat composition to be stored below 20°C. After raising the temperature of the fat composition to 40°C, the fat composition was stirred by a Kenwood mixer (using a whipper) at high speed for 5 min, to obtain the filling of the present invention in foam state. The specific gravity was measured to be 0.29, the stirring adaptability, the heat resistant and shape retention features (height retention at 40°C, edge retention at 40°C, fat exudation), and the meltability in the mouth of the filling were evaluated. The results are listed in Table 1.

[0023] Embodiment 3

According to the same method as Embodiment 1, 89 parts of hard fat (iodine value 34, melting point 34°C, made by Fuji Oil Co., Ltd., trade name "Melano New SS7") as fat with a melting point not higher than the body temperature and 11 parts of extremely hardened oil of high erucic acid rapeseed oil (iodine value lower than or equal to 1, melting point 62°C, containing 45% behenic acid) as saturated fatty acid triglyceride containing behenic acid were mixed, to obtain a fat composition to be stored at 20°C. After raising the temperature of the fat composition to 45°C, the fat composition was stirred by a Kenwood mixer (using a whipper) at high speed for 5 min, to obtain the filling of the present invention in foaming state. The specific gravity was measured to be 0.30, the stirring adaptability, the heat resistant and shape retention features (height retention at 40°C, edge retention at 40°C, fat exudation), and the

meltability in the mouth of the filling were evaluated. The results are listed in Table 1.

[0024] Comparative Example 1

Raising the temperature of the shortening (iodine value 51, melting point 38°C, made by Fuji Oil Co., Ltd., trade name "BSL40") as the conventional products to 30°C, the shortening was stirred by a Kenwood mixer (using a whipper) at high speed for 5 min. The specific gravity was measured to be 0.31, the stirring adaptability, the heat resistant and shape retention features (height retention at 40°C, edge retention at 40°C, fat exudation), and the meltability in the mouth of the filling were evaluated. The results are listed in Table 1.

10 [0025] Comparative Example 2

2 parts of diglycerin monopalmitate (made by Riken Vitamin Co., Ltd., trade name "Poem DP95RF"), and 1 part of lecithin were added to 97 parts of partially hydrogenated oil of palm oil with a moderate melting point (iodine value 36, melting point 45°C), then melted at 80°C, and stirred for 5 min, similar to Embodiment 1. The specific gravity was measured to be 0.31, the stirring adaptability, the heat resistant and shape retention features (height retention at 40°C, edge retention at 40°C, fat exudation), and the meltability in the mouth of the filling were evaluated. The results are listed in Table 1.

[0026] Comparative Example 3

20 89 parts of slightly hydrogenated oil of high erucic acid rapeseed oil (iodine value 95) and 11 parts of extremely hardened oil of high erucic acid rapeseed oil (iodine value lower than or equal to 1, melting point 62°C) as saturated fatty acid triglyceride containing behenic acid were mixed and temporarily melted at 80°C, then, the mixture was quenched at the initial temperature and mixed by combinator till the temperature
25 reached 10°C. Through the processes similar to Embodiment 1, the mixture was stirred

for 5 min, but no bubbles were generated, even after continuous stirring for 10 min, it still did not reach the foaming state like that of the filling of the present invention. The specific gravity was measured to be 0.86, which indicated the mixture did not reach the extrudable state as being a filling. The results are listed in Table 1.

- 5 [0027] The results of Embodiments 1- 3 and Comparative Examples 1- 3 are listed in Table 1.

[Table 1]

	Embodiment 1	Embodiment 2	Embodiment 3	Comparative Example 1	Comparative Example 2	Comparative Example 3
Configuration of fat composition	(A)	(A)	(A)			
Fat with a melting point not higher than the body temperature or fat as the main ingredient	Slightly hydrogenated oil of low erucic acid rapeseed oil (melting point 10°C)	Fractionated palm oil (melting point 26°C)	Hard fat (melting point 34°C)	Conventional shortening (melting point 38°C)	Partially hydrogenated oil of palm oil with a moderate melting point (melting point 45°C)	Slightly hydrogenated oil of low erucic acid rapeseed oil (melting point 10°C)
Saturated fatty acid triglyceride or other ingredient with high melting point	Extremely hardened oil of high erucic acid rapeseed oil	Extremely hardened oil of high erucic acid rapeseed oil	Extremely hardened oil of high erucic acid rapeseed oil		Diglycerin monopalmitate	Extremely hardened oil of high erucic acid rapeseed oil
Precipitating temperature of the crystals of saturated fatty acid triglyceride or other ingredient with high melting point	30-45°C	30-45°C	30-45°C	10°C		10°C
Content of saturated fatty acid triglyceride in the filling (%)	11.0	11.0	11.0	Not measured	Not measured	11.0
Content of behenic acid in the filling (%)	5.0	5.0	5.0	-	-	5.0
Changes in specific gravity as stirring time elapsed	5 min	0.28	0.29	0.30	0.31	0.30
	10 min	Not evaluated	Not evaluated	Not evaluated	Not evaluated	Not evaluated
Extrusion adaptability	Good	Good	Good	Good	Good	Unoperatable
Evaluation of heat resistant and shape retention features at 40°C	Height retention (%)	93.8	93.8	93.8	17.5 (melted)	62.5
	Edge retention	Good	Good	Good	Unevaluatable	Poor
	Exudation	None	None	None	Unevaluatable	Serious
Meltability in the mouth at 20°C	Soft taste, Good	Fresh, Good	Fresh, Good	Sticky, Poor	Dry taste, Poor	Not evaluated

- 10 [0028] Embodiment 4

According to the method described above, 94.5 parts of fractionated palm oil

(iodine value 45, melting point 26°C, made by Fuji Oil Co., Ltd., trade name "Parmel 26") as fat with a melting point not higher than the body temperature and 5.5 parts of extremely hardened oil of high erucic acid rapeseed oil (iodine value lower than or equal to 1, melting point 62°C, containing 45% behenic acid) as saturated fatty acid triglyceride containing behenic acid were mixed, to obtain a fat composition to be stored at 20°C. After raising the temperature of the fat composition to 40°C, the fat composition was stirred by a Kenwood mixer (using a whipper) at high speed for 5 min, to obtain the filling of the present invention in foam state. The specific gravity was measured to be 0.29, the stirring adaptability, the heat resistant and shape retention features (height retention at 40°C, edge retention at 40°C, fat exudation), and the meltability in the mouth of the filling were evaluated. The results are listed in Table 2.

[0029] Comparative Example 4

According to the method described above, 96.7 parts of fractionated palm oil (iodine value 45, melting point 26°C, made by Fuji Oil Co., Ltd., trade name "Parmel 26") as fat with a melting point not higher than the body temperature and 3.3 parts of extremely hardened oil of high erucic acid rapeseed oil (iodine value lower than or equal to 1, melting point 62°C, containing 45% behenic acid) as saturated fatty acid triglyceride containing behenic acid were mixed, to obtain a fat composition to be stored at 20°C. After raising the temperature of the fat composition to 40°C, the fat composition was stirred by a Kenwood mixer (using a whipper) at high speed for 10 min, to obtain the filling of the present invention in foam state. The specific gravity was measured to be 0.31, the stirring adaptability, the heat resistant and shape retention features (height retention at 40°C, edge retention at 40°C, fat exudation), and the meltability in the mouth of the filling were evaluated. The results are listed in Table 2.

[0030] Comparative Example 5

According to the method described above, 97.8 parts of fractionated palm oil (iodine value 45, melting point 26°C, made by Fuji Oil Co., Ltd., trade name "Parmel 26") as fat with a melting point not higher than the body temperature and 2.2 parts of extremely hardened oil of high erucic acid rapeseed oil (iodine value lower than or equal to 1, melting point 62°C, containing 45% behenic acid) as saturated fatty acid triglyceride containing behenic acid were mixed, to obtain a fat composition to be stored at 20°C. After raising the temperature of the fat composition to 40°C, the fat composition was stirred by a Kenwood mixer (using a whipper) at high speed for 10 min. The specific gravity was measured to be 0.78, which indicated that the mixture did not reach the extrudable state as that of a filling. The results are listed in Table 2.

[0031] The results of Embodiment 4, Comparative Example 4, and Comparative Example 5 are listed in Table 2.

[Table 2]

		Embodiment 4	Comparative Example 4	Comparative Example 5
Configuration of fat composition		(A)		
Content of saturated fatty acid triglyceride in the filling (%)		5.5	3.3	2.2
Content of behenic acid in the filling (%)		2.5	1.5	1.0
Changes in specific gravity as stirring time elapsed	5 min	0.29	0.47	0.92
	10 min	Not measured	0.31	0.78
Extrusion adaptability		Good	Good	Un-operatable
Evaluation of heat resistant and shape retention features at 40°C	Height retention (%)	75.0	22.5	Unevaluatable
	Edge retention	Slightly slack, but can be sufficiently maintained	Poor	Unevaluatable
	Exudation	A little, but in tolerant range	Poor	Unevaluatable

[0032] Embodiment 5

5 After raising the temperature of the fat composition prepared in Embodiment 2 to 40°C, 50 parts of sugar powder were added to 50 parts of the fat composition prepared in Embodiment 2, and the mixture was stirred by a Kenwood mixer (using a whipper) at high speed for 10 min, to obtain the filling of the present invention in foam state. The specific gravity was measured to be 0.64, which indicated that the mixture had the

10 extrudable property as a filling. In addition, when the filling was sandwiched between cookies, a sandwich cream with favorable taste and satisfactory meltability in the mouth was obtained. Furthermore, even if the filling was placed at 40°C for 1 day, the fat would not be exuded or defoamed, and the sandwich cream would not flow out. The

results are listed in Table 3.

[0033] Embodiment 6

After raising the temperature of the fat composition prepared in Embodiment 2 to 40°C, 50 parts of dry cheese powder were added to 50 parts of the fat composition prepared in Embodiment 2, and the mixture was stirred by a Kenwood mixer (using a whipper) at high speed for 5 min. The specific gravity was measured to be 0.61, which indicated that the mixture had the extrudable property as a filling. In addition, when the filling was sandwiched between pies, a sandwich cream having favorable taste and dry cheese flavor was obtained. Furthermore, even when the filling was subjected at 40°C for 1 day, the fat would not be exuded or defoamed, and the sandwich cream would not flow out. The results are listed in Table 3.

[0034] Embodiment 7

After raising the temperature of the fat composition prepared in Embodiment 2 to 40°C, 0.5 part of sucralose (made by San Ei Gen F.F.I. Co., Ltd., trade name "San sweet SU-100", sugariness of about 600, if saccharose is 1) was added to 100 parts of the fat composition prepared in Embodiment 2, and the mixture was stirred by a Kenwood mixer (using a whipper) at high speed for 5 min, to obtain the filling of the present invention in foaming state. The specific gravity was measured to be 0.31, which indicated that the mixture had the extrudable property as a filling. In addition, when the filling was sandwiched between cookies, a sandwich cream having favorable taste and satisfactory meltability in the mouth was obtained. Furthermore, even if the filling was placed at 40°C for 1 day, the fat would not be extruded or defoamed, and the sandwich cream would not flow out. The results are listed in Table 3.

[0035] The results of Embodiments 5, 6, and 7 are listed in Table 3.

[Table 3]

		Embodiment 5	Embodiment 6	Embodiment 7
Configuration of fat composition		(B)	(B)	(A)
Content of saturated fatty acid triglyceride in the filling (%)		5.5	5.5	11.0
Content of behenic acid in the filling (%)		2.5	2.5	5.0
Specific gravity after stirring		0.64	0.61	0.31
Extrusion adaptability		Good	Good	Good
Evaluation of heat resistant and shape retention features at 40°C	Configuration of the filling	Sandwiched between cookies	Sandwiched between pies	Sandwiched between cookies
	Exudation	None	None	None
	Defoaming	None	None	None
	Effluence	None	None	None

[0036] Embodiment 8

After raising the temperature of the fat composition prepared in Embodiment 2 to 40°C, 30 parts of liquid sugar (made by Towa Kasei Industrial Co., Ltd., concentration 70%, hydrogenated starch hydrolysates syrup, trade name "AMAMIR") were added to 70 parts of the fat composition prepared in Embodiment 2, and the mixture was stirred by a Kenwood mixer (using a whipper) at high speed for 5 min. The specific gravity was measured to be 0.38, which indicated that the mixture had a desirable emulsification state. The stirring adaptability, the heat resistant and shape retention features (height retention at 40°C, edge retention at 40°C, fat exudation), and the meltability in the mouth of the filling were evaluated. The results are listed in Table 4. It was known by tasting that the filling had satisfactory meltability in the mouth. In addition, after being subjected at 40°C for 1 day, the dessert still retained the shape sufficiently without defoaming or fat exudation.

[0037] Comparative Example 6

After raising the temperature of shortening (iodine value 51, melting point

38°C, made by Fuji Oil Co., Ltd., trade name "BSL40") used in Comparative Example 1 to 30°C, 30 parts of liquid sugar (made by Towa Kasei Industrial Co., Ltd., concentration 70%, hydrogenated starch hydrolysates syrup, trade name "AMAMIR") used in Embodiment 8 were added to 70 parts of shortening used in Comparative Example 1, and the mixture was stirred by a Kenwood mixer (using a whipper) at high speed for 5 min. The specific gravity was measured to be 0.44, which indicated that the mixture had a good emulsification state and desirable extrudable property as a filling. It was known by tasting that the filling had sticky taste and poor meltability in the mouth, and ingredients with high melting point remained in the mouth. In addition, when being subjected at 40°C for 1 day, the filling is severely deformed with serious fat exudation. The results are listed in Table 4.

[0038] Comparative Example 7

30 parts of liquid sugar used in Embodiment 8 was added to 70 parts of the fat composition used in Comparative Example 2, similar to Embodiment 1, the mixture of the fat composition and the liquid sugar was whipped for 5 min, but it cannot be emulsified, and the oil phase and the water phase were separated. The results were listed in Table 4.

[0039] The results of Embodiment 8 and Comparative Examples 6 and 7 are listed in Table 4.

[Table 4]

	Embodiment 8	Comparative Example 6	Comparative Example 7
Configuration of fat composition	(B)		
Fat composition	Identical to Embodiment 2	Identical to Comparative Example 1	Identical to Comparative Example 2

Content of saturated fatty acid triglyceride in the filling (%)	7.7	Not measured	Not measured
Content of behenic acid in the filling (%)	3.5	—	—
Emulsibility	Good	Good	Unemulsible
Specific gravity	0.38	0.44	Unevaluatable
Extrusion adaptability	Good	Good	Un-operatable
Height retention at 40°C (%)	81.3	12.5	Unevaluatable
Edge retention at 40°C	Good	Unevaluatable	Unevaluatable
Exudation at 40°C	None	Unevaluatable	Unevaluatable
Meltability in the mouth at 20°C	Good	Sticky, Poor	Unevaluatable

[0040] [Industrial Applicability]

According to the present invention, a filling superior in heat resistance to conventional products and having satisfactory meltability in the mouth and a process for producing the same without using any special apparatus or emulsifier are provided.

WHAT IS CLAIMED IS:

1. A heat-resistant filling, wherein the heat-resistant filling is a fat composition (A) obtained by mixing a fat with a melting point not higher than a body temperature with a saturated fatty acid triglyceride and whipping the mixture or is a fat composition
5 (B) comprising the fat composition further containing a non-fat ingredient.
2. The heat-resistant filling as claimed in claim 1, wherein the fat composition (A) has specific gravity of 0.2-0.5 or the fat composition (B) has a specific gravity of 0.2-0.9.
3. The heat-resistant filling as claimed in claim 1 or 2, wherein the fat with a
10 melting point not higher than the body temperature is a fat being liquid at 20°C and/or a hard fat.
4. The heat-resistant filling as claimed in any one of claims 1 to 3, wherein the saturated fatty acid triglyceride is a saturated fatty acid triglyceride containing behenic acid.
- 15 5. The heat-resistant filling as claimed in claim 4, wherein the saturated fatty acid triglyceride containing behenic acid is a fat of saturated fatty acid containing behenic acid of more than or equal to 30 wt%.
6. The heat-resistant filling as claimed in claim 4, wherein the content of behenic acid is 2.0-10.0 wt% under the circumstance of the fat composition (A) and is 0.15-10.0
20 wt% under the circumstance of the fat composition (B), with respect to a total amount of the filling.
7. The heat-resistant filling as claimed in claim 1, further comprising an aqueous ingredient.
8. A process for producing a heat-resistant filling, comprising: heating a mixture
25 of a fat with a melting point not higher than the body temperature and a saturated fatty

acid triglyceride to melt crystals, and then cooling to precipitate crystals of the saturated fatty acid triglyceride, and under this condition, whipping the mixture of the fat with a melting point not higher than the body temperature and the saturated fatty acid triglyceride.