ABSTRACT

BAKED CHOCOLATE AND METHOD FOR PRODUCING SAME

An object of the present invention is to provide baked chocolate which contains a specific amount of tempering-type oil and fat, so that the baked chocolate has good flavor or mouth feel and the development of bloom is inhibited, and a method of producing the same. Baked chocolate that has achieved the above object is obtained by preparing and baking a chocolate dough for baking, containing 13-22 wt% of SOS-type triglyceride and 7-20 wt% of an oil and fat in a liquid state at normal temperature, wherein the SFC of oil and fat in the chocolate is 40-65% at 10°C, 20-50% at 20°C, 10-40% at 25°C, and 1-8% at 30°C.

WE CLAIM:

1. Baked chocolate which is obtained by baking chocolate containing 13-22 wt% of SOS-type triglyceride and 7-20 wt% of an oil and fat in a liquid state at normal temperature, wherein SFC of oil and fat in the chocolate is 40-65% at 10°C, 20-50% at 20°C, 10-40% at 25°C, and 1-8% at 30°C.

2. The baked chocolate of claim 1, wherein the baked chocolate satisfies any one or both of the following conditions (a) and (b):

(a) it contains BOB (1,3-dibehenoyl-2-oleylglyceride) in an amount of 1.0 wt% or more based on the weight of the oil and fat of the chocolate; and

(b) it contains acetylated sucrose fatty acid ester in an amount of 0.2 wt% based on the weight of the chocolate.

3. A method for preparing the baked chocolate of claim 1 or 2, wherein the chocolate is baked after 0.1-5.0 wt% of water is added thereto.

4. A method for preparing the baked chocolate of claim 1 or 2, wherein the chocolate is baked after it is tempered.

Dated: 19th day of January 2015

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DESCRIPTION

~~BAKED CHOCOLATE AND METHOD FOR PRODUCING SAME~~

Technical Field

The present invention relates to chocolate for baking, baked chocolate obtained therefrom, and a method for producing the baked chocolate.

Background Art

When chocolate is baked, new flavor or texture is created, and heat resistance is also imparted to the chocolate. By way of example, there may be mentioned a technology for moistening the surface of a chocolate dough, followed by baking (see Patent document 1); a technology for spraying sugar onto at least part of chocolate, followed by baking (see Patent document 2); a technology for baking a chocolate dough containing a starch-based material and water (see Patent document 3), etc.

However, these technologies have problems in that since a baking process is involved, it is not easy to control oil and fat crystals, and the problem of the development of bloom or graining becomes more serious as the content of tempering-type oil and fat, such as cocoa butter or the like, increases. For this reason, non-tempering-type oil and fat has been chiefly used in baked chocolate. However, there has been a strong market demand for baked chocolate containing a large amount of tempering-type oil and fat in terms of the flavor or mouth feel thereof.

Prior art documents

Patent documents

Patent document 1: Japanese Unexamined Patent Application Publication No. 2001-245594

Patent document 2: Japanese Unexamined Patent Application Publication No. 2002-223700

Patent document 3: Japanese Unexamined Patent Application Publication No.

Disclosure

Technical Problem

An object of the present invention is to provide baked chocolate which contains a specific amount of tempering-type oil and fat, so that the baked chocolate has good flavor or mouth feel and the development of bloom is inhibited, and a method of producing the same.

Technical Solution

The present inventors have conducted close investigations, and, as a result, have found that baked chocolate in which the development of bloom is inhibited is obtained by using chocolate in which 13-22 wt% of SOS-type triglyceride is contained, oil and fat in a liquid state at normal temperature is added, and also an oil and fat content is controlled within a specific range of SFC, thereby completing the present invention.

Advantageous Effects

According to the present invention, baked chocolate can be provided which has good flavor, texture and heat resistance and in which the development of bloom is inhibited.

Mode for Invention

(SOS-type triglyceride)

In the present invention, the "SOS-type triglyceride" (hereinafter abbreviated as the "SOS") refers to a symmetrical triacylglyceride with S (saturated fatty acid having 16 or more carbon atoms) bonded at positions 1 and 3 and O (oleic acid, that is, monounsaturated fatty acid having 18 carbon atoms) bonded at position 2, which is the main ingredient of tempering-type oil and fat, such as cocoa butter or the like.

(Chocolate)

In the present invention, the "chocolate" is intended to include not only those that are restricted by codes (Japanese "Fair Competition Code For Labeling of Chocolate") or regulations, but also various chocolates, processed oil and fat products, and chocolate products, which are obtained using animal or vegetable oils or fats other than cocoa butter. Chocolate is prepared by appropriately mixing raw materials, including cacao mass, cocoa butter, cocoa, edible oil and fat, saccharides, powdered milk, an emulsifier, and fragrance, and processing the mixture using a conventional method.

The chocolate of the present invention is characterized in that it contains SOS in an amount of 13-22 wt%, and preferably 15-22 wt%. At less than 13 wt%, there are cases where it is difficult to obtain baked chocolate having a good mouth feel, whereas at more than 22 wt%, there are cases where bloom is readily developed. When SOS originating from cocoa butter is mixed, the cocoa butter content of the chocolate is 15-25 wt% because the SOS content of cocoa butter is about 85 wt%. In this case, the "cocoa butter content" refers to the sum of the content of cocoa butter itself and the content of cocoa butter originating from cacao mass (cocoa butter content: about 55 wt%) or cocoa (cocoa butter content: about 11-22 wt%).

In addition, in the present invention, chocolate having a composition that satisfies SFC, which will be described below, can be easily obtained by adding 7-20 wt% of oil and fat which has a melting point of 20°C or lower and is in a liquid state at normal temperature.

(SFC)

The chocolate of the present invention is characterized in that the SFC (solid fat content) of total lipids (also including the cocoa butter of cacao mass or the milk fat of whole milk powder) is 40-65% at 10°C, 20-50% at 20°C, 10-40% at 25°C, and 1-8% at 30°C, preferably 40-50% at 10°C, 22-40% at 20°C, 12-25% at 25°C, and 1-6% at 30°C, and more preferably 45-50% at 10°C, 26-40% at 20°C, 12-25% at 25°C, and 2-6% at 30°C. If the SFC is excessively higher than the upper limit of

the above range, the effect of inhibiting bloom development will be low. In contrast, if the SFC is excessively lower than the lower limit of the above range, the chocolate will become excessively soft so that the shape-retaining property thereof will decrease, and thus it will be difficult to obtain baked chocolate having a desired appearance. The SFC in the present invention uses a value that is measured by completely dissolving an oil and fat sample collected from chocolate by nucleic acid extraction and then aging the sample at 20°C for 40 hours based on IUPAC.2 150 "SOLID CONTENT DETERMINATION IN FATS BY NMR."

(Baking)

As a method for producing the baked chocolate of the present invention, there is mentioned, for example, a method of adjusting the temperature of chocolate, forming the chocolate into any shape by cutting according to the shape of a mold, squeezing, wire cutting or the like, and then baking the shaped chocolate using an oven, a burner or the like. In this case, the adjustment of the temperature is described as being performed by a method of completely dissolving chocolate by warming it in a bath at about 50°C or a method of semi-dissolving chocolate at about 30°C or lower by way of example. In addition, cereal flour, such as wheat flour, starch or processed starch, nuts, dry fruits and the like may be appropriately added to chocolate before baking. The shaped chocolate may also be appropriately combined with bread or confectionery using a method of placing it thereon, sandwiching it therebetween or dotting it therein, and then the combination may be baked.

(BOB)

The chocolate of the present invention contains BOB (1,3-dibehenoyl-2-oleylglyceride) in an amount of 1.0-10.0 wt%, preferably 2.0-10.0 wt%, and more preferably 3.0-10.0 wt%, based on the weight of oil and fat of the chocolate to more effectively inhibit bloom development after baking. If the content of BOB is higher than 10 wt%, the mouth feel of the chocolate will become worse. To

more efficiently perform the operation, a BOB-containing oil and fat may also be added as an oil and fat for chocolate. As an example, there may be mentioned a method of using oil and fat having a BOB content of 68%, which is obtained by transesterifying high oleic sunflower oil with behenic acid ethyl ester by 1,3 position-specific lipase, removing ethyl ester from the transesterification product by distillation, subjecting the remaining material to solvent fractionation to obtain a high-melting-point fraction, and purifying the fraction.

(Acetylated sucrose fatty acid ester)

The chocolate of the present invention contains acetylated sucrose fatty acid ester in an amount of 0.2 wt% or more, and preferably 0.4% or more, to more effectively inhibit bloom development after baking. More specifically, DK ester F-A10E (trade name)(Dai-Ichi Kogyo Seiyaku Co., Ltd.) or the like may be used as acetylated sucrose fatty acid ester by way of example. In the present invention, the effect of inhibiting bloom development is achieved by using any one of BOB and acetylated sucrose fatty acid ester, and the use of both BOB and acetylated sucrose fatty acid ester achieves the synergistic effect of inhibiting bloom development.

(Water)

In the present invention, water may be added to and mixed with the chocolate dough before baking in an amount of 0.1-5.0 wt%, preferably 0.2-4.0 wt%, and more preferably 0.4-2.0 wt%, to more effectively inhibit bloom development and impart a proper shape-retaining property during baking. If the amount of water added is smaller than the lower limit of the above range, the effect of the present invention will not be achieved. Furthermore, if the amount of water added is larger than the upper limit of the above range, it will cause the chocolate to spread after baking, or it will adversely affect the storage stability of the chocolate during distribution.

More specifically, there may be mentioned a method of adding and mixing water

with a chocolate dough having flowability provided by adjustment of the temperature, then forming the chocolate dough into a suitable shape, and subjecting the formed chocolate to a baking process. In this case, the water may be added as a water-containing composition, apart from pure water, and specific examples thereof include foreign liquors, liquid sugar, fruit juice, oil-in-water type emulsions, etc. In this case, the water is preferably added such that the amount of water added to the chocolate dough is 0.1-5.0 wt% based on the weight of the chocolate dough.

(Tempering)

In the present invention, the development of bloom can be more effectively inhibited by baking the chocolate dough after tempering it. More specifically, a method of tempering the chocolate dough using a conventional method, such as the adjustment of temperature of the chocolate dough dissolved by warming or the addition of seed to the chocolate dough dissolved by warming, shaping the tempered chocolate, and then subjecting the shaped chocolate to a baking process is described by way of example. In addition, the tempered chocolate may also be adjusted to a temperature of about 30°C or below, and then it may be used in a semi-dissolved state.

(Examples)

The present invention will be described in greater detail below with reference to examples. In the following examples, percentages (%) and parts are all by weight unless specified otherwise.

<Investigation 1>

(Preparation of base chocolate)

A blend of 14.0 parts of cacao mass, 21.0 parts by whole milk powder, 39.0 parts of sugar, 11.0 parts of cocoa butter and 0.3 parts of lecithin was refined and conched using a conventional method to prepare base chocolate.

(Example 1)

15.0 parts of refined low-melting-point palm oil (trade name: PALM ACE 10 manufactured by Fuji Oil Co., Ltd.; melting point: 10°C or lower) was uniformly mixed with 85 parts of base chocolate to obtain chocolate. Subsequently, the chocolate was dissolved in a bath at 50°C, after which the temperature thereof was adjusted. Thereafter, the chocolate was tempered by adding 0.2 wt% of a seed material (trade name: CHOCO SEED B manufactured by Fuji Oil Co., Ltd.) thereto, and was poured into a disc-shaped mold (5 cm diameter × 5 mm thickness) and cooled and solidified at 5°C for 30 minutes. The solidified chocolate was taken out of the mold, and it was baked in an oven at 160°C for 6 minutes and cooled at room temperature (20°C), thereby obtaining baked chocolate. Separately, the SFC of the oil and fat sample hexane-extracted from the chocolate was measured.

(Example 2)

Chocolate and baked chocolate were obtained by a process that was the same as that of Example 1, except that soybean oil (manufactured by Fuji Oil Co., Ltd.; melting point: 10°C or lower) was used in place of refined low-melting-point palm oil.

(Example 3)

Chocolate and baked chocolate were obtained by a process that was the same as that of Example 1, except that high oleic sunflower oil (melting point: 10°C or lower) was used in place of refined low-melting-point palm oil.

(Example 4)

Baked chocolate was obtained by a process that was the same as that of Example 1, except that the chocolate was solidified without tempering.

(Example 5)

Chocolate and baked chocolate were obtained by a process that was the same as that of Example 1, except that refined low-melting-point palm oil and cocoa butter were used in amounts of 10 parts and 5 parts, respectively.

(Comparative Example 1)

Chocolate and baked chocolate were obtained by a process that was the same as that of Example 1, except that refined low-melting-point palm oil and cocoa butter were used in amounts of 5 parts and 10 parts, respectively.

(Comparative Example 2)

Chocolate and baked chocolate were obtained by a process that was the same as that of Example 1, except that 15 parts of cocoa butter was used in place of refined low-melting-point palm oil.

(Comparative Example 3)

Chocolate and baked chocolate were obtained by a process that was the same as that of Example 1, except that hydrogenated fractionated palm oil (trade name: MELANO STS manufactured by Fuji Oil Co., Ltd.; melting point: 37°C) was used in place of refined low-melting-point palm oil.

(Evaluation of bloom development resistance)

The obtained baked chocolates were subjected to a constant-temperature storage test at each of 15°C, 20°C, 25°C and 30°C and a cycle storage test (one-day cycle change in temperature) at 17°C／30.5°C and 18°C／27°C for 5 days, and then the degree of bloom development was observed visually and evaluated based on the number of storage conditions having exhibited bloom development, as follows:

◎: 0 (no bloom development);

○: 1

△: 2-3

X: 4 or more

(Results)

The bloom development resistance of the baked chocolates of Examples 1 to 3, which contained refined low-melting-point oil, soybean oil and high oleic sunflower oil (which are in a liquid state at normal temperature), were generally good. As can be seen in Example 5 and Comparative Examples 1 and 2, the bloom development resistance decreased as the content of cocoa butter increased. Furthermore, as can be seen in Example 4, the tempered chocolate had good bloom development resistance. In addition, the flavor of the product stored at 25°C was evaluated, and as a result, the flavor was slightly good in Example 1 (which contained refined low-melting-point palm oil) among Examples 1 to 3 (which contained oil in a liquid state at normal temperature).

(Table 1)

		Ex. 1	Ex. 2	Ex. 3	Ex. 4	Ex. 5	Comp. Ex. 1	Comp. Ex. 2	Comp. Ex. 3
Base chocolate	Cacao mass	14.0	same as left	same as left	same as left	same as left	same as left	same as left	same as left
	Whole milk powder	21.0							
	Sugar	39.0							
	Cocoa butter	11.0							
	Lecithin	0.3							
Added ingredients	Refined low melting point palm oil	15.0	-	-	15.0	10.0	5.0	-	-
	Soybean oil	-	15.0	-	-	-	-	-	-
	High oleic sunflower oil	-	-	15.0	-	-	-	-	-
	Cocoa butter	-	-	-	-	5.0	10.0	15.0	-

	Hydrogenated fractionated palm oil	-	-	-	-	-	-	-	15.0
SOS content of chocolate (%)		15.9	15.9	15.9	15.9	20.1	24.4	28.6	15.9
Cocoa butter content of chocolate (%)		18.7	18.7	18.7	18.7	23.7	28.7	33.7	18.7
Oil content (%)		38.7	38.7	38.7	38.7	38.7	38.7	38.7	38.7
SFC (%)	10°C	46.2	43.1	43.0	46.2	55.5	66.3	77.4	80.0
	20°C	28.7	25.4	24.8	28.7	46.1	56.9	60.1	48.1
	25°C	16.3	17.3	15.5	16.3	34.4	46.0	43.2	25.1
	30°C	2.4	1.8	1.8	2.4	6.8	8.7	10.2	7.3
	35°C	0.1	0.1	0.1	0,1	0.2	0.4	0.2	0.5
Tempering		done	done	done	not done	done	done	done	done
Bloom development resistance		○	○	○	○~△	○~△	△~×	×	×
Flavor		◎~○	○	○	◎~○	◎~○	◎	◎	○

<Investigation 2>

(Example 6)

The chocolate of Example 1 was used, and 3 parts of BOB-containing oil and fat (BOB content: 68.0%) was added thereto and mixed uniformly, thereby obtaining chocolate. Subsequently, baked chocolate was obtained by a process that was the same as that of Example 1.

(Example 7)

The chocolate of Example 1 was used, and 0.5 parts of acetylated sucrose fatty acid ester (trade name: DK ester FA10E manufactured by Dai-Ichi Kogyo Seiyaku Co., Ltd.) was uniformly mixed therewith, thereby obtaining chocolate. Subsequently,

baked chocolate was obtained by a process that was the same as that of Example 1.

(Example 8)

The chocolate of Example 1 was used, and 3 parts of BOB-containing oil and fat and 0.5 parts of acetylated sucrose fatty acid ester were added thereto and mixed uniformly, thereby obtaining chocolate. Subsequently, baked chocolate was obtained by a process that was the same as that of Example 1.

(Comparative Example 4)

The chocolate of Comparative Example 2 was used, and 3 parts of BOB-containing oil and fat and 0.5 parts of acetylated sucrose fatty acid ester were added thereto and mixed uniformly, thereby obtaining chocolate. Subsequently, baked chocolate was obtained by a process that was the same as that of Example 1.

(Results)

The bloom development resistance of the obtained baked chocolates was evaluated in a manner that was the same as that of Investigation 1. Examples 6 to 8, obtained by adding BOB-containing oil and fat and acetylated sucrose fatty acid ester to the chocolate of Example 1, had improved bloom development resistance. In particular, the bloom development resistance was the best when the two ingredients were used in combination. Meanwhile, in the case where the chocolate of Comparative Example 2 was used, the bloom development resistance was rarely improved even when the two ingredients were added.

(Table 2)

		Ex. 1	Ex. 6	Ex. 7	Ex. 8	Comp. Ex. 2	Comp. Ex. 4
Base chocolate	Cacao mass	14.0	same as left	same as left	same as left	same as left	same as left
	Whole milk powder	21.0					

	Sugar	39.0					
	Cocoa butter	11.0					
	Lecithin	0.3					
Added ingredients	Refined low melting point palm oil	15.0	15.0	15.0	15.0	-	-
	Cocoa butter	-	-	-	-	15.0	15.0
	BOB containing oil and fat	-	3.0	-	3.0	-	3.0
	FA10E	-	-	0.5	0.5	-	0.5
Total sum		100.0	103.0	100.5	103.5	100.0	103.5
SOS content of chocolate (%)		15.9	17.4	15.8	17.3	28.6	29.6
Cocoa butter content of chocolate (%)		18.7	18.2	18.6	18.1	33.7	32.6
Oil content (%)		38.7	41.7	38.7	41.7	38.7	41.7
BOB content of total oil and fat (%)		0.0	4.9	0.0	4.9	0.0	4.9
SFC	10°C	46.2	48.2	46.0	48.9	77.4	78.4
	20°C	28.7	31.1	28.5	31.2	60.1	63.0
	25°C	16.3	18.6	16.5	18.5	43.2	46.5
	30°C	2.4	2.5	2.1	2.7	10.2	8.0
	35°C	0.1	0.4	0.1	0.4	0.2	0.6
Bloom development resistance		○	◎~○	◎~○	◎	×	Δ~×

<Investigation 3>

(Examples 9 to 13)

0.5, 1.5, 3.0, 4.5 or 5.5 wt% of water was added to and mixed uniformly with a

chocolate dough obtained by adjusting the temperature of the chocolate of Example 1. Subsequently, baked chocolate was obtained by a process that was the same as that of Example 1. In addition, the water content before addition of water, that is, the content of water in the chocolate of Example 1, was 1.1 wt%. The bloom development resistance of the obtained baked chocolate was evaluated in a manner that was the same as that of Investigation 1.

(Evaluation)

The bloom development resistance was improved by the addition of water. In addition, the shape-retaining property of the chocolate was also improved, and thus the shape thereof was better retained even after baking. However, when the amount of water added was 5.5 wt%, slight spreading after baking occurred.

(Table 3)

	Example 1	Example 9	Example10	Example 11	Example 12	Example 13
Amount of water added later (wt%)	0	0.5	1.5	3.0	4.5	5.5
Bloom development resistance	○	◎	◎	◎	◎	◎
Shape retaining property	○	◎	◎	◎~○	○	△