

DESCRIPTION

Title of Invention: WHEAT FLOUR PREPARATION AND METHOD FOR
PRODUCING SAME, AND BISCUIT CONTAINING WHEAT FLOUR PREPARATION AND
METHOD FOR PRODUCING SAME

5

Technical Field

[0001]

The present invention relates to a wheat flour
preparation and a production method therefor, and relates to
10 biscuits that contain a wheat flour preparation and to a
production method therefor.

Background Art

[0002]

15 Wheat flour preparations, which contain wheat flour and
fats and oils, are used for flavoring as baking ingredients of
bread and baked confectioneries, such as biscuits and cookies.

However, even when wheat flour preparations are used,
flavors can be weak, and imparting flavors, such as milky taste,
20 can be insufficient. In order to impart stronger flavors and
aromas, roasted wheat flour preparations can be used. However,
the use of heated or roasted wheat flour preparations can result
in poor palatability.

[0003]

25 On the other hand, biscuits are produced by using wheat
flour, sugar, edible oil and fat, and salt as starting
ingredients, optionally adding or blending starting ingredients,
such as starch, a dairy product, an egg product, a leavening
agent, and food additives in a mixer to prepare dough, and
30 molding the dough with a molding machine, followed by baking in
an oven. Examples of biscuits include biscuits, cookies, sables,
crackers, and pies, according to the oil and sugar content.

[0004]

Biscuits are required to have crispy texture and flavor
35 in their quality as a final product. In addition, the dough of

biscuits is required to exhibit mechanical resistance to achieve easy preparation and excellent moldability.

[0005]

Typical dough preparation methods for biscuits include
5 sugar butter methods and flour butter methods, both of which have the following characteristics.

In sugar butter methods, fat and oil, such as butter, are mixed with sugar by grinding and foamed to be in the form of a cream, to which eggs are gradually added and mixed. Finally,
10 powders such as wheat flour are added to thus prepare dough. In this method, gluten of wheat flour is relatively less likely to be produced, which makes it easier to achieve a soft and crispy texture.

However, this method suffers from problems.
15 Specifically, for example, mixing eggs takes a long time, and lumps of powders (e.g., wheat flour) are formed. Therefore, this method has problems in terms of machinability in the process of mass-producing baked confectioneries.

[0006]

20 In flour butter methods, fat and oil, such as butter, are mixed with powders such as wheat flour and sugar, to which eggs are added to prepare dough. This method, which can prepare dough in a relatively short time, exhibits excellent machinability. In this method, however, gluten of wheat flour is
25 easily produced, which makes it difficult to achieve a crispy texture.

[0007]

Accordingly, in an attempt to obtain biscuits with which excellent machinability and excellent expansion and texture
30 are achieved by adjusting the amount of gluten in wheat flour, for example, Patent Literature (PTL) 1 discloses a method of adding roasted wheat flour to biscuit dough before baking. Specifically, in this method, roasted wheat flour is used in a proportion of 75 to 100% based on the amount of all the wheat
35 flour, which causes the formation of an adequate gluten network,

whereby machinability with appropriate moldability, as well as a desired crispy texture, is obtained.

[0008]

PTL 2 relates to a method for producing roasted wheat
5 flour having a gluten vitality of 10 to 65% by roasting wheat
flour or a starting ingredient powder consisting of wheat flour
and starch for 50 to 150 minutes at a product temperature of 110
to 160°C. PTL 2 discloses that the use of a mixture of the
roasted wheat flour (15%) and cake wheat flour (85%) achieved
10 excellent processability and produced cookies with appropriate
roasted aroma and crispy texture.

[0009]

However, the methods disclosed in PTL 1 and PTL 2 above
both relate to biscuits based on a sugar butter method; in these
15 methods, a flour butter method causes problems in terms of
machinability.

[0010]

PTL 3 discloses providing a wheat flour preparation
having a particle size distribution of wheat flour in which the
20 appearance rate of particles with a particle size of 10 to 50 μm
is 65% or more. PTL 3 discloses that this wheat flour preparation
can impart excellent flavor and improved palatability.

However, biscuits obtained by using this wheat flour
preparation have an unsatisfactory hard texture.

25 [0011]

PTL 4 proposes a production method for biscuits in
which roasted wheat flour is used, and the gluten vitality of all
the wheat flour is adjusted to 75 to 90% in the production of
biscuits based on a flour butter method. In this method, although
30 machinability can be obtained, the texture, such as palatability
and melting feeling in the mouth, is still less satisfactory
compared to that obtained based on sugar butter methods.

Accordingly, achieving the characteristics of both the
flour butter methods and the sugar butter methods at the same
35 time in production methods for biscuits remains as a problem to

be solved; i.e., flour butter methods, which are believed to achieve higher production efficiency, are characterized by achieving operational efficiency with excellent machinability, while sugar butter methods are characterized by achieving a
5 crispy texture.

Citation List

Patent Literature

[0012]

10 PTL 1: JPH09-149757A

PTL 2: JP2002-345421A

PTL 3: JP2013-198428A

PTL 4: JP2017-169467A

15 Summary of Invention

Technical Problem

[0013]

An object of the present invention is to provide a method for producing a wheat flour preparation or biscuits, the method being capable of obtaining quality comparable to that of
20 biscuits obtained based on a sugar butter method, which is characterized by a crispy texture, by using a production method for biscuits based on a flour butter method, which achieves excellent operational efficiency.

25

Solution to Problem

[0014]

In view of the above, the present inventors conducted extensive research and found that the use of a wheat flour preparation containing roasted wheat flour having a gluten
30 vitality of 75 to 90% and fat and oil in a weight ratio of roasted wheat flour to fat and oil of 10:90 to 80:20 ("roasted wheat flour having a gluten vitality of 75 to 90%": "fat and oil" = 10:90 to 80:20), the wheat flour preparation satisfying a
35 particle size distribution in which 50 vol% or more of roasted

wheat flour particles have a particle size of 50 to 200 μm while no particles have a size of 250 μm or more, can solve problems from the past; i.e., quality comparable to that of biscuits obtained based on a sugar butter method, which is characterized by a crispy texture, can be achieved by using a flour butter method, which achieves excellent operational efficiency. The present invention has thus been completed.

[0015]

More specifically, the present invention relates to the following subject matter.

(1) A wheat flour preparation containing roasted wheat flour having a gluten vitality of 75 to 90% and fat and oil in a weight ratio of roasted wheat flour to fat and oil of 10:90 to 80:20 ("roasted wheat flour having a gluten vitality of 75 to 90%": "fat and oil" = 10:90 to 80:20), the wheat flour preparation satisfying a particle size distribution in which 50 vol% or more of roasted wheat flour particles have a particle size of 50 to 200 μm while no particles have a size of 250 μm or more.

20

(2) A method for producing a wheat flour preparation, the method comprising mixing roasted wheat flour having a gluten vitality of 75 to 90% and fat and oil in a weight ratio of roasted wheat flour to fat and oil of 10:90 to 80:20 ("roasted wheat flour having a gluten vitality of 75 to 90%": "fat and oil" = 10:90 to 80:20); and

performing a grinding treatment to satisfy a particle size distribution in which 50 vol% or more of roasted wheat flour particles have a particle size of 50 to 200 μm while no particles have a size of 250 μm or more.

(3) Biscuits containing a wheat flour preparation containing roasted wheat flour having a gluten vitality of 75 to 90% and fat and oil in a weight ratio of roasted wheat flour to

fat and oil of 10:90 to 80:20 ("roasted wheat flour having a gluten vitality of 75 to 90%": "fat and oil" = 10:90 to 80:20), the wheat flour preparation satisfying a particle size distribution in which 50 vol% or more of roasted wheat flour
5 particles have a particle size of 50 to 200 μm while no particles have a size of 250 μm or more.

(4) A method for producing biscuits based on a flour butter method, the method comprising using a wheat flour
10 preparation containing roasted wheat flour having a gluten vitality of 75 to 90% and fat and oil in a weight ratio of roasted wheat flour to fat and oil of 10:90 to 80:20 ("roasted wheat flour having a gluten vitality of 75 to 90%": "fat and oil" = 10:90 to 80:20), the wheat flour preparation satisfying a
15 particle size distribution in which 50 vol% or more of roasted wheat flour particles have a particle size of 50 to 200 μm while no particles have a size of 250 μm or more.

Advantageous Effects of Invention

20 [0016]

The present invention provides a method for producing a wheat flour preparation or biscuits, the method being capable of obtaining quality comparable to that of biscuits obtained based on a sugar butter method, which is characterized by a crispy
25 texture, by using a production method for biscuits based on a flour butter method, which achieves excellent operational efficiency.

Brief Description of Drawings

30 [0017]

Fig. 1 shows the particle size distribution of the wheat flour preparations obtained in Example 1 and Comparative Example 1.

35 Description of Embodiments

[0018]

The present invention is described in detail below.

[0019]

(Wheat Flour)

5 The wheat flour preparation of the present invention contains fat and oil and roasted wheat flour. In the present invention, the type of wheat flour usable for the roasted wheat flour can be any grade of wheat flour that is typically used for food applications.

10 Specific examples include high-protein strong flour, strong flour, semi-strong flour, all-purpose flour, and cake flour. These can be used alone or mixed in appropriate proportions for use.

[0020]

15 (Gluten Vitality)

In the present invention, the wheat flour for use is roasted wheat flour, and the gluten vitality of all the wheat flour must be adjusted to 75 to 90%, preferably 75 to 85%, and most preferably 75 to 80%.

20 The gluten vitality refers to the soluble crude protein content (%) per 100% of the total crude protein content in wheat flour.

The gluten vitality can be measured by the method described in paragraphs [0008] to [0012] of JPH09-191847A.

25 In the present invention, the gluten vitality of all the wheat flour, which is a starting ingredient of biscuits, is 75 to 90%, with the gluten vitality of raw wheat flour taken as 100, whereby eggs can be easily mixed in the dough preparation, and after baking, biscuits with a crispy texture can be easily
30 obtained.

If the gluten vitality of all the wheat flour is less than 75%, the dough tends to stick together poorly, making the molding process less easy.

In contrast, if the gluten vitality exceeds 90%,
35 although the molding process is smooth, the biscuits texture

after baking tends to be too hard, resulting in a crunchy texture.
[0021]

In one embodiment of the present invention, the gluten vitality of all the wheat flour is adjusted by a method of
5 appropriately adjusting the roasting conditions of the wheat flour to thus adjust the gluten vitality of the roasted wheat flour itself to 75 to 90%.

For example, roasting in an oven at 100 to 140°C for a few minutes to 30 minutes can prepare roasted wheat flour,
10 preferably roasted cake flour or roasted all-purpose flour, and most preferably roasted cake flour, having a gluten vitality of 75 to 90%.

[0022]

The wheat flour preparation of the present invention
15 contains roasted wheat flour and fat and oil, and satisfies a particle size distribution in which 50 vol% or more of roasted wheat flour particles have a particle size of 50 to 200 μm while no particles have a size of 250 μm or more. With a uniform particle size that is not too coarse or too fine, it is possible
20 to impart satisfactory palatability.

If less than 50 vol% of the roasted wheat flour particles have a particle size of 50 to 200 μm , or if particles having a particle size of 250 μm or more are present, the wheat flour preparation contains many particles that are coarse or too
25 fine, making it difficult to impart an excellent texture.

[0023]

In order to obtain a particle size shown in the particle size distribution above in the wheat flour preparation of the present invention, milling is performed with an impact
30 mill, together with performing classification or sieving.

Examples of impact mills include hammer mills and pin mills. For the classification process, for example, sieves, air classifiers, etc. may be used.

Additionally, a sifter is further used to sieve the
35 pulverized material to regulate the particle size.

Wheat flour having a particle size that satisfies a desired particle size distribution can be obtained by appropriately selecting mills and sieves.

[0024]

5 The particle size distribution of the wheat flour contained in the wheat flour preparation of the present invention is measured under a wet condition with a wet/dry particle size distribution analyzer (LS13320, manufactured by Beckman Coulter Inc.).

10 In the particle size distribution, the particle size is expressed in percent by volume based on analysis and calculation.

[0025]

(Fat and Oil)

 The wheat flour preparation of the present invention
15 contains fat and oil and wheat flour. The fat and oil usable in the present invention may be those typically used for margarine, shortening, etc. Examples include vegetable oils and fats, such as rapeseed oil, soybean oil, sunflower seed oil, cottonseed oil, peanut oil, rice bran oil, corn oil, safflower oil, olive oil,
20 kapok oil, sesame oil, evening primrose oil, palm oil, shea fat, sal fat, cocoa fat, coconut oil, and palm kernel oil; and animal oils and fats, such as milk fat, beef fat, lard, fish oil, and whale oil. Examples also include processed oils and fats obtained by, for example, hydrogenating, fractionating, or transesterifying
25 these oils and fats independently or in a combination of two or more. An oil and fat composition with physical properties that exhibit plasticity at an ordinary temperature is preferred. In further consideration of flavor, it is preferable to use milk fat such as butter as the fat and oil to impart a richer milk taste.

30 [0026]

 The wheat flour preparation of the present invention preferably contains roasted wheat flour and fat and oil in a weight ratio of roasted wheat flour to fat and oil of 10:90 to 80:20 ("roasted wheat flour having a gluten vitality of 75 to
35 90%": "fat and oil" = 10:90 to 80:20). With a ratio in this range,

physical properties, such as plasticity that allows easy handling of the wheat flour preparation, and the flavor of the roasted wheat flour and fat and oil, can be provided in a well-balanced manner.

5 [0027]

The present invention relates to a method for producing biscuits based on a flour butter method. The flour butter method in the present invention is a method of preparing baked confectionery dough generally according to the following
10 procedure.

1) Powder, such as wheat flour and sugar, as well as refrigerated butter or fat and oil as a butter substitute, is placed in a mixer bowl, and the mixture is stirred sufficiently at a low speed with a mixer until the fat and oil are formed into
15 flakes.

2) Eggs and egg yolks are mixed by stirring.

Examples of biscuits as used in the present invention include biscuits, cookies, sables, crackers, and pies.

[0028]

20 In addition to the wheat flour, the starting ingredients of the biscuits of the present invention include sugar, edible oils and fats, and salt. According to applications and preferences, it is also possible to appropriately use starch, dairy products, egg products, leavening agents, coloring agents, and flavoring agents, if necessary, as long as the crispy texture
25 after baking and the machinability are not impaired.

[0029]

The biscuits of the present invention, which can be prepared based on the flour butter method, can contribute to
30 improving the production efficiency of not only the small-scale production of handmade biscuits, but also continuous-line mass production of biscuits.

[0030]

The present invention is described in more detail below
35 with reference to Examples. In the Examples, "parts" is based on

weight.

[0031]

(Example 1)

Cake wheat flour was heated to 120°C with stirring,
5 followed by cooling to obtain roasted cake flour.

The obtained roasted cake flour had a gluten vitality
of 78%.

The roasted cake flour and butter were mixed in a
weight ratio of roasted cake flour to butter of 60:40, and ground
10 to obtain a wheat flour preparation A.

The roasted wheat flour contained in the obtained wheat
flour preparation A satisfied a particle size distribution in
which 53 vol% of particles had a particle size of 50 to 200 µm
while no particles had a particle size of 250 µm or more.

15 [0032]

(Comparative Example 1)

Cake wheat flour was heated to 120°C with stirring,
followed by cooling to obtain roasted cake flour.

The obtained roasted cake flour had a gluten vitality
20 of 78%.

The roasted cake flour and butter were mixed in a
weight ratio of roasted cake flour to butter of 60:40, and ground
to obtain a wheat flour preparation B.

The roasted wheat flour contained in the obtained wheat
25 flour preparation B satisfied a particle size distribution in
which 25 vol% of particles had a particle size of 50 to 200 µm
while 15 vol% of particles had a particle size of 250 µm or more.

[0033]

(Example 2)

30 Cake wheat flour was heated to 145°C with stirring,
followed by cooling to obtain roasted cake flour.

The obtained roasted cake flour had a gluten vitality
of 75.5%.

The roasted cake flour and butter were mixed in a
35 weight ratio of roasted cake flour to butter of 60:40, and ground

to obtain a wheat flour preparation C.

The roasted wheat flour contained in the obtained wheat flour preparation C satisfied a particle size distribution in which 57 vol% of particles had a particle size of 50 to 200 μm while no particles had a particle size of 250 μm or more.

[0034]

(Example 3)

Cake wheat flour was heated to 100°C with stirring, followed by cooling to obtain roasted cake flour.

The obtained roasted cake flour had a gluten vitality of 89%.

The roasted cake flour and butter were mixed in a weight ratio of roasted cake flour to butter of 60:40, and ground to obtain a wheat flour preparation D.

The roasted wheat flour contained in the obtained wheat flour preparation D satisfied a particle size distribution in which 55 vol% of particles had a particle size of 50 to 200 μm while no particles had a particle size of 250 μm or more.

[0035]

Fig. 1 shows the particle size distribution of the wheat flour preparations obtained in Example 1 and Comparative Example 1.

[0036]

Preparing and baking dough of biscuits based on a flour butter method were performed according to the following method. (Example 4)

1) One hundred and seventy parts (170 parts) of the wheat flour preparation A adjusted to a product temperature of 20°C, 40 parts of sugar, and 3 parts of skimmed milk powder were mixed by low-speed stirring.

2) Subsequently, 6 parts of egg yolk and 1 part of salt were added and mixed by low-speed stirring.

The time required for the preparation of the dough was 10 minutes. The specific gravity of the dough was 1.1.

3) The dough was formed into a bar shape and cut at a

thickness of about 10 mm to obtain round cut dough.

4) The dough was baked in an oven at 170°C for 15 minutes, thus obtaining biscuits.

[0037]

5 (Comparative Example 2)

1) One hundred and seventy parts (170 parts) of the wheat flour preparation B adjusted to a product temperature of 20°C, 40 parts of sugar, and 3 parts of skimmed milk powder were mixed by low-speed stirring.

10 2) Subsequently, 6 parts of egg yolk and 1 part of salt were added and mixed by low-speed stirring.

The time required for the preparation of the dough was 10 minutes. The specific gravity of the dough was 1.1.

15 3) The dough was formed into a bar shape and cut at a thickness of about 10 mm to obtain round cut dough.

4) The dough was baked in an oven at 170°C for 15 minutes, thus obtaining biscuits.

[0038]

(Example 5)

20 1) One hundred and seventy parts (170 parts) of the wheat flour preparation C adjusted to a product temperature of 20°C, 40 parts of sugar, and 3 parts of skimmed milk powder were mixed by low-speed stirring.

25 2) Subsequently, 6 parts of egg yolk and 1 part of salt were added and mixed by low-speed stirring.

The time required for the preparation of the dough was 10 minutes. The specific gravity of the dough was 1.1.

3) The dough was formed into a bar shape and cut at a thickness of about 10 mm to obtain round cut dough.

30 4) The dough was baked in an oven at 170°C for 15 minutes, thus obtaining biscuits.

[0039]

(Example 6)

35 1) One hundred and seventy parts (170 parts) of the wheat flour preparation D adjusted to a product temperature of

20°C, 40 parts of sugar, and 3 parts of skimmed milk powder were mixed by low-speed stirring.

2) Subsequently, 6 parts of egg yolk and 1 part of salt were added and mixed by low-speed stirring.

5 The time required for the preparation of the dough was 10 minutes. The specific gravity of the dough was 1.1.

3) The dough was formed into a bar shape and cut at a thickness of about 10 mm to obtain round cut dough.

4) The dough was baked in an oven at 170°C for 15
10 minutes, thus obtaining biscuits.

[0040]

For comparison, preparing and baking dough of biscuits based on a sugar butter method were performed according to the following method.

15 (Comparative Example 3)

1) Seventy parts (70 parts) of butter adjusted to a product temperature of 20°C weighed in a mixer bowl were mixed with 40 parts of sugar by low-speed stirring.

2) The resulting product was foamed to a specific
20 gravity of 0.75 by high-speed stirring.

3) Subsequently, 6 parts of egg yolk and 1 part of salt were added and mixed by low-speed stirring, and the mixture was foamed to a specific gravity of 0.65.

4) Thereafter, 3 parts of skimmed milk powder, 100
25 parts of raw cake flour, and 1.2 parts of leavening agent were added and mixed.

The time required for the preparation of the dough was 20 minutes. The specific gravity of the dough was 1.1.

5) The dough was formed into a bar shape and cut at a
30 thickness of about 10 mm to obtain round cut dough.

6) The dough was baked in an oven at 170°C for 15 minutes, thus obtaining biscuits.

[0041]

Table 1 shows the formulations and evaluation results
35 of Examples 4 to 6 and Comparative Examples 2 and 3.

[0042]

[Table 1]

	Flour butter method				Sugar butter method
	Ex. 4	Comp. Ex. 2	Ex. 5	Ex. 6	Comp. Ex. 3
Wheat flour preparation A	170				
Wheat flour preparation B		170			
Wheat flour preparation C			170		
Wheat flour preparation D				170	
Butter					70
Raw cake flour					100
Sugar	40	40	40	40	40
Skimmed milk powder	3	3	3	3	3
Egg yolk	6	6	6	6	6
Salt	1	1	1	1	1
Operational efficiency	◎ Excellent	○ Good	○ Good	◎ Excellent	× Poor (Preparation took a long time.)
Flavor	Better butter flavor and roasting aroma	Weak butter flavor	Better butter flavor and roasting aroma	Excellent butter flavor and roasting aroma	Excellent butter flavor and roasting aroma
Texture	Easily loosened and crispy	Crispy	Easily loosened and crispy	Crispy	Easily loosened and crispy
Palatability	Light	Slightly hard	Very light	Slightly hard	Light
Melting feeling in the mouth	Excellent	Relatively poor	Excellent	Relatively excellent	Excellent

CLAIMS

[Claim 1]

Biscuits containing a wheat flour preparation
5 containing roasted wheat flour having a gluten vitality of 75 to
90% and fat and oil in a weight ratio of roasted wheat flour to
fat and oil of 10:90 to 80:20, the wheat flour preparation
satisfying a particle size distribution in which 50 vol% or more
of roasted wheat flour particles have a particle size of 50 to
10 200 μm while no particles have a size of 250 μm or more.

[Claim 2]

A method for producing biscuits based on a flour butter
method, the method comprising using a wheat flour preparation
15 containing roasted wheat flour having a gluten vitality of 75 to
90% and fat and oil in a weight ratio of roasted wheat flour to
fat and oil of 10:90 to 80:20, the wheat flour preparation
satisfying a particle size distribution in which 50 vol% or more
of roasted wheat flour particles have a particle size of 50 to
20 200 μm while no particles have a size of 250 μm or more.