

SPECIFICATION

METHOD FOR PRODUCING FOOD PRODUCT

5 TECHNICAL FIELD

[0001]

The present invention relates to a method for producing a food product.

10 BACKGROUND ART

[0002]

Patent Documents 1 and 2 describe techniques for using starch for producing a food product.

Patent document 1 (Japanese Unexamined Patent Publication No. 15 2007-236389) describes a method for preparing a cooked food product including the steps of applying a fat-based coating to the surface of an uncooked or incompletely cooked food product and bringing the fat-coated food product into contact with superheated steam having a specific temperature for a specific period of time to obtain a cooked 20 food product, and a doughnut is described as a specific example of the cooked food product.

[0003]

In addition, Patent Document 2 (Japanese Unexamined Patent Publication No. 2004-290023) describes a method for producing a 25 deep-fried food by dusting fried food with a starch-based powder and refrying the fried food, and also describes that it is possible to provide a deep-fried food, particularly a doughnut, which can retain

a crispy texture even in a case where the food is stored in a closed container for 48 hours or more when using wheat flour as the starch-based powder.

5 RELATED DOCUMENT

PATENT DOCUMENT

[0004]

[Patent Document 1] Japanese Unexamined Patent Publication No. 2007-236389

10 [Patent Document 2] Japanese Unexamined Patent Publication No. 2004-290023

SUMMARY

TECHNICAL PROBLEM

15 [0005]

However, the above-mentioned patent documents do not disclose or suggest a food product in which an outer layer is formed by attaching a batter to the outside of a bakery dough or a bakery food and deep frying the batter. Accordingly, the present invention provides a food product having an excellent crispy feeling and an easiness to bite immediately after preparation of the outer layer and after storage.

20

SOLUTION TO PROBLEM

25 [0006]

According to the present invention, there is provided a method for producing a food product including:

preparing a bakery food;
preparing a batter by adding a component (A);
attaching the batter to an outside of the bakery food; and
deep frying the bakery food to which the batter is attached to
5 form an outer layer derived from the batter,
in which the outer layer is an outermost layer.

Component (A): one or two selected from the group consisting
of unmodified starch and modified starch
[0007]

10 According to the present invention, there is provided a method
for producing a food product including:

preparing a bakery dough;
preparing a batter by adding a component (A);
attaching the batter to an outside of the bakery dough; and
15 deep frying the bakery dough to which the batter is attached
to form an outer layer derived from the batter,
in which the outer layer is an outermost layer.

Component (A): one or two selected from the group consisting
of unmodified starch and modified starch

20 [0008]

According to the present invention, there is provided a method
for imparting a crispy feeling to an outer layer of a food product
including obtaining the food product by the method for producing a
food product according to the present invention described above.

25 In addition, according to the present invention, there is
provided a method for maintaining a crispy feeling of an outer layer
of a food product including obtaining the food product by the method

for producing a food product according to the present invention described above.

[0009]

According to the present invention, there is provided a batter
5 mix to be used in the method for producing a food product according to the present invention described above, the batter mix including:
the component (A); and wheat flour.

[0010]

It is to be noted that any combination of these respective
10 constitutions and those obtainable by converting the expression of the present invention between methods, apparatuses, and the like are also effective as embodiments of the present invention.

For example, according to the present invention, there is provided a food product obtainable by the above-described method for
15 producing a food product according to the present invention.

ADVANTAGEOUS EFFECTS OF INVENTION

[0011]

As described above, according to the present invention, it is
20 possible to obtain a food product with an excellent crispy feeling and an easiness to bite immediately after preparation of the outer layer and after storage.

DESCRIPTION OF EMBODIMENTS

25 [0012]

Hereinafter, embodiments of the present invention will be described with reference to specific examples of each component.

Each component can be used alone or in combination of two or more thereof.

[0013]

In the embodiment, a first method for producing a food product
5 includes the following steps:
(Step 11) preparing a bakery food;
(Step 12) adding a component (A) to prepare a batter;
(Step 13) attaching the batter containing the component (A) to the
outside of the bakery food; and
10 (Step 14) deep frying the bakery food to which the batter is attached
to form an outer layer derived from the batter.

Hereinafter, each step will be described.

[0014]

(Step 11)

15 In step 11, a bakery food is prepared. Step 11 includes, for
example, a step of preparing a bakery dough. Step 11 includes, for
example, one or two or more cooking steps selected from the group
consisting of baking, deep frying, steam heating and microwave
heating of bakery dough. Commercially available products can also
20 be used as the bakery food.

[0015]

Specific examples of the bakery food include one selected from
the group consisting of doughnuts, bread, baked confectionery, and
steamed confectionery. Examples of doughnuts include baked
25 doughnuts, deep fried doughnuts, and steamed doughnuts, examples of
bread include ordinary bread baked in an oven and the like, deep fried
bread, and steamed bread, and examples of baked confectionery include

sponge cake, castella, financier, madeleine, waffle, baumkuchen, and chiffon cake. Examples of steamed confectionery include steamed cakes and steamed buns (manju). Since the outer layer derived from the batter obtainable by the production method of the embodiment is
5 excellent in the crispy feeling and easiness to bite, and also excellent in texture difference between a softness of the bakery food as a core and a hardness of the outer layer derived from the batter, the bakery food suitably has a soft texture. From that viewpoint, the bakery food is preferably a doughnut, bread, steamed cake, sponge
10 cake, castella, financier, madeleine, waffle, baumkuchen, or chiffon cake, more preferably a doughnut, and even more preferably a deep fried doughnut.

[0016]

(Step 12)

15 Step 12 is a step of adding a component (A) to prepare a batter.

[0017]

The content of the component (A) in the batter is preferably 10% by mass or more, more preferably 20% by mass or more, even more preferably 30% by mass or more, and still even more preferably 35%
20 by mass or more with respect to the total solid content in the batter from the viewpoint of improving the crispy feeling and easiness to bite immediately after the production and storage of the food product.

From the same viewpoint, the content of the component (A) in the batter is 100% by mass or less, preferably 80% by mass or less,
25 more preferably 60% by mass or less, even more preferably 50% by mass or less, and still even more preferably 45% by mass or less with respect to the total solid content in the batter.

[0018]

Hereinafter, the component (A) blended in the batter will be described.

In the embodiment, a gelatinization start temperature of a raw material starch of the modified starch and the unmodified starch of the component (A) is preferably 50°C or higher, more preferably 55°C or higher, and preferably 83°C or lower, and more preferably 70°C or lower from the viewpoint of improving the crispy feeling and easiness to bite immediately after production and after storage of the food product. Here, the gelatinization start temperature is a temperature at which gelatinization of starch starts, may be known by measuring the viscosity developed by gelatinization, and may be measured by, for example, Brabender Viscograph E or an equivalent measuring apparatus. Examples of the raw material starch having a gelatinization start temperature of 50°C or higher and 83°C or lower include tapioca starch, corn starch, waxy corn starch, potato starch, and sweet potato starch.

[0019]

The raw material starch of the modified starch and the unmodified starch of the component (A) in the embodiment are preferably one or two or more selected from tapioca starch, corn starch, waxy corn starch, potato starch, and sweet potato starch, more preferably one or two selected from tapioca starch and corn starch, and even more preferably tapioca starch.

25 [0020]

The component (A) may include either unmodified starch or modified starch, preferably includes modified starch from the

viewpoint of improving the crispy feeling and easiness to bite immediately after production and after storage of the food product. The component (A) more preferably includes modified starch in an amount of 10% by mass or more and 100% by mass or less, even more preferably includes modified starch in an amount of 50% by mass or more and 100% by mass or less, and still even more preferably 80% by mass or more and 100% by mass or less with respect to the entire component (A). From the same viewpoint, the modified starch is preferably one or two or more selected from the group consisting of oxidized starch, acetylated starch, acetylated oxidized starch, and distarch phosphate, more preferably one or two or more selected from the group consisting of oxidized starch, and acetylated starch, and acetylated oxidized starch, and even more preferably one or two selected from the group consisting of oxidized starch and acetylated oxidized starch. Further, it is preferable that the component (A) includes oxidized starch and acetylated oxidized starch. Here, the acetylated oxidized starch is a starch that is been subjected to an acetylation treatment and an oxidation treatment, irrespective of the order of the treatments.

[0021]

In a case where the outer layer includes oxidized starch and acetylated oxidized starch, the content of acetylated oxidized starch in the component (A) in the batter is preferably 0.1 parts by mass or more, more preferably 0.2 parts by mass or more, and even more preferably 0.3 parts by mass or more with respect to 1 part by mass of the oxidized starch from the viewpoint of improving the crispy feeling and easiness to bite immediately after production and after

storage of the food product.

In addition, from the same viewpoint, in the component (A) in the batter, the content of the acetylated oxidized starch is preferably 5 parts by mass or less, more preferably 3 parts by mass or less, and even more preferably 2 parts by mass or less with respect to 1 part by mass of the oxidized starch.

In a case where the component (A) includes oxidized starch and acetylated oxidized starch, the content of the total amount of oxidized starch and acetylated oxidized starch in the component (A) may be 10% by mass or more and 100% by mass or less, More preferably 50% by mass or more and 100% by mass or less, and even more preferably 80% by mass or more and 100% by mass or less.

[0022]

Further, the batter may include a solid content other than the component (A). Specific examples of solid contents other than starch include wheat flour, sweeteners such as sugar, and seasonings. The batter preferably includes wheat flour and more preferably includes soft wheat flour.

In a case where the batter includes wheat flour, the content of the wheat flour in the batter is preferably 20% by mass or more, more preferably 30% by mass or more, even more preferably 40% by mass or more, still even more preferably 50% by mass or more, and further still even more preferably 55% by mass or more with respect to the total solid content in the batter from the viewpoint of stably forming an outer layer derived from the batter on the outside of the food.

In addition, from the viewpoint of improving the crispy feeling and easiness to bite immediately after the production and storage

of the food product, the content of the wheat flour in the batter is preferably 90% by mass or less, more preferably 80% by mass or less, even more preferably 70% by mass or less, and still even more preferably 65% by mass or less with respect to the total solid content
5 in the batter.

Further, in the case where the batter includes wheat flour, the mass ratio of the component (A) per wheat flour is preferably 0.1 or more, more preferably 0.2 or more, and even more preferably 0.4 or more from the viewpoint of improving the crispy feeling and the
10 easiness to bite immediately after the production and after storage of the food product. From the viewpoint of stably forming an outer layer derived from the batter on the outside of the food product, the mass ratio of the component (A) per wheat flour is, for example, 6.0 or less, preferably 5.0 or less, more preferably 4.0 or less,
15 even more preferably 2.0 or less, still even more preferably 1.5 or less, and further still even more preferably 1.0 or less.

[0023]

In addition, specifically, the batter includes water in addition to the solid content. The content of water in the batter is, for
20 example, 40% by mass or more and 80% by mass or less. Here, the content of water is a mass proportion to the total composition of the batter.

[0024]

(Step 13)

Step 13 is a step of attaching the batter including the component
25 (A) to the outside of the bakery food.

[0025]

(Step 14)

There is no limitation in the deep frying conditions in step 14, and the frying conditions can be set according to the type of the bakery food. For example, the temperature is set to 140°C or higher and 200°C or lower and the time is set to 60 seconds or longer
5 and 480 seconds or shorter.

[0026]

In the embodiment, a second method for producing a food product includes the following steps:

(Step 21) preparing a bakery dough;

10 (Step 22) adding component (A) to prepare a batter;

(Step 23) attaching the batter including the component (A) to an outside of the bakery dough; and

(Step 24) deep frying the bakery dough to which the batter has attached to form an outer layer derived from the batter.

15 Hereinafter, each step will be described.

[0027]

(Step 21)

In step 21, bakery dough is prepared. Step 21 includes, for example, a step of preparing a bakery dough. Commercially available
20 products can also be used as the bakery dough.

[0028]

Specific examples of the bakery dough include one selected from the group consisting of doughnut dough, bread dough, and dough for baked confectionery. The doughnut dough includes cake doughnut dough
25 and yeast doughnut dough, and the bread dough includes ordinary bread dough, as well as dough for filled and stuffed bread (savory bread) having a filling or the like therein and confectionery bread. Since

the outer layer derived from the batter obtainable by the production method of the embodiment is excellent in crispy feeling and easiness to bite, and also excellent in texture difference between a softness of the bakery dough after cooking as a core and a hardness of the outer layer derived from the batter, the bakery dough after cooking suitably has a soft texture.

In addition, from the viewpoint of improving the workability of attaching the batter, it is preferable that the bakery dough has shape retention properties and hardness such that the batter can be lifted up by hand to attach the batter to the dough. In addition, it is preferable to attach the batter to yeast-containing dough after fermentation. The bakery dough is preferably cake doughnut dough, yeast doughnut dough, bread dough, dough for filled and stuffed bread, and dough for confectionery bread, more preferably cake doughnut dough and yeast doughnut dough, and even more preferably cake doughnut dough. In addition, the bakery dough may be refrigerated or frozen, and is preferably frozen in order to have appropriate shape retaining properties.

[0029]

20 (Step 22)

Step 22 is a step of adding the component (A) to prepare a batter.

[0030]

The content of the component (A) in the batter is preferably 10% by mass or more, more preferably 20% by mass or more, even more preferably 30% by mass or more, and still even more preferably 35% by mass or more with respect to the total solid content in the batter from the viewpoint of improving the crispy feeling and easiness to

bite immediately after the production and storage of the food product.

From the same viewpoint, the content of the component (A) in the batter is 100% by mass or less, preferably 80% by mass or less, more preferably 60% by mass or less, even more preferably 50% by mass or less, and still even more preferably 45% by mass or less with respect to the total solid content in the batter.

[0031]

Hereinafter, the component (A) blended in the batter will be described.

10 In the embodiment, a gelatinization start temperature of unmodified starch and the raw material starch of the modified starch of the component (A) is preferably 50°C or higher, more preferably 55°C or higher, and preferably 83°C or lower, and more preferably 70°C or lower from the viewpoint of improving the crispy feeling and easiness to bite immediately after production and after storage of the food product. Here, the gelatinization start temperature is a temperature at which gelatinization of starch starts, may be known by measuring the viscosity developed by gelatinization, and may be measured by, for example, Brabender Viscograph E or an equivalent
15 measuring apparatus. Examples of the raw material starch having a gelatinization start temperature of 50°C or higher and 83°C or lower include tapioca starch, corn starch, waxy corn starch, potato starch, and sweet potato starch.

[0032]

25 The raw material starch of the modified starch and the unmodified starch of the component (A) in the embodiment are preferably one or two or more selected from tapioca starch, corn starch, waxy corn starch,

potato starch, and sweet potato starch, more preferably one or two selected from tapioca starch and corn starch, and even more preferably tapioca starch.

[0033]

5 The component (A) may include either unmodified starch or modified starch, preferably includes modified starch from the viewpoint of improving the crispy feeling and easiness to bite immediately after production and after storage of the food product. The component (A) more preferably includes modified starch in an
10 amount of 10% by mass or more and 100% by mass or less, even more preferably includes modified starch in an amount of 50% by mass or more and 100% by mass or less, and still even more preferably 80% by mass or more and 100% by mass or less with respect to the entire component (A). From the same viewpoint, the modified starch is
15 preferably one or two or more selected from the group consisting of oxidized starch, acetylated starch, acetylated oxidized starch, and distarch phosphate, more preferably one or two or more selected from the group consisting of oxidized starch, and acetylated starch, and acetylated oxidized starch, even more preferably one or two selected
20 from the group consisting of oxidized starch and acetylated oxidized starch, and still even more preferably oxidized starch and acetylated oxidized starch. Further, it is preferable that the component (A) includes oxidized starch and acetylated oxidized starch. Here, the acetylated oxidized starch is a starch that is been subjected to an
25 acetylation treatment and an oxidation treatment, irrespective of the order of the treatments.

[0034]

In a case where the outer layer includes oxidized starch and acetylated oxidized starch, the content of acetylated oxidized starch in the component (A) in the batter is preferably 0.1 parts by mass or more, more preferably 0.2 parts by mass or more, and even more preferably 0.3 parts by mass or more with respect to 1 part by mass of the oxidized starch from the viewpoint of improving the crispy feeling and easiness to bite immediately after production and after storage of the food product.

In addition, from the same viewpoint, in the component (A) in the batter, the content of the acetylated oxidized starch is preferably 5 parts by mass or less, more preferably 3 parts by mass or less, and even more preferably 2 parts by mass or less with respect to 1 part by mass of the oxidized starch.

In a case where the component (A) includes oxidized starch and acetylated oxidized starch, the content of the total amount of oxidized starch and acetylated oxidized starch in the component (A) may be 10% by mass or more and 100% by mass or less, More preferably 50% by mass or more and 100% by mass or less, and even more preferably 80% by mass or more and 100% by mass or less.

[0035]

Further, the batter may include a solid content other than the component (A). Specific examples of solid contents other than starch include wheat flour, sweeteners such as and sugar, and seasonings. The batter preferably includes wheat flour and more preferably includes soft wheat flour.

In a case where the batter includes wheat flour, the content of the wheat flour in the batter is preferably 20% by mass or more,

more preferably 30% by mass or more, even more preferably 40% by mass or more, still even more preferably 50% by mass or more, and further still even more preferably 55% by mass or more with respect to the total solid content in the batter from the viewpoint of stably forming
5 an outer layer derived from the batter on the outside of the food.

In addition, from the viewpoint of improving the crispy feeling and easiness to bite immediately after the production and storage of the food product, the content of the wheat flour in the batter is preferably 90% by mass or less, more preferably 80% by mass or
10 less, even more preferably 70% by mass or less, and still even more preferably 65% by mass or less with respect to the total solid content in the batter.

Further, in the case where the batter includes wheat flour, the mass ratio of the component (A) per wheat flour is preferably 0.1
15 or more, more preferably 0.2 or more, and even more preferably 0.4 or more from the viewpoint of improving the crispy feeling and the easiness to bite immediately after the production and after storage of the food product. From the viewpoint of stably forming an outer layer derived from the batter on the outside of the food product,
20 the mass ratio of the component (A) per wheat flour is, for example, 6.0 or less, preferably 5.0 or less, more preferably 4.0 or less, even more preferably 2.0 or less, still even more preferably 1.5 or less, and further still even more preferably 1.0 or less.

[0036]

25 In addition, specifically, the batter includes water in addition to the solid content. The content of water in the batter is, for example, 40% by mass or more and 80% by mass or less. Here, the content

of water is a mass proportion to the total composition of the batter.

[0037]

(Step 23)

Step 23 is a step of attaching the batter including the component

5 (A) to the outside of the bakery dough.

[0038]

(Step 24)

There is no limitation in the deep frying conditions in step
24, and the frying conditions can be set according to the type of
10 bakery dough. For example, the temperature is set to 140°C or higher
and 200°C or lower and the time is set to 60 seconds or longer and
900 seconds or shorter.

[0039]

A food product is obtainable by the steps of the first or second
15 method for producing a food product described above.

Since the food product obtainable in the embodiment has an outer
layer formed by attaching the batter including the component (A) to
the outside of the bakery food or bakery dough and deep frying the
bakery food or bakery dough, the crispy feeling and easiness to bite
20 (non-gummy texture) immediately after the production of the outer
layer and after storage are excellent. More specifically, according
to the embodiment, it is possible to obtain a food product excellent
in crispy feeling and easiness to bite after storage at room
temperature. In addition, according to the embodiment, it is
25 possible to obtain a food excellent in texture difference between
the softness of the bakery food and the bakery dough after cooking
as the core, and the hardness of the outer layer derived from the

batter.

The storage temperature at room temperature can be, for example, higher than 10°C and 40°C or lower.

In the embodiment, a method for imparting a crispy feeling to
5 the outer layer of the food product includes obtaining a food product by the above-described method for producing a food product.

In the embodiment, the method for maintaining the crispy feeling of the outer layer of the food product includes obtaining a food product by the above-described method for producing a food product.

10 [0040]

The food product obtainable by the production method according to the embodiment is specifically a deep fried food product, and includes food products in which the outer layer derived from the batter is provided on the outermost layer of the food product.

15 [0041]

The bakery food is a core part of the food obtainable in the embodiment. The bakery food preferably constitutes 80% or more of the total food product volume, and more preferably 90% or more of the total food product volume.

20 In addition, the bakery food is preferably a bakery food obtainable by subjecting bakery dough to one or two or more heating cooking steps selected from the group consisting of baking, deep frying, steam heating, and microwave heating.

[0042]

25 The bakery dough is a core part of the food product obtainable in the embodiment. The bakery dough preferably constitutes 80% or more of the total food product volume, and more preferably 90% or

more of the total food product volume after deep frying.

[0043]

The outer layer derived from the batter in the embodiment is provided on the outside of the bakery food or the bakery dough. In
5 a case where a plurality of outer layers is provided, the outer layer derived from the batter is provided as the outermost layer, that is, the outermost layer. The outer layer may be provided in contact with the bakery food or bakery dough, or an interposed layer may be provided between the outer layer and the bakery food or the bakery dough. From
10 the viewpoint of simplifying food product production steps, preferably, the outer layer is provided in contact with the bakery food or the bakery dough.

The outer layer may be provided over the entire outside of the bakery food or the bakery dough, or may be provided in a part of the
15 outside of the bakery food or the bakery dough. From the viewpoint of improving the texture difference between the softness of the bakery food or the bakery dough as the core of the food product obtainable by the embodiment and the hardness of the outer layer derived from the batter, preferably, the outer layer covers the entire outside
20 of the bakery food or the bakery dough.

[0044]

The average thickness of the outer layer derived from the batter is preferably more than 0 mm, more preferably 0.1 mm or more, and more preferably 0.5 mm or more from the viewpoint of stably improving
25 the crispy feeling and easiness to bite immediately after the production and after storage of the food product. In addition, from the same viewpoint, the average thickness of the outer layer derived

from the batter is preferably 15 mm or less, and more preferably 10 mm or less.

Here, the thickness of the outer layer derived from the batter may be different outside the bakery food or the bakery dough.

5 [0045]

A mix for batter of the embodiment is used in the above-described first or second method for producing a food product according to the embodiment. Specifically, the mix includes the component (A) and wheat flour. The total mass of the component (A) and the wheat flour
10 is preferably 80% by mass or more, more preferably 90% by mass or more, and even more preferably 95% by mass or more. The total mass of the component (A) and the wheat flour in the mix for batter is 100% by mass or less.

[0046]

15 Further, with respect to 100 parts by mass of the wheat flour, the content of the component (A) is preferably 10 parts by mass or more, more preferably 20 parts by mass or more, even more preferably 40 parts by mass or more, and still even more preferably 50 parts by mass or more, and is, for example, 600 parts by mass or less,
20 preferably 500 parts by mass or less, more preferably 200 parts by mass or less, even more preferably 150 parts by mass or less, still even more preferably 100 parts by mass or less, and further still even more preferably 80 parts by mass or less.

[Examples]

25 [0047]

Examples of the present invention are shown below, but the gist of the present invention is not limited thereto.

[0048]

(Raw Materials)

The following materials were mainly used as raw materials.

(Doughnut and Doughnut Dough)

5 Frozen doughnut dough: "EGG DOUGHNUT", manufactured by Orlando Foods Inc.

Deep fried doughnut: "PONDERING", manufactured by Mister Donut Thailand

(Component (A))

10 Tapioca starch: manufactured by J-Oil Mills, Inc.
(gelatinization start temperature: 64°C)

Corn starch: manufactured by J-Oil Mills, Inc. (gelatinization start temperature: 79°C)

15 Acetylated oxidized tapioca starch: "GELCOL SP-2" manufactured by J-Oil Mills, Inc. (gelatinization start temperature of raw material starch: 64°C)

Oxidized tapioca starch: oxidized starch obtained by the method described in Production Example 1 (gelatinization start temperature of raw material starch: 64°C)

20 Acetylated tapioca starch: "ACTBODY A700" manufactured by J-Oil Mills, Inc. (gelatinization start temperature of raw material starch: 64°C)

(Others)

25 Wheat flour 1: soft wheat flour, "FLOWER", manufactured by Nisshin Flour Milling Inc.

Wheat flour 2: soft wheat flour, "All purpose flour" (Kite Brand), manufactured by United Flour Mill Public Co. Ltd.

Sugar 1: "CASTER SUGAR", manufactured by Dai-Nippon Meiji Sugar Co., Ltd.

Sugar 2: "Pure Refined Sugar", manufactured by Mitr-Phol Group

Frying oil 1: "FlyUp 201", manufactured by J-Oil Mills, Inc.

5 Frying oil 2: soybean oil, manufactured by Thai Vegetable Oil Public Company Limited

[0049]

Here, the gelatinization start temperature of the tapioca starch and the corn starch was measured by the following method.

10 (Method for Measuring Gelatinization Start Temperature)

The gelatinization start temperature of each starch was measured by Brabender Viscograph E (manufactured by Brabender GmbH & Co.KG.). The starch was put into a beaker containing 450 mL of distilled water so as to be 6% in terms of dry matter, and stirred, and then the starch
15 slurry was transferred to a metal cylindrical container attached to the apparatus. The starch solution was heated while rotating a stirring rod (blade type) attached to the apparatus at 75 rpm, and the viscosity of the starch solution was measured while elevating the temperature by 1.5°C per minute. The temperature at which the
20 viscosity of the starch solution reached 10 BU was defined as the gelatinization start temperature.

[0050]

(Production Example 1)

In this example, oxidized tapioca starch was produced.

25 150 g of tapioca starch and 190 g of distilled water were put into a separable flask and dispersed in a separable flask to prepare a slurry having a dry matter reduced mass concentration of 38.2% by

mass.

After the temperature of the obtained slurry was controlled to 37°C, 18.2 mL of a sodium hypochlorite aqueous solution (effective chlorine concentration: 14.3%) was charged at a time, and the effective chlorine concentration with respect to the starch reduced mass was set to 2% by mass/g.

After charging the sodium hypochlorite aqueous solution, a 3% by mass sodium hydroxide aqueous solution was added dropwise to adjust the pH to 9.9.

Thereafter, a sodium hydroxide aqueous solution was added dropwise timely to maintain the pH within 9.9 ± 0.03 until the completion of the reaction, thereby obtaining oxidized starch.

The reaction was completed at a time when a part of the slurry was sampled timely and added dropwise into a saturated potassium iodide solution so that the solution did not exhibit purple color.

After confirming the completion of the reaction, the slurry was neutralized to pH 6 by adding 3% by mass of hydrochloric acid, and then the oxidized starch in the slurry was washed and dehydrated.

Thereafter, the mixture was dried at 40°C overnight, pulverized, sieved with a 60-mesh sieve (opening: 250 μm), and used as oxidized tapioca starch.

[0051]

(Examples 1 to 7 and Comparative Example 1)

A frozen doughnut dough was ,in a frozen state, deep fried in a frying oil 1 heated to 180°C for 2 minutes, turned upside down, and further deep fried for 1 minute to obtain a bakery food as a core (filling) in this example.

After deep frying, the bakery food after cooking was cooled down at room temperature, and then a batter having the composition of each example shown in Table 1 or Table 2 were attached, and deep fried at 180°C for 75 seconds on each side.

5 The food texture of the outer layer derived from the batter immediately after deep frying of the obtained food product and the outer layer derived from the batter after 4 hours at room temperature (21°C) was evaluated based on the following evaluation standards by the average of the scores of four expert panelists, and a score of
10 2.1 or higher was regarded as pass.

[0052]

(Crispy Feeling)

5 Points: Extremely crispy

4 Points: Quite crispy

15 3 Points: Crispy

2 Points: Slightly crispy

1 Point: Not crispy at all

(Easiness to bite)

5 Points: Extremely easy to bite

20 4 Points: Quite easy to bite

3 Points: Easy to bite

2 Points: Slightly easy to bite

1 Point: Gummy texture

(Texture Difference Between Core and Outer Layer)

25 5 Points: There is a great texture difference between the softness of the core and the hardness of the outer layer

4 Points: There is a texture difference between the softness

of the core and the hardness of the outer layer

3 Points: There is a slight texture difference between the softness of the core and the hardness of the outer layer

2 Points: There is little texture difference between the
5 softness of the core and the hardness of the outer layer

1 Point: There is no texture difference between the softness of the core and the hardness of the outer layer

[0053]

Table 1

	Raw material (% by mass)	Comparative Example 1	Example 1	Example 2	Example 3	Example 4	Example 5
Component (A)	Tapioca starch		14.92				
	Corn starch			14.92			
	Acetylated oxidized starch				14.92		
	Oxidized tapioca starch					14.92	
	Acetylated tapioca starch						14.92
Other raw materials	Wheat flour 1	36.50	21.58	21.58	21.58	21.58	21.58
	Sugar 1	0.25	0.25	0.25	0.25	0.25	0.25
	Water	63.25	63.25	63.25	63.25	63.25	63.25
Total		100.0	100.0	100.0	100.0	100.0	100.0
	Evaluation						
Immediately after deep frying	Crispy Feeling	1.3	3.3	3.8	4.3	4.8	3.8
	Easiness to bite	1.5	3.3	2.5	2.8	4.5	4.3
	Texture difference between core and outer layer	3.8	3.3	3.8	3.5	3.8	4.0
After storage	Crispy Feeling	1.0	2.8	3.3	4.3	4.3	3.3
	Easiness to bite	1.3	3.0	3.8	4.0	4.3	3.3
	Texture difference between core and outer layer	4.0	2.8	3.5	4.0	4.0	3.0

[0054]

The outer layer of the food product of each Example shown in Table 1 had preferable crispy feeling and easiness to bite both immediately after deep frying and after storage at room temperature, and was also excellent in texture difference between the core and the outer layer.

In a case of comparison for each component (A), regarding the crispy feeling in the texture of the outer layer derived from the batter immediately after deep frying, oxidized tapioca starch, acetylated oxidized tapioca starch, acetylated tapioca starch, and corn starch were excellent in that order, and regarding the easiness to bite, oxidized tapioca starch, acetylated tapioca starch, and tapioca starch were excellent in this order. In addition, regarding

the crispy feeling in the texture of the outer layer derived from the batter after storage at room temperature, oxidized tapioca starch and acetylated oxidized tapioca starch were equivalent, and then acetylated tapioca starch and corn starch were excellent in this order.

- 5 Regarding easiness to bite, oxidized tapioca starch, acetylated oxidized tapioca starch, and corn starch were excellent in this order.

In Table 1, Example 4 including oxidized tapioca starch was the most excellent in almost all evaluation items.

- On the other hand, although the food product obtained in Comparative Example 1 had a texture difference between the core and the outer layer, the outer layer was not crispy and gummy texture.
- [0055]

Table 2

	Raw material (% by mass)	Example 3	Example 6	Example 7	Example 4
Component (A)	Acetylated oxidized tapioca starch	14.92	10.44	7.46	
	Oxidized tapioca starch		4.48	7.46	14.92
Other raw materials	Wheat flour 1	21.58	21.58	21.58	21.58
	Sugar 1	0.25	0.25	0.25	0.25
	Water	63.25	63.25	63.25	63.25
Total		100.0	100.0	100.0	100.0
	Evaluation				
Immediately after deep frying	Crispy Feeling	4.3	4.5	4.3	4.8
	Easiness to bite	2.8	4.5	4.3	4.5
	Texture difference between core and outer layer	3.5	3.3	3.0	3.8
After storage	Crispy Feeling	4.3	4.3	4.8	4.3
	Easiness to bite	4.0	4.3	4.5	4.3
	Texture difference between core and outer layer	4.0	3.5	4.3	4.0

[0056]

- 15 The outer layer of the food product of each Example shown in Table 2 had preferable crispy feeling and easiness to bite both immediately after deep frying and after storage at room temperature,

and was also excellent in texture difference between the core and the outer layer.

Among these, regarding the texture of the outer layer derived from the batter immediately after deep frying, a case where oxidized tapioca starch is blended alone (Example 4) was excellent in crispy feeling, and a case where oxidized tapioca starch was used alone (Example 4) and a case where oxidized tapioca starch and acetylated oxidized tapioca starch were mixed at a ratio of 1: 2.33 (Example 6) was excellent in the easiness to bite.

Regarding the texture of the outer layer derived from the batter after storage at room temperature, a case where oxidized tapioca starch and acetylated oxidized tapioca starch were mixed at a ratio of 1: 1 (Example 7) was the most excellent in both the crispy feeling and easiness to bite and more excellent deterioration resistance over time was observed.

[0057]

(Example 8)

A frozen doughnut dough in a frozen state was used as a core, a batter having the composition of each example described in Table 3 was directly added to the dough, and the dough was deep fried in the frying oil 1 at 180°C for 2 minutes, and further turned over for 1 minute.

The food texture of the outer layer derived from the batter immediately after deep frying of the obtained food product and the outer layer derived from the batter after 4 hours at room temperature (21°C) was evaluated based on the following evaluation standards by the average of the scores of four expert panelists, and a score of

2.1 or higher was regarded as pass.

[0058]

Table 3

	Raw material (% by mass)	Example 8
Component (A)	Acetylated oxidized tapioca starch	7.46
	Oxidized tapioca starch	7.46
Other raw materials	Wheat flour 1	21.58
	Sugar 1	0.25
	Water	63.25
Total		100.0
	Evaluation	
Immediately after deep frying	Crispy Feeling	3.8
	Easiness to bite	3.8
	Texture difference between core and outer layer	2.3
After storage	Crispy Feeling	2.5
	Easiness to bite	3.0
	Texture difference between core and outer layer	2.5

[0059]

- 5 The outer layer of the food product of Example 8 shown in Table 3 had preferable crispy feeling and easiness to bite both immediately after deep frying and after storage at room temperature, and was also excellent in texture difference between the core and the outer layer.

[0060]

- 10 (Examples 9 to 11)

A deep fried doughnut was used as a core, a batter having the composition of each example shown in Table 4 was attached thereto, and the doughnut was deep fried in a frying oil 2 at 170°C to 180°C for 140 seconds to obtain a food product of each example.

- 15 After 70 seconds from the beginning of deep frying, the doughnut was turned upside down once, that is, both sides were deep fried for 70 seconds.

Two specialized panelists evaluated the texture of the outer

layer derived from the batter immediately after the frying of the obtained food product and after 4 hours at 27°C according to the evaluation standards described above, and calculated the average value of each score. A score of 2.1 or higher was regarded as pass.

5 [0061]

Table 4

	Raw material (% by mass)	Example 9	Example 10	Example 11
Component (A)	Acetylated oxidized tapioca starch	14.92		7.46
	Oxidized tapioca starch		14.92	7.46
Other raw materials	Wheat flour 2	21.58	21.58	21.58
	Sugar 2	0.25	0.25	0.25
	Water	63.25	63.25	63.25
Total		100.0	100.0	100.0
	Evaluation			
Immediately after deep frying	Crispy Feeling	3.0	5.0	4.0
	Easiness to bite	5.0	5.0	5.0
After storage	Crispy Feeling	3.0	4.0	4.0
	Easiness to bite	4.0	3.0	5.0

[0062]

The outer layer of the food product of each Example shown in Table 4 had preferable crispy feeling and easiness to bite both immediately after deep frying and after storage at room temperature, and was excellent in texture difference between the core and the outer layer. Among these, in the food product of Example 11 in which the batter including oxidized tapioca starch and acetylated oxidized tapioca starch mixed at a ratio of 1: 1 was attached, the outer layer derived from the batter after storage at room temperature was excellent in both crispy feeling and easiness to bite and more excellent degradation resistance over time was also observed.

[0063]

(Examples 12 to 16)

A commercially available bakery food product was used as a core, a batter having the composition of each example shown in Table 5 was attached thereto, and the food product was deep fried in the frying 2 at 180°C for 150 seconds to obtain a food product of each example.

5 The following products were used as bakery foods.

(Bakery Food Product)Waffle: Maneken belgium waffle (available from ROSEN Co., Ltd.)

Baumkuchen: moist and soft baumkuchen (available from Aeon Co., Ltd.)Castella: Castella (available from Aeon Co., Ltd.)

10 Steamed cake: Hokkaido cheese steamed cake (manufactured by Yamazaki Baking Company, Limited)

Bread: Daily table butter roll (available from Aeon Co., Ltd.)

[0064]

15 Three specialized panelists evaluated the texture of the outer layer derived from the batter immediately after deep frying of the obtained food product and after 4 hours at 25°C based on the above-mentioned evaluation standards, and calculated the average value of each score. A score of 2.1 or higher was regarded as pass.

[0065]

Table 5

	Raw material (% by mass)	Example 12	Example 13	Example 14	Example 15	Example 16
Core food product		Waffle	Baumkuchen	Castella	Steamed cake	Bread
Component (A)	Acetylated oxidized tapioca starch	7.46	7.46	7.46	7.46	7.46
	Oxidized tapioca starch	7.46	7.46	7.46	7.46	7.46
Other raw materials	Wheat flour 1	21.58	21.58	21.58	21.58	21.58
	Sugar 1	0.25	0.25	0.25	0.25	0.25
	Water	63.25	63.25	63.25	63.25	63.25
Total		100.0	100.0	100.0	100.0	100.0
	Evaluation					
Immediately after deep frying	Crispy Feeling	4.7	4.7	4.0	4.7	3.7
	Easiness to bite	4.7	4.7	3.3	4.0	4.0
	Texture difference between core and outer layer	4.3	4.0	3.7	3.7	4.0
After storage	Crispy Feeling	4.3	4.0	3.3	3.3	3.3
	Easiness to bite	4.0	3.7	3.0	3.3	3.0
	Texture difference between core and outer layer	4.7	4.3	3.0	3.0	3.3

[0066]

The outer layer of the food product of each Example shown in Table 5 had preferable crispy feeling and easiness to bite both immediately after deep frying and after storage at room temperature, and was also excellent in texture difference between the core and the outer layer. In addition, even in a case where baked confectionery such as waffle, baumkuchen, and castella was used as the food product in an inner layer, the texture difference between the inner layer and the outer layer was excellent. Further, even in a case where a steamed cake or bread was used as a core, the texture difference between the inner layer and the outer layer was preferable.

[0067]

(Examples 17 to 19)

A commercially available bakery food was used as a core, and

a batter having the composition of each example shown in Table 6 was added thereto, and was deep fried in the frying oil 2 at 180 °C for 150 seconds to obtain a food of this example.

The following product was used as the bakery food. The following
5 component was used as the component (A) in addition to the above.

(Bakery Food Product)

Sponge cake: (cut to 3cm × 3cm × 3.5cm except for cream of
"STRAWBERRY SPECIAL" manufactured by Yamazaki Baking Company,
Limited)

10 Component (A)

Distarch phosphate from tapioca starch: "ACTOBODY TP-1",
manufactured by J-Oil Mills, Inc.

(Gelatinization start temperature of raw material starch: 64 °C)
[0068]

15 Three specialized panelists evaluated the texture of the outer
layer derived from the batter immediately after deep frying of the
obtained food product and after 4 hours at 25°C based on the
above-mentioned evaluation standards, and calculated the average
value of each score. A score of 2.1 or higher was regarded as pass.

[0069]

Table 6

	Raw material (% by mass)	Example 17	Example 18	Example 19
Component (A)	Distarch phosphate from tapioca starch	14.92		
	Acetylated oxidized tapioca starch		13.60	9.47
	Oxidized starch		13.60	9.47
	Corn starch			27.41
Other raw materials	Wheat flour 1	21.58	12.95	
	Sugar 1	0.25	0.29	0.32
	Water	63.25	59.56	53.33
Total		100.00	100.00	100.00
	Evaluation			
Immediately after deep frying	Crispy Feeling	2.7	4.3	3.0
	Easiness to bite	2.3	4.7	3.0
	Texture difference between core and outer layer	3.3	4.7	2.7
After storage	Crispy Feeling	3.3	3.7	2.7
	Easiness to bite	2.3	2.7	2.3
	Texture difference between core and outer layer	3.3	3.7	2.7

[0070]

As shown in Table 6, the outer layer of the food product of each example in which the sponge cake was used as the inner layer had preferable crispy feeling and easiness to bite both immediately after frying and after storage at room temperature and was also excellent in texture difference between the core and the outer layer.

Even in a case where distarch phosphate was used as the component (A), a preferable food product was obtained. Also, as in Example 18, in a case where the mass ratio of the component (A) per wheat flour was 2.1, a food product having a preferable outer layer texture both immediately after frying and after storage at room temperature was obtained. Further, a preferable food product was also obtained in a case where the composition included the component (A) but did not include wheat flour.

[0071]

(Production Example 1 of Mix for Batter)

200 g of tapioca starch and 800 g of wheat flour 1 were mixed to produce a mix for a batter.

5 [0072]

(Production Example 2 of Mix for Batter)

240 g of acetylated oxidized tapioca starch, 160 g of oxidized tapioca starch, and 600 g of wheat flour 1 were mixed to produce a mix for batter.

10 [0073]

(Production Example 3 of Mix for Batter)

110 g of acetylated tapioca starch, 1.2 g of sugar 1, and 88.8 g of wheat flour 1 were mixed to produce a mix for a batter.

[0074]

15 This application claims priority based on Japanese Patent Application No. 2018-015566 filed on January 31, 2018, the entire disclosure of which is incorporated herein.

CLAIMS

1. A method for producing a food product comprising:

preparing a bakery food;

5 adding the following component (A) to prepare a batter;

attaching the batter to an outside of the bakery food; and

deep frying the bakery food to which the batter is attached to
form an outer layer derived from the batter,

wherein the outer layer is an outermost layer.

10 Component (A): one or two selected from the group consisting
of unmodified starch and modified starch

2. The method for producing a food product according to claim 1,

wherein a gelatinization start temperature of a raw material

15 starch of the modified starch and the unmodified starch is 50°C or
higher and 83°C or lower.

3. The method for producing a food product according to claim 1 or
2,

20 wherein the modified starch is one or two or more selected from
the group consisting of oxidized starch, acetylated starch, and
acetylated oxidized starch.

4. The method for producing a food according to any one of claims

25 1 to 3,

wherein a raw material starch of the modified starch and the
unmodified starch are tapioca starch.

5. The method for producing a food product according to any one of claims 1 to 4,

wherein the component (A) includes oxidized starch and
5 acetylated oxidized starch.

6. The method for producing a food product according to claim 5,

wherein in the component (A), a content of the acetylated
oxidized starch is 0.1 parts by mass or more and 5 parts by mass or
10 less with respect to 1 part by mass of the oxidized starch.

7. The method for producing a food product according to any one of claims 1 to 6,

wherein the preparing the bakery food includes one or two or
15 more cooking steps selected from the group consisting of baking, deep
frying, steam heating, and microwave heating of a bakery dough.

8. The method for producing a food product according to any one of claims 1 to 7,

20 wherein the bakery food is one selected from the group consisting
of a donut, bread, baked confectionery, and steamed confectionery.

9. The method for producing a food product according to any one of claims 1 to 8,

25 wherein the batter further includes wheat flour.

10. The method for producing a food product according to claim 9,

wherein a mass ratio of the component (A) per the wheat flour in the batter is 0.1 or more and 6.0 or less.

11. A method for producing a food product comprising:

5 preparing a bakery dough;
 adding the following component (A) to prepare a batter;
 attaching the batter to an outside of the bakery dough; and
 deep frying the bakery dough to which the batter is attached
to form an outer layer derived from the batter,

10 wherein the outer layer is an outermost layer.

 Component (A): one or two selected from the group consisting
of unmodified starch and modified starch

12. The method for producing a food product according to claim 11,

15 wherein a gelatinization start temperature of a raw material
starch of the modified starch and the unmodified starch is 50°C or
higher and 83°C or lower.

13. The method for producing a food product according to claim 11

20 or 12,

 wherein the modified starch is one or two or more selected from
the group consisting of oxidized starch, acetylated starch, and
acetylated oxidized starch.

25 14. The method for producing a food product according to any one
of claims 11 to 13,

 wherein a raw material starch of the modified starch and the

unmodified starch are tapioca starch.

15. The method for producing a food product according to any one of claims 11 to 14,

5 wherein the component (A) includes oxidized starch and acetylated oxidized starch.

16. The method for producing a food product according to claim 15,

 wherein in the component (A), a content of the acetylated
10 oxidized starch is 0.1 parts by mass or more and 5 parts by mass or less with respect to 1 part by mass of the oxidized starch.

17. The method for producing a food product according to any one of claims 11 to 16,

15 wherein the bakery dough is one selected from the group consisting of donut dough, bread dough, and dough for baked confectionery.

18. A method for imparting a crispy feeling to an outer layer of
20 a food product, comprising:

 obtaining the food product by the method for producing a food product according to any one of claims 1 to 17.

19. A method for maintaining a crispy feeling of an outer layer of
25 a food product, comprising:

 obtaining the food product by the method for producing a food product according to any one of claims 1 to 17.

20. A mix for a batter used in the method for producing a food product according to any one of claims 1 to 17, the mix comprising:

the component (A); and

5 wheat flour.

21. The mix for a batter according to claim 20,

wherein a total mass of the component (A) and the wheat flour is 80% by mass or more with respect to an entire mix for a batter.

10

22. The mix for a batter according to claim 20 or 21,

wherein a content of the component (A) is 10 parts by mass or more and 500 parts by mass or less with respect to 100 parts by mass of the wheat flour.

15