

DESCRIPTION

MANUFACTURING METHOD OF OIL-AND-FAT FOR ENHANCING SALTY TASTE

5 TECHNICAL FIELD

[0001]

The present invention relates to a manufacturing method of an oil-and-fat for enhancing salty taste. The present invention also relates to a salty food and beverage and a method for enhancing salty taste by using the oil-and-fat for enhancing salty taste for the salty
10 food and beverage.

BACKGROUND ART

[0002]

A salty taste of the food is a necessary taste for eating the food deliciously. A salt and
15 the like is generally used as a salt taste agent, which is a substance to provide a salty taste. However, an excessive intake of the salt is largely connected to lifestyle-related diseases such as heart disease and high blood pressure. Particularly in recent years, consumers become more health conscious, and the influence of the health conscious affects not only conventional meals but also snacks. Therefore, the consumers are more likely to choose the one containing less salt
20 if the food is the same. Nevertheless, if an amount of the salt is reduced, taste of the food may be spoiled in some cases. In "Dietary Reference Intakes for Japanese (2010 edition)," a target value of daily salt intake amount is determined as less than 9.0 g for a male adult and less than 7.5 g for a female adult. However, "National Health and Nutrition Survey" of the financial year 2012 reports that the average value (over 20 years old) of the daily salt intake is 11.3 g for a
25 male and 9.6 g for a female. Thus, the salt is taken excessively.

[0003]

As a method of enhancing salty taste by using an oil-and-fat and oil phase, an oil-and-fat for enhancing taste and a method of enhancing taste of oil-containing food comprising taste-imparting substance shown in Patent Document 1 and an oil-and-fat
30 composition containing 55 wt.% or more oleic acid and 0.5 wt.% or less linolenic acid shown in Patent Document 2 are disclosed, for example.

In the manufacturing method shown in Patent Document 3, it is described that a butter flavor can be manufactured while suppressing oxidized odor and irritating odor and enhancing the butter flavor. In the first embodiment of Patent Document 3, it is described that salty taste is
35 extremely excellent when the butter flavor is added to a commercially available margarine.

PRIOR ART DOCUMENTS

[Patent Documents]

[0004]

Patent Document 1: International Patent Application Publication No.

5 WO2011-102477

Patent Document 2: Japanese Unexamined Patent Application Publication No.

2006-246857

Patent Document 3: Japanese Unexamined Patent Application Publication No.

2009-261339

10 [Nonpatent Documents]

[0005]

Nonpatent Document 1: FIL-IDF International Standard 68A: 1977

DISCLOSURE OF THE INVENTION

15 [Problems to be Solved by the Invention]

[0006]

First, the inventors of the present invention considered the prior art documents in detail. The oil-and-fat for enhancing taste and the method of enhancing taste of oil-containing food comprising taste-imparting substance shown in Patent Document 1 is characterized in that
20 an organic acid or a salt thereof is added to an oil-and-fat in the state of an aqueous solution, then dehydration treatment is performed to obtain an oil-and-fat for enhancing taste, and the oil-and-fat for enhancing taste is used together with a food material containing a taste-imparting substance especially a salt. Therefore, moisture is added to make an aqueous solution and then dehydration treatment is performed to filter and remove the organic acid or
25 the salt thereof precipitated as a crystal. Thus, the process is complicated.

In the oil-and-fat composition and food shown in Patent Document 2, it is described that taste (e.g., salty taste) of the food can be enhanced and retained by using the oil-and-fat composition (especially sunflower oil) containing 55 wt.% or more oleic acid and 0.5 wt.% or less linolenic acid. However, a butter oil is not suggested or described as the oil-and-fat to be
30 used for Patent Document 2. Anyway, the butter oil contains oleic acid approximately 24 wt.%, linolenic acid approximately 1 wt.%, and short/medium chain fatty acid approximately 10 to 20 wt.%.

[0007]

In the manufacturing method shown in Patent Document 3, a milk raw material is
35 hydrolyzed with two kinds or more of lipolytic enzymes to adjust an acid value to 30 to 80, and then a process of deactivating the enzyme is required. Thus, the process is extremely

complicated.

[0008]

Namely, the purpose of the present invention is to provide a method for manufacturing an oil-and-fat for enhancing salty taste of the salty food and beverage without requiring a complicated process. In addition, the purpose is to provide a salty food and beverage having enhanced salty taste and a method for enhancing salty taste by using the oil-and-fat for enhancing salty taste for the salty food and beverage.

[Means for Solving the Problem]

[0009]

As a result of intensive research to solve the above described problem, the inventors found surprisingly that salty taste was enhanced by using an oil-and-fat obtained by performing a heating treatment for an oil-and-fat containing a butter oil having a low moisture content at a specific temperature and condition for the salty foods and beverages. Thus, the present invention was completed.

[0010]

Namely, the present invention relates to:

(1) a manufacturing method of an oil-and-fat for enhancing salty taste, characterized in that the method comprising the step of: performing a heating treatment on an oil-and-fat containing butter oil, the oil-and-fat containing a moisture 2 wt.% or less, the heating treatment being performed at a temperature of 105°C or more and 145°C or less and in a condition that a TTm value (°C minute) is 8 to 5000 (wherein, the TTm value (°C minute) is an integration value of a temperature value (°C) over a heating duration time (minute), the temperature value being obtained by subtracting 100 from a heating temperature),

(2) the manufacturing method of the oil-and-fat for enhancing salty taste described in (1), wherein the oil-and-fat contains the butter oil 50 wt.% or more,

(3) the manufacturing method of the oil-and-fat for enhancing salty taste described in (1) or (2), wherein a peroxide value is less than 1.5 meq/kg and an acid value is less than 2 immediately after the heating treatment,

(4) the manufacturing method of a salty food and beverage containing the oil-and-fat for enhancing salty taste manufactured by the method of any one of (1) to (3), and

(5) a method for enhancing salty taste of a salty food and beverage by using the oil-and-fat for enhancing salty taste manufactured by the method of any one of (1) to (3).

[Effects of the Invention]

[0011]

By using the manufacturing method of the present invention, an oil-and-fat for enhancing salty taste of the salty food and beverage can be manufactured without requiring a

complicated process. In addition, by using the oil-and-fat for enhancing salty taste manufactured by the manufacturing method of the present invention, a salty food and beverage having enhanced salty taste and a method for enhancing salty taste can be provided. Because of this, an amount of the salt taste agent used for the salty food and beverage can be reduced.

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MODES FOR CARRYING OUT THE INVENTION

[0012]

Hereafter, the manufacturing method of the oil-and-fat for enhancing salty taste of the present invention will be explained in detail.

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In the present invention, the oil-and-fat for enhancing salty taste indicates the oil-and-fat that can enhance salty taste of the salty foods and beverages by using the oil-and-fat for the salty foods and beverages. Whether or not the oil-and-fat conforms to the definition of the oil-and-fat for enhancing salty taste is determined according to the method described in the embodiments. By using the oil-and-fat for enhancing salty taste obtained by the manufacturing method of the present invention, the salty foods and beverages can be prepared so that salty taste is enhanced remarkably. Because of this, the amount of the salt taste agent used for obtaining the equivalent salty taste can be reduced.

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In the present invention, the manufacturing method of the oil-and-fat for enhancing salty taste is characterized in that an oil-and-fat containing a butter oil having a low moisture content is heated at a specific temperature and condition.

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[0013]

(Oil-and-fat containing butter oil)

In the present invention, the oil-and-fat containing butter oil indicates a butter oil itself or an oil-and-fat obtained by mixing the butter oil with other oils-and-fats. Note that the butter oil can be used regardless of heat history before the heating treatment of the present invention is performed. For example, as long as the effect of the present invention is not deteriorated, a bleaching and/or deodorization process may or may not be applied to the butter oil to be used. In particular, the butter oil to which the bleaching and/or deodorization process is not applied and not heated to 100°C or more is preferred.

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When using the oils-and-fats other than the butter oil, the oils-and-fats to which the bleaching and/or deodorization process is applied are preferably used.

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[0014]

Furthermore, in the present invention, the oil-and-fat containing butter oil preferably contains the butter oil 50 wt.% or more, more preferably 55 wt.% or more, and more preferably 60 wt.% or more. It is preferable to contain 50 wt.% or more butter oil because the effect of enhancing salty taste is increased.

35

[0015]

The butter oil of the present invention is produced by separating and removing almost all water phase components except for milk fat from butter or cream. As an example of the butter oil, anhydrous milk fat, clarified butter and fractionated butter oil can be listed, for example.

As a manufacturing method of the butter oil, as shown in Nonpatent Document 1, the butter oil can be obtained, for example, by heating unsalted butter to approximately 60°C to melt the unsalted butter, leaving it at rest for 20 to 30 minutes, and then concentrating it by centrifugal separation. Thus, the butter oil having a milk fat content of approximately 99.5 wt.% can be obtained. The butter oil obtained by the above described method is further heated to 90 to 98°C and vacuum dried to remove residual moisture and dissolved oxygen. Thus, the anhydrous milk fat having a fat content of 99.8 wt.% or more can be obtained. The above described butter oil, which is industrially available, can be used for the present invention. In the drying method when manufacturing the butter oil, even when the butter oil is heated, the heating is performed at a temperature of 100°C or less to prevent the flavor from being changed.

It is known that the composition of the butter oil largely varies depending on various factors such as a season, a feed and a production region. However, the butter oil used as a raw material of the present invention is not limited by the above described factors. As for a distribution temperature of the butter oil, although normal temperature distribution products can be used, frozen distribution products are preferred since the possibility of oxidation deterioration is less. In the present invention, the manufacturing method of the butter is not particularly limited. Usually, a non-fermented butter (sweet cream butter) obtained by separating a cream from a raw milk using centrifugal separation and then stirring (churning) it to solidify it is used. Note that the typical composition of the butter is a water-in-oil emulsion containing approximately 83 wt.% of butter oil, approximately 16 wt.% of moisture and non-fat milk solids.

[0016]

In the present invention, the oil phase indicates a state that an oil-and-fat and a component dissolved in the oil-and fat are mixed in an emulsified oil-and-fat composition. The oil phase is separated and recognized as a part consisting mainly of the oil-and fat when the emulsified oil-and-fat composition is heated and melted to destroy the emulsified state. In the present invention, the water phase indicates a state that a water and a component dissolved in the water are mixed in an emulsified oil-and-fat composition. The water phase is separated and recognized as a part consisting mainly of the water when the emulsified oil-and-fat composition is heated and melted to destroy the emulsified state.

[0017]

In the oil-and-fat containing butter oil of the present invention, oils-and-fats other than the butter oil are not particularly limited. Specifically, various animal and vegetable oils-and-fats such as lard, beef tallow, palm oil, palm kernel oil, coconut oil, corn oil, cottonseed oil, soybean oil, rapeseed oil, rice oil, sunflower oil, and safflower oil can be listed, for example. In addition, processed oils-and-fats subjected to one or more treatment selected from hydrogenation, fractionation and transesterification can be also listed. As the oils-and-fats other than the butter oil, the above listed oils-and-fats can be used alone or more than two kinds of oils-and-fats can be used in combination. Furthermore, the oils-and-fats other than the butter oil to be used are preferably substantially free of trans acid, i.e., containing 2 wt.% or less trans acid.

In the oil-and-fat containing butter oil of the present invention, an oleic acid content is preferably less than 55 wt.%, more preferably less than 52 wt.%, and further more preferably less than 49 wt.%. If the oleic acid content is within the above described range, an enhancing effect is enough when used for the salty foods and beverages, and thus preferred.

[0018]

The moisture content of the oil-and-fat containing butter oil of the present invention should be low. Specifically, the content before heating is 2 wt.% or less, more preferably 1 wt.% or less, furthermore preferably 0.5 wt.% or less. If the moisture content of the oil-and-fat containing butter oil is within the above described range, the hydrolysis hardly occurs during the heating treatment, and thus preferred. The moisture can be removed from the oil-and-fat containing butter oil by separating and removing the water phase using centrifugal separation or by retaining the oil-and-fat containing butter oil at a reduced pressure in a molten state.

Note that the moisture content is measured by using Karl Fischer method or sea sand method.

[0019]

In the oil-and-fat containing butter oil of the present invention, an acid value is preferably less than 2 and a peroxide value is preferably less than 1.5 meq/kg, the acid value is more preferably 1 or less and the peroxide value is more preferably 1 meq/kg or less. If the acid value and the peroxide value are within the above described range, the oil-and-fat containing butter oil is not deteriorated by oxidation deterioration, deteriorated flavor is not felt, and thus preferred. Note that the acid value and the peroxide value are measured according to Standard methods for the analysis of fats established by Japan Oil Chemists' Society.

[0020]

In the manufacturing method of the present invention, the heating treatment is preferably performed in a state that the oil-and-fat containing butter oil does not substantially contain carbohydrate and protein. Specifically, the total content of carbohydrate and protein is

preferably 0.5 wt.% or less, and more preferably 0.3 wt.% or less. If the total content is within the above described range, filtration and other processes are not required after the heating treatment. Thus, the processes are not complicated. Even when the heating treatment is performed on the oil-and-fat containing butter oil without containing carbohydrate and protein, Maillard reaction does not occur almost at all. Therefore, furans such as maltol and furfural are not substantially generated since the furans are the product of the Maillard reaction.

In the present invention, the carbohydrate indicates sugars (e.g., saccharide, starch) and dietary fibers, and the protein indicates lipolytic enzymes (e.g., lipase, esterase) and amino acids/peptides which are the composition of the milk protein and the protein.

In the present invention, the oil-and-fat containing butter oil contains the butter oil which is obtained by separating and removing the water phase containing carbohydrate and protein from butter or cream. Furthermore, since carbohydrate and protein are not added, solid content does not exist before and after the heating treatment. Thus, filtration and other processes are not required after the heating treatment. Accordingly, the manufacturing method of the present invention is very simple unlike the general manufacturing method of burnt butter since the process of removing the product of the Maillard reaction or the like generated by the heating treatment is not required.

[0021]

(Method of heating treatment)

In the manufacturing method of the present invention, the heating treatment should be performed so that the heating duration time is adjusted to satisfy a specific heating temperature and a specific TTm value (°C minute).

In the manufacturing method of the present invention, an upper limit temperature of the heating treatment is 145°C or less, more preferably 140°C or less, further more preferably 135°C or less. On the other hand, a lower limit temperature of the heating treatment is 105°C or more, more preferably 110°C or more, further more preferably 115°C or more. If the heating temperature is within the above described range, the oxidation deterioration of the oil-and-fat is not accelerated and an enhancing effect is enough when used for the salty foods and beverages, and thus preferred.

[0022]

In the manufacturing method of the present invention, the TTm value is 8 to 5000 (°C minute), more preferably 12 to 2500, more preferably 30 to 1700, and most preferably 50 to 1300. Here, the TTm value (°C minute) is an integration value of a temperature value (°C) over the heating duration time (minute). The temperature value is obtained by subtracting 100 from a heating temperature. Namely, the temperature value can be shown as (heating temperature -100). The effect for enhancing salty taste of the present invention cannot be obtained in the

heating temperature of 100°C or less. Because of this, the heating condition of the present invention is defined by the TTm value (°C minute) which is the integration value of the temperature value (heating temperature –100) (°C) over the heating duration time (minute).

When calculating the TTm value (°C minute) which is the heating condition of the present invention, the time to raise the temperature from 100°C to the heating temperature and the time to drop the temperature from the heating temperature to 100°C are included. Note that the heating temperature is not necessarily constant as long as the heating temperature is within the range and the heating duration time is within the range defined by the TTm value (°C minute).

Specifically, in the condition that the temperature change is 0.5 to 10 °C/minute, the TTm value can be calculated as an approximate integration value by measuring the temperature at every 30 minutes in a stage that the temperature is 100°C or more, multiplying the measured temperature by 0.5 minute and summing up all of the multiplied values. More simply, when the temperature increases and decreases linearly, the TTm value can be calculated from the following formula: (heating treatment when increasing temperature (°C minute)) + ((heating temperature –100) (°C) × heating duration time (minute)) + (heating treatment when cooling (°C minute)).

In the manufacturing method of the present invention, the heating duration time is not limited as long as the above described TTm value (°C minute) is satisfied. As a guide, the heating duration time of the heating treatment is preferably 240 minutes or less after the temperature reaches the target heating temperature, more preferably 90 minutes or less, furthermore preferably 1 to 60 minutes, and most preferably 1.5 to 45 minutes. If the TTm value is within the above described range, the oxidation deterioration of the oil-and-fat is not accelerated and an enhancing effect is enough when used for the salty foods and beverages, and thus preferred.

[0023]

In the manufacturing method of the present invention, the method of heating and cooling is not limited to one of a batch type and a continuous type. However, an indirect heating method and an indirect cooling method are preferred. The indirect heating method and the indirect cooling method are preferred because the moisture content in the oil-and-fat containing butter oil is not increased and the influence of the hydrolysis is less.

In addition, as the heating condition of the manufacturing method of the present invention, the heating treatment can be performed without controlling the pressure (e.g., normal pressure).

In the oil-and-fat for enhancing salty taste manufactured in the present invention, although the mechanism of enhancing salty taste is unclear, it is presumed that the oil-and-fat for enhancing salty taste having enough effect cannot be obtained when the heating treatment is

performed under reduced pressure because active ingredients considered to be generated by the heating treatment of the present invention is released to the outside of a system under reduced pressure.

[0024]

5 (Oil-and-fat for enhancing salty taste)

In the oil-and-fat for enhancing salty taste obtained by the manufacturing method of the present invention, the peroxide value immediately after the heating treatment is preferably less than 1.5 meq/kg, and more preferably 1 meq/kg or less. In addition, the acid value immediately after the heating treatment is preferably less than 2, and more preferably 1 or less. Accordingly, the oil-and-fat can be used as it is without any purification treatment such as column treatment and bleaching/deodorization after the heating treatment. Here, immediately after the heating treatment means that the analysis is performed within approximately one hour after the heating treatment.

[0025]

15 In the oil-and-fat for enhancing salty taste obtained by the manufacturing method of the present invention, an antioxidant, an emulsifier, a perfume, a coloring agent and other oil-soluble additives can be added in a range not interrupting the effect of the present invention. The antioxidant is not particularly limited. As the antioxidant, tocopherol, ascorbic acid and its salt, and ester such as ascorbyl palmitate can be listed, for example. In addition, the oil-and-fat for enhancing salty taste obtained by the manufacturing method of the present invention can be stored and distributed in the same way as industrially distributed butter oils and purified oils-and-fats. Furthermore, the oil-and-fat for enhancing salty taste obtained by the manufacturing method of the present invention is preferably used under the condition that the peroxide value is less than 2.5 meq/kg, more preferably less than 2.0 meq/kg, and further more preferably 1.5 meq/kg or less by paying attention to the storage condition.

[0026]

(Salty foods and beverages)

In the present invention, the salty foods and beverages mean, in a literal sense, foods and beverages containing salty taste. Here, the salty foods and beverages do not contain the oil-and-fat for enhancing salty taste obtained by the manufacturing method of the present invention. When the oil-and-fat for enhancing salty taste obtained by the manufacturing method of the present invention is used for the salty foods and beverages, the salty foods and beverages having enhanced salty taste can be prepared in comparison with the case that the same amount of oil-and-fat manufactured by the method different from the manufacturing method of the present invention is used.

[0027]

(Salt taste agent)

In the present invention, the salt taste agent means a substance having a function of imparting salty taste when it is contained in the foods and beverages. Hence, salty taste is felt when eating the salty foods and beverages of the present invention. Here, the threshold value of the salt taste agent varies depending on the kind of the salt taste agent, purity of active constituents and the like. However, by using the oil-and-fat for enhancing salty taste obtained by the manufacturing method of the present invention, salty taste can be enhanced in comparison with the case that the oil-and-fat for enhancing salty taste is not used. In addition, by using the oil-and-fat for enhancing salty taste obtained by the manufacturing method of the present invention, the amount of the salt taste agent can be reduced to obtain almost the same salty taste.

[0028]

In the present invention, the salt taste agent is not particularly limited. For example, salt (common salt) can be listed. The salt generally means sodium chloride. The salt for household use may contain approximately 5 wt.% of minerals. In any case, the salt taste agent used for the present invention is not limited as long as it has a composition available for foods.

[0029]

In the present invention, the content of the salt taste agent in the salty foods and beverages cannot be defined unconditionally since the threshold value of salty taste felt by the human tongue varies depending on the salt taste agent. However, the content of the salt taste agent is preferably 0.01 to 50 wt.%, more preferably 0.05 to 25 wt.%, and furthermore preferably 0.1 to 15 wt.%. If the content of the salt taste agent is within the above described range, salty taste of the foods and beverages themselves can be easily felt and the effect for enhancing salty taste of the present invention is relatively easily understood.

[0030]

(Usage)

The oil-and-fat for enhancing salty taste obtained by the manufacturing method of the present invention can be used for the salty foods and beverages suitable for enhancing salty taste. As the foods and beverages suitable for enhancing salty taste, the present invention can be used for manufacturing wheat flour processed foods, oil-and-fat processed foods and cooked processed foods, for example. Specifically, as the wheat flour processed foods, breads such as sweet bun, danish and croissant, Japanese/western confectionery such as doughnut, sponge cake, waffle, bouchee, dorayaki (baked cake filled with sweet red bean paste) and pound cake, confectionery such as pie, cookie and biscuit can be listed. As the oil-and-fat processed foods, flavor oils and chocolates can be listed. As the cooked processed foods, egg products (e.g., omelet), soups, daily dishes and pasta sauces can be listed. In addition, the oil-and-fat for

enhancing salty taste can be used for the foods and beverages used as raw materials of the above described foods and beverages. For example, the oil-and-fat for enhancing salty taste can be used for oil-and-fat processed foods, water-in-oil emulsions and oil-in-water emulsions. Specifically, as the water-in-oil emulsions, margarine, fat spread and foods mainly made from milk or the like in which oil-and-fat is in a continuous phase can be listed. As the oil-in-water emulsions, creams (e.g., whip cream), flour pastes (e.g., custard cream), cheeses (e.g., cream cheese), ice creams, beverages containing oil-and fat, sauces (e.g., bechamel sauce and white sauce) and soups can be listed.

[0031]

A use amount of the oil-and-fat for enhancing salty taste obtained by the manufacturing method of the present invention is not particularly limited. The use amount is arbitrarily determined according to the degree of the effect for enhancing salty taste required for the salty foods and beverages. For example, in the total oil amount of the salty foods and beverages, the content of the oil-and-fat for enhancing salty taste obtained by the manufacturing method of the present invention is preferably 0.5 wt.% or more, more preferably 1 wt.% or more, and further more preferably 1.5 wt.% or more. In the case of the soup which contains more oil-and-fat than the above described amount, for example, the oil-and-fat for enhancing salty taste is uniformly dispersed. Thus, the oil-and-fat is easily eaten with the salty foods and beverages and the effect for enhancing salty taste of the present invention is easily felt. However, even in the case of the margarine itself which uses the salty foods and beverages, contains extremely large amount of oil and contains the salt taste agent, the effect for enhancing salty taste of the present invention is felt. Hence, the upper limit of the amount of the oil-and-fat is not particularly determined.

[0032]

The method of using the oil-and-fat for enhancing salty taste obtained by the manufacturing method of the present invention is not particularly limited. The oil-and-fat can be used in any stage of manufacturing foods and beverages. For example, the oil-and-fat for enhancing salty taste can be directly added at the finishing stage of making soups or the like. In addition, the oil-and-fat for enhancing salty taste obtained by the manufacturing method of the present invention can be used as a part of the oil phase of the water-in-oil emulsions, or can be used when preparing filling creams and sandwich creams which are prepared by mixing liquid sugar and other flavor materials with the water-in-oil emulsions. Furthermore, the effect for enhancing salty taste of the present invention can be obtained when the oil-and-fat for enhancing salty taste obtained by the manufacturing method of the present invention is used as a part of the oil phase of the water-in-oil emulsion, and when danish is baked after the water-in-oil emulsions is mixed. Other than the above described methods, when the milk fat

content of the foods and beverages cannot be increased because of physical property and limitation of cost, the oil-and-fat for enhancing salty taste obtained by the manufacturing method of the present invention can be used simultaneously with the generally used milk-flavoring agent and/or other materials for enhancing salty taste.

5 **Examples**

[0033]

Hereafter, working examples and manufacturing examples will be exemplified to further clarify the effect of the present invention.

[0034]

10 Comparative example 1)

The Yotsuba butter (butter manufactured by Yotsuba Milk Products Co., Ltd.) was heated in hot water of 57 to 62°C and a separated oil phase was filtered to prepare a butter oil. The prepared butter oil was defined as a comparative example 1. In the butter oil (comparative example 1), the total content of carbohydrate and protein was 0.3 wt.% or less, the moisture
15 was 668 wt.ppm, the acid value was 0.65, and the peroxide value was a measurement limit or less (measurement limit value: 0.4 meq/kg). In addition, flavor of the butter oil (comparative example 1) was refreshing with little unpleasant taste and having a smell of natural milk.

Note that the moisture was measured by using Karl Fischer method unless otherwise described. The content of the protein was measured by using Kjeldahl method. The content of
20 the carbohydrate was calculated by reducing the moisture, the protein, the fat and the ash from the weight. The content of the fat was measured by using Ether extraction method. The content of the ash was measured by Direct ashing method.

[0035]

Test example 1 Influence by heating temperature>

25 Comparative example 2)

1400g of the above described butter oil (comparative example 1) was filled in a container of a heating/stirring device having a capacity of 2 liters, and the heating treatment was performed by retaining the butter oil for ten minutes at normal pressure after the temperature reaches 100°C.

30 After the retaining of the heating treatment was finished, the butter oil was immediately cooled down to 80°C or less. Note that stirring was performed during the heating treatment and the subsequent cooling process so that the temperature in the system becomes as even as possible.

At that time, a temperature rising speed of the heating/stirring device was
35 approximately 4°C/minute, and a cooling speed was approximately 8°C/minute.

Examples 1 to 4, Comparative example 3)

As shown in Table 2 below, the heating treatment of the butter oil (comparative example 1) was performed similarly to the comparative example 2 except for that the heating temperature was changed.

The TTm value of the example 1 was calculated as shown below.

5 TTm value = (heating treatment when increasing temperature (°C minute)) + ((heating temperature-100) (°C) × heating duration time (minute)) + (heating treatment when cooling (°C minute)) = (10 (°C) × 10 (°C)/4 (°C minute))/2 + ((110-100) (°C) × 10 (minute)) + (10 (°C) × 10 (°C)/8 (°C minute))/2 = 12.5 + 100 + 6.3 = 118.8 (°C minute)

Example 5)

10 The heating treatment was performed for ten minutes at 130°C similarly to the example 3 except for that 1000 wt.ppm of tocopherol was added to the butter oil (comparative example 1) as an antioxidant.

[0036]

15 Flavor of the foods and beverages using samples of the above described examples 1 to 5 and comparative examples 1 to 3 was evaluated by ten panelists according to the following standard.

About the deteriorated flavor, the samples of the examples 1 to 5 and the comparative examples 1 to 3 were completely melted and evaluated relatively in a melted state at 40°C. At that time, the score of the butter oil (comparative example 1) is defined as 3.0.

20 Then, a water-in-oil emulsion for filling was prepared by replacing the butter oil of Table 1 below with one of the heated butter oils prepared in the examples and comparative examples so that the content of the butter oil becomes finally 5.0 wt.%, and salty taste was evaluated. At that time, salty taste was evaluated relatively in the condition that the score of the foods and beverages containing the same amount of the butter oil (comparative example 1) was defined as 1.0, and the average scores of the panelists were listed in Table 2 below.

Note that the evaluation of the flavor in the test example 2 and later was also performed similarly according to the following standard.

[0037]

30 Standard (point method) for evaluating flavor: In all items, the flavor is evaluated to be acceptable when the average score is 2 or more.

Deteriorated flavor:

3: Good, similar to the butter oil (comparative example 1) and deteriorated flavor/smell were not felt.

2: Acceptable level, deteriorated flavor/smell were slightly felt compared to the butter oil (comparative example 1).

1: Not good, deteriorated flavor/smell were strongly felt compared to the butter oil

(comparative example 1).

Salty taste:

3: Good, salty taste is strongly felt compared to the foods and beverages containing the same amount of the butter oil (comparative example 1).

5 2: Salty taste is slightly felt compared to the foods and beverages containing the same amount of the butter oil (comparative example 1).

1: Not good, salty taste is equal or less than the foods and beverages containing the same amount of the butter oil (comparative example 1).

[0038]

10 According to the following "Preparing method of water-in-oil emulsion," the water-in-oil emulsion for filling shown in Table 1 below was prepared.

"Preparing method of water-in-oil emulsion"

1. According to Table 1 below, oil-and-fat was melted and an emulsifier which is capable of being dissolved in the oil-and-fat was added to prepare an oil phase.

15 2. A material categorized in a water phase raw material was added to water and dissolved to prepare a water phase.

3. The water phase was added to the oil phase while the oil phase was stirred to mix them together. The mixed liquid obtained here was referred to as a preparation liquid.

20 4. When used for filling/kneading, the preparation liquid was poured into a case through a combinator and a pin machine to obtain a water-in-oil emulsion. When used for roll-in, the preparation liquid was prepared into a sheet-shaped water-in-oil emulsion through a combinator, a resting tube and a forming machine.

5. The water-in-oil emulsion was stored in a refrigerator at 3-7°C for 3-7 days.

[0039]

25 Table 1 Composition of water-in-oil emulsion for filling

	butter oil	5.0 (%)	5.0
	transesterified oil-and-fat A	20.0	20.0
	transesterified oil-and-fat B	38.0	38.0
	soybean oil	19.0	19.0
	powdered skim milk	2.9	2.9
	salt	1.0	1.0
30	water	13.3	13.3
	emulsifier	0.8	0.8

-The unit is wt.%.

35 -As the transesterified oil-and-fat A, it was used that an oil-and-fat having a melting point of 34°C obtained by a transesterification of a blended oil of coconut oil, palm stearin and fully hydrogenated high-erucic-rape seed oil which substantially did not contain trans acid using

sodium methylate as a catalyst. In the transesterified oil-and-fat A, the moisture was 70 wt.ppm, the acid value was 0.1 or less, and the peroxide value was the measurement limit or less. The flavor was tasteless and odorless similarly to a general purified vegetable oil-and-fat.

-As the transesterified oil-and-fat B, it was used that an oil-and-fat having a melting point of 32°C obtained by an enzymatic random transesterification of a blended oil of palm oil and palm kernel olein which substantially did not contain trans acid. In the transesterified oil-and-fat B, the moisture was 80 wt.ppm, the acid value was 0.1 or less, the peroxide value was the measurement limit or less, and the total content of carbohydrate and protein was 0.3 wt.% or less. The flavor was tasteless and odorless similarly to a general purified vegetable oil-and-fat. Furthermore, in the transesterified oil-and-fat B, the content of the oleic acid was 33 wt.%, and the content of the linolenic acid was 0.5 wt.% or less.

-As the emulsifier, glycerin fatty acid ester, polyglycerol fatty acid ester, sorbitan fatty acid ester and lecithin were used.

[0040]

Table 2 Influence by heating temperature

	oil-and-fat				water-in-oil emulsion
	heating temperature	TTm value	peroxide value	deteriorated flavor	salty taste
comparative example 1	unheated	0.0	0.4 or less	3.0	1.0
comparative example 2	100 °C	0.0		3.0	1.0
example 1	110 °C	118.8		2.8	2.0
example 2	120 °C	275.0		2.7	2.6
example 3	130 °C	468.8		2.6	2.7
example 4	140 °C	700.0	0.8	2.1	2.7
comparative example 3	150 °C	968.8	1.7	1.0	-
example 5	130 °C	468.8	0.4 or less	2.8	2.5

-The unit of the TTm value is °C minute.

-The unit of the peroxide value is meq/kg.

-In the table, “-” means that evaluation of the flavor was not performed.

In Test example 1, the heating duration time was fixed to 10 minutes. As a result, the acid value was 0.7 in all examples and all comparative examples.

As a result of the flavor evaluation, the effect of enhancing salty taste was enough

when the heating temperature was 110°C or more. However, in the sample of the comparative example 3 where the heating temperature was 150°C or more, the peroxide value was increased to 1.7 meq/kg and deteriorated flavor was felt. About the color after the heating treatment, the color was light yellow in the samples of examples 1-5 and comparative example 2 similarly to the butter oil (comparative example 1). However, the color was slightly faded by color fading reaction of oil-and-fat in the sample of the comparative example 3.

Therefore, in the following experiments, the heating temperature of 120°C was used as a reference since the deteriorated flavor was not felt and the effect of enhancing salty taste was enough in the example 2. Thus, various conditions other than the heating temperature were examined. In the example 2, the moisture was 400 wt.ppm, and the peroxide value was the measurement limit or less.

In the sample of the example 5, since 1000 wt.ppm of tocopherol was added as an antioxidant, the peroxide value was the measurement limit or less. Thus, the deteriorated flavor was not felt and the effect of enhancing salty taste was enough similarly to the sample of the example 3.

As explained above, brown burnt butter obtained by heating a general butter containing moisture and non-fat milk solids was essentially different from the heat-treated butter oil of the present invention. Namely, the oil-and-fat containing heat-treated butter oil obtained by the manufacturing method of the present invention does not contain carbohydrate and protein substantially. Therefore, the Maillard reaction did not occur during the heating treatment and the product of the Maillard reaction was not included in the oil-and-fat containing butter oil. All the oils-and-fats containing heat-treated butter oil obtained by the manufacturing method of the present invention did not include the product of the Maillard reaction also in the following test examples.

[0041]

Test example 2 Influence by heating duration time>

Examples 6-10, Comparative example 4)

As shown in Table 3 below, the heating treatment was performed on the butter oil (comparative example 1) at 120°C similarly to the example 2 except for that the heating duration time was changed.

[0042]

Table 3 Influence by (heating) duration time

	oil-and-fat				water-in-oil emulsion
	duration time	TTm value	peroxide value	deteriorated flavor	salty taste
example 6	1 minute	95	0.4 or less	2.9	2.1
example 7	3 minutes	135		2.8	2.6
example 8	30 minutes	675		2.7	2.6
example 9	60 minutes	1275	0.6	2.4	2.6
example 10	180 minutes	3675	1.4	2.0	2.6
comparative example 4	360 minutes	7275	10.3	1.0	-

-The unit of the TTm value is °C minute.

-The unit of the peroxide value is meq/kg.

-In the table, “-” means that evaluation of the flavor was not performed.

In Test example 2, the acid value was 0.7 in all examples and all comparative examples.

In the example 7, it was confirmed that the equivalent oil-and-fat for enhancing salty taste could be prepared in a shorter heating duration time than the example 2. In the example 6 where the heating duration time was further shortened, although the effect of enhancing salty taste was inferior to the example 7, remarkable effect could be confirmed compared to the butter oil (comparative example 1).

In the examples 8-10 and the comparative example 4, using the heating temperature (120°C) same as the sample of the example 2, the influence when extending the heating duration time was confirmed. As a result, it was confirmed that the deteriorated flavor was increased as the heating duration time became longer. In particular, in the sample of the comparative example 4 where the heating duration time was set to 360 minutes, the peroxide value was increased to 10.3 meq/kg and strong deteriorated flavor was felt.

[0043]

Test example 3 Influence by composition of oil-and-fat containing butter oil>

Examples 11-12, Comparative examples 5-8)

In case of the milk raw material, it was confirmed that flavor varied depending on the difference of the feed and the breed. Therefore, instead of the butter oil prepared from Yotsuba butter, the heating treatment was performed on 100 wt.% of the anhydrous milk fat (frozen distribution product, moisture 952 wt.ppm, comparative example 5) made in New Zealand for ten minutes at 120°C similarly to the example 2 to prepare a sample of the example 11.

In addition, the heating treatment was performed on the oil-and-fat containing butter oil (comparative example 6) obtained by mixing the butter oil (comparative example 1) prepared from 60 wt.% of Yotsuba butter and 40 wt.% of the transesterified oil-and-fat B for ten minutes at 120°C similarly to the example 2 to prepare a sample of the example 12.

Furthermore, the heating treatment was performed on 100 wt.% of the transesterified oil-and-fat B (comparative example 7) without containing the butter oil for ten minutes at 120°C similarly to the example 2 to prepare a sample of the comparative example 8.

Here, the comparative examples 5, 6 and 7 did not contain carbohydrate and protein substantially.

In all heating conditions of Test example 3, the TTM value was as follows.

$$\text{TTM value} = (20\text{ (}^{\circ}\text{C)} \times 20\text{ (}^{\circ}\text{C)}/4\text{ (}^{\circ}\text{C minute)})/2 + (120 - 100)\text{ (}^{\circ}\text{C)} \times 10\text{ (minute)} + (20\text{ (}^{\circ}\text{C)} \times 20\text{ (}^{\circ}\text{C)}/8\text{ (}^{\circ}\text{C minute)})/2 = 200 + 50 + 25 = 275\text{ (}^{\circ}\text{C minute)}$$

[0044]

About the example 11 and the comparative example 5, 7 and 8, the water-in-oil emulsion for filling was prepared by replacing the butter oil shown in Table 1 with the anhydrous milk fat or the transesterified oil-and-fat B and evaluated. About the example 12 and the comparative example 6, the water-in-oil emulsion for filling was prepared similarly except for that the butter oil was set to 8.33 wt.% and the transesterified oil-and-fat B was set to 34.67 wt.% so that the content of the butter oil becomes finally 5.0 wt.%.

Table 4 Influence by composition of oil-and-fat containing butter oil

	oil-and-fat				water-in-oil emulsion
	heating temperature	duration time	composition	deteriorated flavor	salty taste
comparative example 5	heating treatment not performed		anhydrous milk fat made in New Zealand	3.0	1.0
example 11	120°C	10 minutes		2.7	2.6
comparative example 6	heating treatment not performed		60% Yotsuba butter oil	3.0	1.0
example 12	120°C	10 minutes		2.7	2.6
comparative example 7	heating treatment not performed		transesterified oil-and-fat B	3.0	1.0
comparative example 8	120°C	10 minutes		3.0	1.0

In Test example 3, the heating temperature was fixed to 120°C. As a result, in all examples and all comparative examples, the acid value was 0.7 and the peroxide value was the measurement limit or less.

As shown in the example 11, even in the butter oil made in other places, by performing the heating treatment, the effect for enhancing salty taste similarly to the above described sample of the example 2 was confirmed. As shown in the example 12, even when the content of the butter oil was not 100 wt.%, by finally adjusting the content of the heat-treated butter oil to the same amount, the effect for enhancing salty taste similarly to the example 2 was confirmed. However, in the sample of the comparative example 8 in which the heating treatment was performed on 100 wt.% of the transesterified oil-and-fat B without containing the butter oil, the effect for enhancing salty taste was not confirmed.

[0045]

Test example 4 Influence by content of moisture>

Example 13)

The butter oil (comparative example 1) was distilled under reduced pressure at 40°C (using an evaporator) to obtain a butter oil containing 247 wt.ppm of moisture. The heating treatment was performed on the obtained butter oil for ten minutes at 120°C similarly to the example 2 to obtain the sample of the example 13.

Preparation of an emulsion for adjusting moisture content)

An emulsion consisting of 80 wt.% of the butter oil (comparative example 1) and 20 wt.% of water was fed to a continuous scraping type cooling machine to obtain an emulsion for adjusting moisture content containing 20.02 wt.% of moisture.

Note that the content of moisture of the emulsion for adjusting moisture content was measured by sea sand method.

Examples 14-15, Comparative examples 9-10)

The above described emulsion for adjusting moisture content and the butter oil (comparative example 1) were arbitrarily mixed to prepare the butter oil having different moisture content. Note that the moisture content of each butter oil before the heating treatment shown in Table 5 below was measured by using Karl Fischer method.

The heating treatment was performed on the above described butter oil having different moisture content for ten minutes at 120°C similarly to the example 2 to obtain the sample of the examples 14-15 and the comparative examples 9-10.

In the comparative example 9 where the moisture content before the heating treatment was set to 5 wt.%, it was brought to a boiling state at 105°C and the temperature was constant for nine minutes during the heating treatment. After that, the heating was continued and the heating treatment was performed by retaining it for ten minutes after the temperature reaches 120°C. In the comparative example 10 where the moisture content before the heating treatment was set to 16 wt.% similarly to the general butter, the temperature was constant for twenty minutes at 105°C. After that, similarly, the heating was continued and the heating treatment was

performed by retaining it for ten minutes after the temperature reaches 120°C. The TTm values based on the above described values are shown in Table 5 below.

[0046]

Table 5 Influence by moisture content

	oil-and-fat containing butter oil	oil-and-fat		water-in-oil emulsion	
	moisture content	TTm value	deteriorated flavor	salty taste	thick feeling
example 13	247 (ppm)	275	2.9	2.5	2.6
example 14	2148 (ppm)	275	2.6	2.6	2.7
example 15	1 (%)	275	2.5	2.6	2.7
comparative example 9	5 (%)	320	1.5	-	-
comparative example 10	16 (%)	375	1.2	-	-

-The unit of the moisture content is wt.ppm or wt.%.

-The unit of the TTm value is °C minute.

-In the table, “-” means that evaluation of the flavor was not performed.

In Test example 4, the heating duration time was fixed to ten minutes after the heating temperature reaches to 120°C (heating temperature). As a result, in all examples and all comparative examples, the acid value was 0.7 and the peroxide value was the measurement limit or less.

In addition, it was confirmed that an irritating feeling to throat became gradually strong as the moisture content of the butter oil increased. In particular, in the sample of the comparative example 10, although the moisture content after the heating treatment was reduced to 4000 wt.ppm, the irritating feeling to throat was extremely strong. Thus, the comparative example 10 was not good.

Test example 5 Influence by manufacturing method>

Comparative example 11)

The butter oil (comparative example 1) was stored statically for two weeks at 60°C to obtain the sample of the comparative example 11.

Comparative example 12)

The butter oil (comparative example 1, moisture 668 wt.ppm) was chilled and solidified in a freezer according to the method described in the example 1 of WO2013-105624 (sample D, moisture 757 wt.ppm), and then it was stored statically for two weeks at the

constant temperature of 20°C to obtain the sample of the comparative example 12.

[0047]

Table 6 Influence by manufacturing method

	oil-and-fat			water-in-oil emulsion
	treatment method	peroxide value	deteriorated flavor	salty taste
comparative example 11	60°C/2 weeks	2.8	1.0	-
comparative example 12	20°C/2 weeks	0.4 or less	2.7	1.2

-The unit of the peroxide value is meq/kg.

-In the table, “-” means that evaluation of the flavor was not performed.

In all comparative examples of Test example 5, the acid value was 0.7.

In the sample of the comparative example 11, although the temperature was 60°C, after the treatment period of two weeks, the peroxide value was 2.8 meq/kg and deteriorated flavor was strongly felt.

In the sample of the comparative example 12, the evaluation of salty taste was similar to the butter oil (comparative example 1) and apparently inferior to the heat-treated butter oil (examples). Thus, the comparative example 12 was not good.

As described above, by heat-treating the oil-and-fat containing butter oil having a low moisture content at a specific temperature and condition, the oil-and-fat for enhancing salty taste of the present invention could be prepared.

[0048]

Hereafter, examples used for various foods and beverages are shown to further clarify that the oil-and-fat for enhancing salty taste obtained by the manufacturing method of the present invention can be used for wide variety of foods and beverages containing the salt taste agent.

The flavor (salty taste) of the foods and beverages containing the salt taste agent using the oil-and-fat for enhancing salty taste obtained by the manufacturing method of the present invention was evaluated relatively according to the above described standards unless otherwise described.

Note that the sample of the above described example 2 was used as the oil-and-fat for enhancing salty taste.

[0049]

(Water-in-oil emulsion for roll-in)

The water-in-oil emulsion for roll-in shown in Table 7 below was prepared according

to the above described "Preparing method of water-in-oil emulsion."

Table 7 Composition of water-in-oil emulsion for roll-in

		example 16	example 13
5	oil-and-fat for enhancing salty taste (example 2)	20.0 (%)	
	butter oil (comparative example 1)		20.0
	transesterified oil-and-fat C	20.0	20.0
	transesterified oil-and-fat B	28.0	28.0
	rapeseed oil	15.0	15.0
	salt	1.3	1.3
	water	15.0	15.0
	emulsifier	0.7	0.7
10	ratio (%) of oil-and-fat for enhancing salty taste in oil phase	24.1	0.0

-The unit is wt.%.

-As the transesterified oil-and-fat C, it was used that an oil-and-fat having a melting point of 47°C obtained by a transesterification of a blended oil of palm stearin, coconut oil and fully hydrogenated high-erucic-rape seed oil which substantially did not contain trans acid using sodium methylate as a catalyst. In the transesterified oil-and-fat C, the moisture was 70 wt.ppm, the acid value was 0.1 or less and the peroxide value was the measurement limit or less. The taste and flavor was tasteless and odorless similarly to a general purified vegetable oil-and-fat.

-As the emulsifier, glycerin fatty acid ester and lecithin were used.

[0050]

(Croissant)

Hereafter, a croissant which is a wheat flour processed food will be explained.

According to "Preparing method of croissant" shown below, a croissant was baked using the water-in-oil emulsion for roll-in prepared in the examples 16 and the comparative example 13.

"Preparing method of croissant"

1. The wheat flour dough material shown in Table 8 below was kneaded, then fermented in a storage of 28°C and 75% of humidity for 60 minutes, then stored in a freezer of -18°C for 30 minutes, and then ferment was retarded for 60 minutes in the freezer of -7°C.
2. The water-in-oil composition for roll-in was folded in the above described material to be 60 pts.wt. with respect to the powder, then folded in three by a reverse sheeter twice, then ferment was retarded for 60 minutes in the freezer of -7°C, then folded in three by the reverse sheeter once, and then ferment was retarded for 45 minutes in the freezer of -7°C.
3. The dough was stretched to a thickness of 4 mm by the reverse sheeter, then 55g the dough was shaped, and then fermented in a storage of 32°C and 75% of humidity for 60 minutes.

4. The dough was baked in an oven for 17 minutes with an inside temperature of 210°C to prepare a croissant.

[0051]

Table 8 Composition of wheat flour dough material for croissant

strong flour	100.0
sugar	8.0
salt	1.9
powdered skim milk	3.0
whole egg	8.0
shortening	5.0
yeast	3.0
yeast food	0.1
water	51.0

-The unit is pts.wt..

-As the shortening, "Pampas LB" manufactured by FUJI OIL CO., LTD. was used.

[0052]

The flavor was evaluated after the baked croissant was cooled for one hour under room temperature.

Table 9 Taste and flavor evaluation of croissant

	example 17	comparative example 14
used water-in-oil emulsion for roll-in	example 16	comparative example 13
salty taste	2.3	1.0

As a result, in the croissant of the example 17, salty taste was felt stronger than the croissant of the comparative example 14. Thus, the example 17 was good.

[0053]

(Shortening)

Next, the shortening, which is an oil-and-fat processed food, will be explained.

According to the following "Preparing method of shortening," the shortening shown in Table 10 below was prepared.

"Preparing method of shortening"

1. According to Table 10 below, an oil-and-fat was melted and an emulsifier which is capable of being dissolved in the oil-and-fat was added and mixed.

The mixed liquid obtained here was referred to as a preparation liquid.

2. From the preparation liquid, a shortening is prepared through a combinator and a pin machine.

3. For the prepared shortening, tempering was performed for one day at 20°C, and then stored in a refrigerator at 3-7°C for 3-7 days.

[0054]

Table 10 Composition of shortening

	manufacturing example 1	manufacturing example 2
oil-and-fat for enhancing salty taste (example 2)	10.0 (%)	
butter oil (comparative example 1)		10.0
transesterified oil-and-fat C	10.0	10.0
palm oil (iodine value 52)	49.6	49.6
palm olein (iodine value 67)	30.0	30.0
emulsifier	0.4	0.4
ratio (%) of oil-and-fat for enhancing salty taste in oil phase	10.0	0.0

-The unit is wt.%.

-As the emulsifier, glycerin fatty acid ester and sorbitan fatty acid ester and lecithin were used.

-Since the salt taste agent is not included in the above described shortening, the above examples are referred to as the manufacturing examples.

[0055]

(Sandwich cream)

According to "Preparing method of sandwich cream" below, a sandwich cream was prepared using the shortening prepared in the manufacturing method 1 and the manufacturing method 2.

"Preparing method of sandwich cream"

1. 50 pts.wt. of the shortening adjusted to 20°C was stirred by a Kenwood Mixer (using beater), and whipped until the specific gravity became 0.4.

2. 20 pts.wt. of dextrin (manufactured by Matsutani Chemical Industry Co., Ltd.) and 30pts.wt. of powdered cheese (containing 5 wt.% of salt) was added to the whipped shortening, and mixed by a Kenwood Mixer (using beater) to prepare a sandwich cream.

[0056]

The flavor was evaluated after the obtained sandwich cream was cooled for one day under room temperature.

Table 11 Taste and flavor evaluation of sandwich cream

	example 18	comparative example 15
used shortening	manufacturing example 1	manufacturing example 2
salty taste	2.3	1.0

As a result, in the sandwich cream of the example 18, salty taste was felt stronger than the sandwich cream of the comparative example 15. Thus, the example 18 was good.

[0057]

(Gallettes salées)

According to "Preparing method of galettes salées" below, galettes salées (salted biscuits) were baked using the shortening prepared in the manufacturing method 1 and the manufacturing method 2.

"Preparing method of galettes salées"

1. 60 pts.wt. of sugar was added to 100 pts.wt. of the shortening adjusted to 20°C, stirred by a Kenwood Mixer (using beater), and whipped until the specific gravity became 0.8.

2. While the mixture of the whipped shortening and the sugar was mixed by the Kenwood Mixer (using beater), 20 pts.wt of whole egg was added in three separate times.

3. 1.2 pts.wt. of salt and 100 pts.wt. of weak flour were added to the mixture of the shortening, sugar and the whole egg, and the mixture was stirred lightly by the Kenwood Mixer (using beater). Then, dough was gathered together by hand and entered in a plastic bag, and then the dough was rested for one night at 5°C.

4. The dough was stretched to a thickness of 8 mm, then cut with a circular mold, and then baked in an oven for 12 minutes with an inside temperature of 180°C to prepare galettes salées.

[0058]

The taste and flavor was evaluated after the obtained galettes salées were cooled for one hour under room temperature.

Table 12 Taste and flavor evaluation of galettes salées

	example 19	comparative example 16
used shortening	manufacturing example 1	manufacturing example 2
salty taste	2.3	1.0

As a result, in the galettes salées of the example 19, salty taste was felt stronger than the galettes salées of the comparative example 16. Thus, the example 19 was good. As shown in the above examples, even when the salt taste agent is not included in the raw material such as the shortening, the effect for enhancing salty taste of the present invention can be obtained when the wheat flour processed foods or the like include salty taste and the oil-and-fat for enhancing salty taste (examples) as the final product of the foods and beverages using the raw material.

[0059]

(Oil-in-water emulsion for cooking)

According to the following "Preparing method of oil-in-water emulsion for cooking," the oil-in-water emulsion for cooking shown in Table 13 below was prepared.

"Preparing method of oil-in-water emulsion for cooking"

1. According to Table 13 below, an oil-and-fat was melted and an emulsifier (e.g., glycerin fatty acid ester, lecithin) which is capable of being dissolved in the oil-and-fat was

added to prepare an oil phase.

2. A powdered skim milk, an additive (e.g., sucrose fatty acid ester) which is capable of being dissolved in water, and an emulsifier were added to the water and dissolved to prepare a water phase.

3. The above described oil phase and water phase were stirred by a homomixer for 15 minutes at 68°C to preliminary emulsify them, and then sterilizing treatment was performed by a direct heating method using an ultra- high-temperature sterilizer (manufactured by Iwai Kikai Kogyo Co., Ltd.) for 4 seconds at 145°C.

4. After the sterilizing treatment, homogenization was performed at a homogenization pressure of 30 kg/cm² and the temperature was cooled to 5°C immediately.

5. After the cooling, an aging treatment was performed for 24 hours to prepare an oil-in-water emulsion for cooking.

[0060]

Table 13 Composition of oil-in-water emulsion for cooking

	manufacturing example 3	manufacturing example 4	manufacturing example 5
oil-and-fat for enhancing salty taste (example 2)	7.0 (%)		
butter oil (comparative example 1)		7.0	14.0
transesterified oil-and-fat B	30.0	30.0	23.0
coconut oil	8.7	8.7	8.7
powdered skim milk	4.6	4.6	4.6
water	48.8	48.8	48.8
emulsifier	0.6	0.6	0.6
sodium citrate	0.3	0.3	0.3
ratio (%) of oil-and-fat for enhancing salty taste in oil phase	13.9	0.0	0.0
ratio (%) of butter oil in oil phase	13.9	13.9	27.8

-The unit is wt.%.

-As the emulsifier, sucrose fatty acid ester, sorbitan fatty acid ester, glycerin fatty acid ester and lecithin were used.

-Since the salt taste agent is not included in the above described oil-in-water emulsion for cooking, the above examples are referred to as the manufacturing examples.

[0061]

The obtained oil-in-water emulsion for cooking was heated to 90°C, then 0.3 pts.wt. of salt was dissolved in 100 pts.wt. of the oil-in-water emulsion for cooking, then cooled to 60°C, and then taste and flavor was evaluated. The taste and flavor of the comparative example

18 was evaluated relatively in the condition that the comparative example 17 was defined as evaluation reference (salty taste: 1.0) although the content of the butter oil was different.

Table 14 Taste and flavor evaluation of oil-in-water emulsion heated to 90°C

	example 20	comparative example 17	comparative example 18
used oil-in-water emulsion for cooking	manufacturing example 3	manufacturing example 4	manufacturing example 5
salty taste	2.5	1.0	1.0

As a result of being heated to 90°C, with respect to the comparative example 17 which uses 7.0 wt.% of the butter oil (comparative example 1), in the comparative example 18 which uses 14.0 wt.% of the butter oil (twice as much as the comparative example 17), although the flavor of the butter became strong, the effect of enhancing the salty taste was not felt. In the example 20 which uses 7.0 wt.% of the oil-and-fat for enhancing salty taste (example 2), salty taste was felt stronger than the oil-in-water emulsion for cooking of the comparative examples 17 and 18. Thus, the example 20 was good.

[0062]

For the oil-in-water emulsion for cooking to which retort sterilization treatment was performed for 30 minutes at 120°C, 0.3 pts.wt. of salt was dissolved in 100 pts.wt. of the oil-in-water emulsion on the next day of the retort sterilization treatment, then heated to 60°C, and then the taste and flavor was evaluated. The taste and flavor of the comparative example 4 was evaluated relatively in the condition that the comparative example 3 containing the butter oil (comparative example 1) was defined as evaluation reference (salty taste: 1.0).

Table 15 Taste and flavor evaluation of oil-in-water emulsion for cooking to which retort sterilization treatment was performed

	example 21	comparative example 19	comparative example 20
used oil-in-water emulsion for cooking	manufacturing example 3	manufacturing example 4	manufacturing example 5
salty taste	2.5	1.0	1.0

In the oil-in-water emulsion of the example 21 to which retort sterilization treatment was performed, salty taste was felt stronger than the oil-in-water emulsion for cooking of the comparative examples 19 and 20. Thus, the example 21 was good. As shown in the above examples, even when the salt taste agent is not included in the raw material such as the oil-in-water emulsion for cooking, the effect for enhancing salty taste of the present invention can be obtained when the oil-in-water emulsion for cooking heated to 90°C or retort-sterilization-treated includes salty taste and the oil-and-fat for enhancing salty taste (examples) as the final product of the foods and beverages using the raw material. Furthermore, from the comparison between the example 20 and the comparative example 18 and the

comparison between the example 21 and the comparative example 20, it was confirmed that foods and beverages having strong salty taste could be prepared by using the oil-and-fat for enhancing salty taste of the present invention for the salty foods and beverages even when the content of the butter oil was reduced.

5 [0063]

(White sauce)

According to "Preparing method of white sauce" below, a white sauce shown in Table 16 below was prepared.

"Preparing method of white sauce"

10 1. A pan was put over the fire, and the dissolved oil-and-fat was mixed according to Table 16 below to prepare an oil phase.

2. A wheat flour was added and heated while it was stirred and mixed so as to be mixed uniformly.

15 3. A milk was gradually added while it was heated to mix them, then a salt was added after the milk was completely added and uniformly mixed, then the mixture was heated and mixed so as to be mixed more uniformly to prepare a white sauce.

[0064]

Table 16 Composition of white sauce

	example 22	comparative example 21
20 oil-and-fat for enhancing salty taste (example 2)	6.0 (%)	
butter oil (comparative example 1)		6.0
wheat flour	7.0	7.0
milk (milkfat content 3.8%)	86.7	86.7
salt	0.3	0.3
25 ratio (%) of oil-and-fat for enhancing salty taste in oil phase	64.6	0.0
ratio (%) of butter oil in oil phase	100.0	100.0

-The unit is wt.%.

[0065]

30 The taste and flavor was evaluated after the obtained white sauce was cooled to approximately 60°C.

Table 17 Taste and flavor evaluation of white sauce

	example 22	comparative example 21
salty taste	2.5	1.0

35 As a result, in the white sauce of the example 22, salty taste was felt stronger than the white sauce of the comparative example 21. Thus, the example 22 was good.

[0066]

(Cream cheese-like oil-in-water emulsion)

According to "Preparing method of cream cheese-like oil-in-water emulsion" below, a cream cheese-like oil-in-water emulsion shown in Table 18 below was prepared.

5 "Preparing method of cream cheese-like oil-in-water emulsion"

1. According to Table 18 below, an oil-and-fat was dissolved and mixed to prepare an oil phase (60°C).

2. A powdered skim milk and a total milk protein were stirred and dissolved in water to prepare a water phase.

10 3. The above described oil phase and water phase were stirred by a homomixer for 30 minutes at 70°C to preliminary emulsify them, and then sterilizing treatment was performed, and then homogenization was performed at a homogenization pressure of 50 kg/cm² to prepare an oil-in-water emulsion.

4. A lactic acid bacteria bulk starter for cheese was added to the oil-in-water emulsion, and fermented for 15 hours at 20°C to prepare a fermented milk of pH4.9.

5. A heat sterilization was performed on the fermented milk for 30 minutes at 80°C, then a salt and a processed starch were added, then the mixture was stirred and kneaded by a kneader for 10 minutes at 80°C, and then homogenization was performed at a homogenization pressure of 10 kg/cm² to prepare a cream cheese-like oil-in-water emulsion.

20 [0067]

Table 18 Composition of cream cheese-like oil-in-water emulsion

	example 23	comparative example 22
oil-and-fat for enhancing salty taste (example 2)	2.0 (%)	
25 butter oil (comparative example 1)		2.0
palm oil	19.0	19.0
powdered skim milk	14.0	14.0
total milk protein	3.0	3.0
lactic acid bacteria bulk starter for cheese	1.0	1.0
water	57.2	57.2
salt	0.3	0.3
30 processed starch	3.5	3.5
ratio (%) of oil-and-fat for enhancing salty taste in oil phase	9.5	0.0

-The unit is wt.%.

-As the processed starch, a hydroxypropylated phosphoric acid crosslinked starch was used.

35 [0068]

The taste and flavor was evaluated after the obtained cream cheese-like oil-in-water

emulsion was cooled in a refrigerator for one day.

Table 19 Taste and flavor evaluation of cream cheese-like oil-in-water emulsion

	example 23	comparative example 22
salty taste	2.2	1.0

As a result, in the cream cheese-like oil-in-water emulsion of the example 23, salty taste was felt stronger than the cream cheese-like oil-in-water emulsion of the comparative example 22. Thus, the example 23 was good.

[0069]

Results and considerations

As it is obvious from the above results, the manufacturing method of the present invention is very simple without requiring the complicated processes of removing solid contents and performing long-time reaction or enzyme reaction. However, salty taste of the salty foods and beverages can be enhanced by using the oil-and-fat for enhancing salty taste (examples) obtained by the manufacturing method of the present invention. On the other hand, in the manufacturing methods shown as the comparative examples using the methods different from the present invention, deteriorated flavor was strongly felt or the oil-and-fat having enough effect of enhancing salty taste could not be prepared even when the oil-and-fat for enhancing salty taste was used.

In addition, by using the oil-and-fat for enhancing salty taste (examples) obtained by the manufacturing method of the present invention for the salty foods and beverages, the effect of enhancing salty taste can be confirmed in wide variety of foods and beverages. For example, the effect can be confirmed not only in the foods such as a sandwich cream, a filling, a water-in-oil emulsion and a cream cheese-like oil-in-water emulsion which are eaten without being heated again but also the foods such as an oil-in-water emulsion for cooking and a white sauce which are eaten by being heated again.

Furthermore, by using the oil-and-fat for enhancing salty taste (examples) obtained by the manufacturing method of the present invention for a water-in-oil emulsion for roll-in and a shortening, the salty taste was enhanced in the wheat flour processed foods such as a croissant and a cookie made by baking an ingredient containing the oil-and-fat for enhancing salty taste.

In the conventional reducing salt agents, since almost all the components were water-soluble as described above, the water phase was used in almost all the technologies for reducing salt. However, when the water-soluble law salt materials are coexisted by using the oil-and-fat for enhancing salty taste of the present invention, salt can be further reduced in the salty foods and beverages.

CLAIMS

1. A manufacturing method of an oil-and-fat for enhancing salty taste, characterized in that the method comprising the step of:

performing a heating treatment on an oil-and-fat containing butter oil does not substantially contain carbohydrate and protein, the oil-and fat containing a moisture 2 wt.% or less, the heating treatment being performed at a temperature of 110°C or more and 145°C or less and in a condition that a TTm value (°C minute) is 30 to 5000.

(wherein, the TTm value (°C minute) is an integration value of a temperature value (°C) over a heating duration time (minute), the temperature value being obtained by subtracting 100 from a heating temperature.)

2. The manufacturing method of the oil-and-fat for enhancing salty taste according to claim 1, wherein

the oil-and-fat contains the butter oil 50 wt.% or more.

3. The manufacturing method of the oil-and-fat for enhancing salty taste according to claim 1 or claim 2, wherein

a peroxide value is less than 1.5 meq/kg and an acid value is less than 2 immediately after the heating treatment.

4. A manufacturing method of a salty food and beverage containing the oil-and-fat for enhancing salty taste manufactured by the method of any one of claims 1 to 3.

5. A method for enhancing salty taste of a salty food and beverage by using the oil-and-fat for enhancing salty taste manufactured by the method of any one of claims 1 to 3.