

DESCRIPTION

GARLIC OIL, AGENT FOR IMPARTING GARLIC FLAVOR TO FOOD PRODUCT,
AND METHOD FOR IMPARTING GARLIC FLAVOR TO FOOD PRODUCT

TECHNICAL FIELD

5 [0001]

The present invention relates to a garlic oil that has excellent garlic flavor and high garlic-flavor persistence, an agent for imparting garlic flavor to a food product, and a method for imparting garlic flavor to a food product.

10 BACKGROUND ART

[0002]

In garlic oils, garlic and an edible oil and fat are combined to impart the fragrance of the garlic to the edible oil. As one example of a garlic oil, Patent Document 1
15 discloses a garlic oil that has a 2,6-dimethylpyrazine concentration of 0.1 ppm or greater and 10 ppm or less and that includes an emulsifier, the garlic oil being such that the peak area proportion of the 2,6-dimethylpyrazine and 2,3-dihydro-3,5-dihydroxy-6-methyl-4H-pyran-4-on ranges from
20 1:0.01 to 1:15, as measured by solid-phase microextraction (SPME)/gas chromatography-mass spectrometry.

[Related Art Documents]

[Patent Documents]

[0003]

25 [Patent Document 1] Japanese Laid-Open Patent Application No. 2016-198092

DISCLOSURE OF THE INVENTION

[Problems the Invention is Intended to Solve]

[0004]

However, there is a demand from consumers to enhance the
5 garlic flavor of garlic oils. In addition, a problem is
presented in that the garlic flavor of the garlic oil weakens
over time.

[0005]

It is accordingly an object of the present invention to
10 provide a garlic oil that has excellent garlic flavor and high
garlic-flavor persistence, an agent for imparting garlic
flavor to a food product, and a method for imparting garlic
flavor to a food product.

[Means for Solving the Aforementioned Problems]

15 [0006]

The garlic oil of the present invention is characterized
by containing a garlic flavor oil and a pepper flavoring
composition.

[0007]

20 Due to the garlic oil of the present invention containing
a garlic flavor oil and a pepper flavoring composition, it is
possible for the pepper flavoring composition to enhance the
garlic flavor of the garlic flavor oil. Therefore, according
to the garlic oil of the present invention, it is possible to
25 provide a garlic oil that has excellent garlic flavor and high
garlic-flavor persistence.

[0008]

In the garlic oil of the present invention, the garlic flavor oil is to contain an extract created from an edible oil of garlic or of a processed-garlic product.

5 [0009]

Due to the garlic flavor oil containing an extract created from an edible oil of garlic or of a processed-garlic product, it is possible to impart a more natural garlic flavor to the garlic oil.

10 [0010]

The garlic oil of the present invention may contain soybean oil.

[0011]

By having the garlic oil containing soybean oil, it is possible to further enhance the garlic flavor.

[0012]

In the garlic oil of the present invention, the pepper flavoring composition is to contain either of an extract of pepper or of a processed-pepper product and an essential oil of pepper.

[0013]

Due to the pepper flavoring composition containing either of an extract of pepper or of a processed-pepper product and an essential oil of pepper, it is possible to enhance the garlic flavor of the garlic oil.

[0014]

The present invention also provides an agent for imparting garlic flavor to a food product, the agent containing the garlic oil described above as an active ingredient.

5 [0015]

The present invention also provides a method for imparting garlic flavor to a food product, the method being characterized by including a step for adding the garlic oil described above to the food product.

10 [Effect of the Invention]

[0016]

According to the garlic oil of the present invention, it is possible to provide a garlic oil that has excellent garlic flavor and high garlic-flavor persistence.

15 [0017]

According to the agent for imparting garlic flavor to a food product of the present invention, including the garlic oil described above as an active ingredient makes it possible to enhance the garlic flavor of a food product and to extend the persistence of said flavor.

[0018]

According to the method for imparting garlic flavor to a food product of the present invention, including a step for adding the garlic oil described above to a food product makes it possible to enhance the garlic flavor of the food product and to extend the persistence of the garlic flavor.

25

BRIEF DESCRIPTION OF THE DRAWINGS

[0019]

FIG. 1 is a graph showing an evaluation of garlic flavor when rapeseed oil is used as a base oil;

5 FIG. 2 is a graph showing an evaluation of garlic flavor when soybean oil is used as a base oil;

FIG. 3 is a graph showing an evaluation of garlic flavor when corn oil is used as a base oil;

10 FIG. 4 is a graph showing an evaluation of pepper flavor when rapeseed oil is used as a base oil;

FIG. 5 is a graph showing an evaluation of pepper flavor when soybean oil is used as a base oil;

FIG. 6 is a graph showing an evaluation of pepper flavor when corn oil is used as a base oil;

15 FIG. 7 is a graph showing changes in garlic flavor and pepper flavor associated with the amount of a pepper flavoring composition that is added; and

FIG. 8 is another graph showing changes in garlic flavor and pepper flavor associated with the amount of a pepper
20 flavoring composition that is added.

MODE FOR CARRYING OUT THE INVENTION

[0020]

A preferred embodiment of the present invention is described in detail below.

25 [0021]

The garlic oil of the present invention contains a garlic flavor oil and a pepper flavoring composition. The garlic flavor oil is an edible oil and fat including a component derived from garlic flavor. The garlic flavor oil preferably contains at least one of a garlic flavoring composition and an extract created from an edible oil of garlic or of a processed-garlic product.

[0022]

Examples of the component derived from garlic flavor include diallyl disulfide. The garlic oil preferably contains diallyl disulfide in an amount of 1% or more and 40% or less, more preferably in an amount of 2% or more and 35% or less, and even more preferably in an amount of 20% or more and 35% or less. The diallyl sulfide content of the garlic oil can be measured through, e.g., a dynamic headspace method in which a gas chromatography (GC)/mass spectrometry (MS) mass spectrometer is used.

[0023]

The extract created from an edible oil of garlic or of a processed-garlic product is obtained by, e.g., heating raw-material garlic in an edible oil. Processed-garlic products include, e.g., grated garlic, minced garlic, dried garlic (including freeze-dried garlic), and fried garlic chips.

[0024]

As the garlic flavor oil containing the extract created from an edible oil of garlic or of a processed-garlic product,

it is permissible, for example, to use the extract created from an edible oil of garlic or of a processed-garlic product, or the garlic flavor oil can be obtained by blending the extract and an edible oil that shall be described later. Using
5 an extract created from an edible oil of garlic or of a processed-garlic product makes it possible to impart a more natural garlic flavor to the garlic oil.

[0025]

The garlic flavoring composition may be formed using,
10 e.g., any of a natural flavoring, a synthetic flavoring, and a mixed flavoring. Due to the garlic oil containing the garlic flavoring composition, it is possible to further enhance the garlic flavor of the garlic oil containing the extract created from an edible oil of garlic or of a processed-garlic product,
15 or to reduce the amount of the extract created from an edible oil of garlic or of a processed-garlic product.

[0026]

Further, using only the garlic flavoring composition as a garlic-flavor-derived component in the garlic flavor oil makes
20 it possible to reduce the cost of manufacturing the garlic oil. The garlic flavor oil that contains the garlic flavoring composition can be obtained by, e.g., blending the garlic flavoring composition and an edible oil that shall be described later.

[0027]

For example, a commercially available garlic flavoring can be used as the garlic flavoring composition. Examples of the commercially available garlic flavoring include "Garlic Flavor" (product name, product nos. HQ-7603 and G-13277, made by Takasago International Corp.), "Fried Garlic Flavor" (product name, product no. F-63361, made by Takasago International Corp.), "Roasted Garlic Oil" (product name, product no. G-11028, made by Takasago International Corp.), "Garlic Oleoresin" (product name, product no. HQ-7601, made by Takasago International Corp.), "Garlic Oil" (product name, product nos. #81 and #3032, made by Takata Koryo Co., Ltd.), "Fresh Garlic Flavor" (product name, product no. TM-24821, made by Shiono Koryo Co., Ltd.), "Garlic" (product name, product no. SP-180384, made by San-Ei Gen FFI, Inc.), "Garlic Oil" (product name, product nos. GL96875 and GL96876, made by Ogawa & Co., Ltd.), "Spice OG Garlic" (product name, made by Ogawa & Co., Ltd.), "Garlic Roast Seasoning Oil" (product name, made by Saitosyokuhin Corp.), "L-001572 and L-106432" (both product nos., made by Givaudan Japan KK), "Fried Garlic" (product name, product no. SC687886, made by IFF Nippon KK), "Garlic Fried" (product name, product no. SC852532, made by IFF Nippon KK), "mz Garlic Oil S" (product name, made by Maruzen Shokuhin Kogyo KK), and "Garlic Oil" (product name, product no. #000032, made by Stange Japan KK).

[0028]

The pepper flavoring composition preferably contains either of an extract of pepper or of a processed-pepper product and an essential oil of pepper. The pepper flavoring composition may, e.g., contain a synthetic flavoring and/or a mixed flavoring, and may be configured from only a synthetic

[0029]

By having the garlic oil contain the pepper flavoring composition, it is possible to enhance the garlic flavor of the garlic oil. Using an extract of pepper or of a processed-pepper product, or an essential oil of pepper, as the pepper flavoring composition makes it possible to further increase an effect for strengthening the garlic flavor. Using either of a synthetic flavoring and a mixed flavoring as the pepper flavoring composition makes it possible to reduce the cost of manufacturing the garlic oil while increasing the effect for strengthening the garlic flavor.

[0030]

There is no particular limitation as to the type of pepper to employ as a raw material. Any of black pepper, white pepper, green pepper, and pink pepper may be used, although it is preferable to use black pepper. Processed-pepper products include, e.g., products obtained by grinding and then granulating or pulverizing pepper.

[0031]

The extract of pepper or of a pepper-processed product is obtained by, e.g., heating pepper in an edible oil (described later). The essential oil of pepper is obtained through, e.g., steam distillation from pepper. A commercially available pepper flavoring can be used as the pepper flavoring composition. Examples of the commercially available pepper flavoring include "Black Pepper Flavor" (product name, product nos. K-73666, MQ-9022, and M-33563, all made by Takasago International Corp.), "Fresh-ground Black Pepper Flavor" (product name, product no. SC712862, made by IFF Nippon KK), and "Poivre Noir Madagascar He" (product name, made by Chuo Koryo, Inc.).

[0032]

The pepper flavoring composition is preferably contained in the garlic oil in an amount of 0.001% or more and 0.05% or less by component proportion, more preferably in an amount of 0.002% or more and 0.04% or less, and even more preferably in an amount of 0.002% or more and 0.03% or less.

[0033]

For example, the pepper flavoring composition is preferably contained in the garlic oil in an amount of 0.001 mass% or more and 0.05 mass% or less, more preferably in an amount of 0.002 mass% or more and 0.04 mass% or less, and even more preferably in an amount of 0.002 mass% or more and 0.03 mass% or less.

[0034]

The pepper flavoring composition preferably includes caryophyllene, limonene, and β -pinene.

[0035]

5 The caryophyllene is to be included in the garlic oil in an amount of 0.000005% or more and 0.015% or less by component proportion, preferably in an amount of 0.00001% or more and 0.012% or less.

[0036]

10 The limonene is to be included in the garlic oil in an amount of 0.000005% or more and 0.015% or less by component proportion, preferably in an amount of 0.00002% or more and 0.013% or less.

[0037]

15 The β -pinene is to be included in the garlic oil in an amount of 0.000005% or more and 0.015% or less by component proportion, preferably in an amount of 0.00002% or more and 0.012% or less.

[0038]

20 The flavoring compositions are preferably added to the garlic oil such that the caryophyllene, limonene, and β -pinene content of the garlic oil is 0.000015% or more and 0.045% or less by component proportion, preferably 0.00003% or more and 0.03% or less.

[0039]

25 The garlic oil contains a base oil. Examples of the base oil include soybean oil, rapeseed oil, corn oil, sunflower

oil, safflower oil, rice bran oil, cottonseed oil, perilla oil, linseed oil, grape seed oil, peanut oil, olive oil, sesame oil, palm oil, and medium-chain fatty acid triglycerides. The garlic oil may contain any base oil,

5 although soybean oil is particularly preferred due to making it possible to further enhance the garlic flavor of the garlic oil.

[0040]

The garlic oil of the present invention is produced by
10 blending, e.g., the garlic flavor oil, the pepper flavoring composition, and the base oil. The pepper flavoring composition content is to be adjusted, as appropriate, in accordance with the concentration of the garlic flavor oil contained in the garlic oil.

15 [0041]

The diallyl disulfide content of the garlic oil is preferably 0.3% or more and 15.0% or less by component proportion in the garlic oil, more preferably 0.4% or more and 12.0% or less, and even more preferably in an amount of 0.6%
20 or more and 10.0% or less.

[0042]

The caryophyllene content of the garlic oil in the present invention is preferably 0.10 or more, more preferably 0.17 or more, even more preferably 0.20 or more, and yet even
25 more preferably 0.30 or more per unit of diallyl disulfide.

[0043]

Moreover, the caryophyllene content of the garlic oil in the present invention is preferably 2 or less, 1.5 or less, 1.3 or less, 0.7 or less, 0.6 or less, 0.4 or less, 0.35 or less, 0.34 or less, 0.20 or less, or 0.17 or less, in increasing order of preference, per unit of diallyl disulfide. [0044]

The limonene content of the garlic oil in the present invention is preferably 1.0 or more, more preferably 1.2 or more, even more preferably 2.0 or more, and yet even more preferably 2.5 or more per unit of diallyl disulfide. Moreover, the limonene content of the garlic oil in the present invention is preferably 15.0 or less, 13.0 or less, 10.0 or less, 5.0 or less, 4.0 or less, 3.0 or less, 2.5 or less, 2.0 or less, or 1.3 or less, in increasing order of preference, per unit of diallyl disulfide. [0045]

The β -pinene content of the garlic oil in the present invention is preferably 3.0 or more, 3.5 or more, 4.0 or more, 4.4 or more, 8.0 or more, or 8.8 or more, in increasing order of preference, per unit of diallyl disulfide. Moreover, the β -pinene content of the garlic oil in the present invention is preferably 53 or less, 40 or less, 35 or less, 17 or less, 15 or less, 9 or less, 8 or less, 7 or less, 5 or less, or 4.5 or less, in increasing order of preference, per unit of diallyl disulfide. [0046]

The garlic oil described above can also be used as an agent for imparting garlic flavor to a food product, the agent containing the garlic oil as an active ingredient.

[0047]

5 The garlic oil can also be used in a food product for which it is desirable to add garlic flavor, irrespective of whether the food product is from Chinese cuisine, Japanese cuisine, Italian cuisine, French cuisine, or another cuisine variety.

10 [0048]

Specifically, in a method for imparting garlic flavor to a food product, by including a step for adding the garlic oil to a food product it makes possible to impart excellent garlic flavor to the food product and to extend the persistence of
15 the garlic flavor in the food product.

[0049]

Examples of such a food product include: Chinese-style fried rice, stir-fried vegetables, and other stir-fried foods; grilled meats and other grilled foods; ramen soup,
20 bouillabaisse, and other soups; pasta sauce, *mapo tofu* sauce, *goya chanpuru* sauce, seasoned meat gravy, and other sauces; carpaccio, marinated foods, and other salads; *gyoza*, meat bun filling, hamburgers, sausages, and other processed meat products; seasoned rice, pilaf, and other cooked rice dishes;
25 fish sausage, *kamaboko*, and other processed marine products; deep-fry powders, *chijimi* flour, powdered soups, and other

prepared powders; seasoning sauces, dressings, mayonnaise, ponzu sauce, Chinese cuisine base, pot broth, and other condiments; margarine, fat spread, and other margarines; and French fries, deep-fried meat and fish, fried squid rings, croquettes, and other deep-fried food products.

[0050]

Specifically, in the cooking, processing, manufacture, etc., of a variety of food products, the garlic oil is used as: loosening oil, rice-cooking oil, stir-frying oil, frying oil, or another cooking oil; boxed oil, pan grease, or another release oil; thickening oil, oil for injection, finishing oil, or another seasoning oil. Alternatively, after the cooking, processing, manufacture, etc., of a variety of food products, the garlic oil is admixed into the food products by addition, blending, coating, dissolution, dispersion, emulsification, etc. Through such use, it is possible to impart a flavor derived from the garlic oil to the food products, to enhance the garlic flavor of the food products, and to extend the persistence of the garlic flavor.

[0051]

Thus, the garlic oil and the agent for imparting garlic flavor can be particularly suitably applied to food products that present problems in terms of, *inter alia*, deterioration or loss of flavor upon distribution, microwave heating, etc., such as frozen processed food products, refrigerated processed food products, retort food products, bottled food products,

canned food products, dried food products, box-packed food products, and other distributed processed food products.

[0052]

As described above, the garlic oil of the present invention contains the garlic flavor oil and the pepper flavoring composition, thereby making it possible for the pepper flavoring composition to heighten the garlic flavor of the garlic flavor oil, and for the garlic flavor to be sustained for an extended period. Therefore, according to the garlic oil of the present invention, it is possible to provide a garlic oil that has excellent garlic flavor and high garlic-flavor persistence.

[Example]

[0053]

(Experimental example 1) (Garlic flavor experiment)

An effect for heightening the garlic flavor of a garlic oil by adding a pepper flavoring composition was confirmed.

(Production of oil and fat for evaluation)

Seven types of oil and fat for evaluation were produced using the blends shown in table 1. Within the blends shown in table 1, "Poivre Noir Madagascar He" (product name, made by Chuo Koryo, Inc.) was used as the pepper flavoring. "Black Pepper" (product name, made by SB Shokuhin KK) was used as the pepper. "Garlic Oil" (product name, made by T. Hasegawa Co., Ltd.), which is an extract created from an edible oil of garlic or of a processed-garlic product, was used as the

garlic flavor oil. "*Sarasara* Canola Oil" (product name, made by J-Oil Mills, Inc.) was used as the rapeseed oil. "*Koku to Umami* Soybean Oil" (product name, made by J-Oil Mills, Inc.) was used as the soybean oil. "Corn Oil" (product name, made by
5 J-Oil Mills, Inc.) was used as the corn oil.

[0054]

[Table 1]

Blend	Designation						
	Rapeseed (-)	Rapeseed (+)	Rapeseed (pepper)	Soybean (-)	Soybean (+)	Corn (-)	Corn (+)
Pepper flavoring		0.005%			0.005%		0.005%
Pepper			0.25%				
Garlic oil	12.5%	12.5%	12.5%	12.5%	12.5%	12.5%	12.5%
Base oil	Rapeseed oil	87.495%	87.25%				
	Soybean oil			87.5%	87.495%		
	Corn oil					87.5%	87.495%

The numeric values in the table are in units of mass%.

[0055]

(Method of experimentation)

An amount of 5 g of one among the seven types of oil and fat for evaluation was added to 100 g of noodles used for peperoncino pasta to produce a sample. Specifically, seven types of peperoncino pasta to which mutually different oils and fats for evaluation were added were produced as samples.

[0056]

(Production of peperoncino pasta)

The peperoncino pasta was produced using the raw materials described below.

(Raw materials)

Pasta noodles (100 g): Spaghetti, 1.7 mm thick, nine-minute boiling time (made by Aeon Co., Ltd.); untangling oil (1 g): *J-noodle sabaki-yu* (product name, made by J-Oil Mills, Inc.); minced chili pepper (small amount); garlic oil (5 g); peperoncino sauce (15 g); sautéed sausage (8 g); sautéed bacon slices (8 g); dried parsley (0.05 g).

[0057]

The peperoncino sauce was produced by simmering corn starch (4 g), special chicken bouillon (36 g), salt (2.5 g), water (200 g), tomato paste (4 g), and powdered gelatin (2.4 g) in a pot and then cooling the resultant sauce.

[0058]

(Production procedure)

(Step 1) The untangling oil was added to the boiled pasta, and the pasta was vacuum-cooled.

(Step 2) The garlic oil and the minced chili pepper were added to and tossed with the vacuum-cooled pasta of step 1.

5 (Step 3) One third of the total amount of the pasta of step 2 was ladled into a container, and the peperoncino sauce was added by being poured over the center of the pasta, i.e., into the center of the container.

(Step 4) The remaining two-thirds of the total amount of
10 the pasta, was introduced into the container so as to cover the peperoncino sauce.

(Step 5) The pasta of step 4 was topped with the bacon, the sausage, and the dried parsley.

(Step 6) The pasta of step 5 was stored in a
15 refrigerator.

[0059]

(Method of evaluation)

The garlic flavor and pepper flavor of the seven types of peperoncino pasta was evaluated. The evaluation of flavor was
20 carried out on the first day when the peperoncino pasta was produced (number of days of preservation: 0), one day after production (number of days of preservation: 1), and two days after production (number of days of preservation: 2). The
evaluation of the garlic flavor of the peperoncino pasta is
25 shown in table 3, and the evaluation of the pepper flavor thereof is shown in table 4.

[0060]

In addition, the evaluation of the garlic flavor in a case where rapeseed oil was used as the edible oil and fat for the garlic oil is shown in fig. 1, the evaluation in a case where soybean oil was used is shown in fig. 2, and the evaluation in a case where corn oil was used is shown in fig. 3. In the drawings, "(-)" indicates that neither the pepper flavoring nor the pepper was added, "(+)" indicates that the pepper flavoring was added, and "(pepper)" indicates that the pepper was added.

[0061]

Moreover, the evaluation of the pepper flavor in a case where rapeseed oil was used as the edible oil and fat for the garlic oil is shown in fig. 4, the evaluation in a case where soybean oil was used is shown in fig. 5, and the evaluation in a case where corn oil was used is shown in fig. 6. In the drawings, "(-)" indicates that neither the pepper flavoring nor the pepper was added, "(+)" indicates that the pepper flavoring was added, and "(pepper)" indicates that the pepper was added.

[0062]

The flavor was evaluated after the peperoncino pasta was warmed for 40 seconds using a microwave oven set to 800 W. The experiment article was refrigerated and stored until the experiment was implemented (or for one hour in the case of experiment articles that were preserved for "0" days).

[0063]

In the evaluation, three panel experts evaluated the degree of the garlic flavor and the degree of the pepper flavor using a five-step scale, and the average of the points assigned by each of the panel experts was calculated. The evaluation was carried out according to the following tables.

[0064]

[Table 2]

Points	Degree of flavor
0	None
1	Minimal
2	Somewhat evident
3	Evident
4	Rather strong
5	Very strong

[0065]

[Table 3]

Degree of garlic flavor			
Number of days of preservation	0	1	2
Rapeseed (-)	3.0	2.0	0.0
Rapeseed (+)	4.0	3.2	1.2
Rapeseed (pepper)	3.0	1.8	0.5
Soybean (-)	3.0	2.2	0.0
Soybean (+)	4.0	3.5	2.0
Corn (-)	3.0	1.7	0.2
Corn (+)	4.0	2.8	1.7

[0066]

[Table 4]

Degree of pepper flavor			
Number of days of preservation	0	1	2
Rapeseed (-)	0.0	0.0	0.0
Rapeseed (+)	0.0	0.0	0.0
Rapeseed (pepper)	3.0	3.2	2.0
Soybean (-)	0.0	0.0	0.0
Soybean (+)	0.2	0.2	0.0
Corn (-)	0.0	0.0	0.0
Corn (+)	0.0	0.0	0.0

[0067]

5 (Evaluation of garlic flavor)

As shown in table 3 and fig. 1, a stronger garlic flavor was evident for all periods of preservation in the sample "rapeseed (+)," which contained the pepper flavoring composition in addition to the garlic flavor oil, than in
10 either of the sample "rapeseed (-)," which did not contain the pepper flavoring composition, or the sample "rapeseed (pepper)," which contained the pepper.

[0068]

As shown in table 3 and fig. 2, a stronger garlic flavor
15 was evident for all periods of preservation in the sample "soybean (+)," which contained the pepper flavoring composition in addition to the garlic flavor oil, than in the sample "soybean (-)," which did not contain the pepper flavoring composition.

20 [0069]

As shown in table 3 and fig. 3, a stronger garlic flavor was evident for all periods of preservation in the sample "corn (+)," which contained the pepper flavoring composition in addition to the garlic flavor oil, than in the sample "corn (-)," which did not contain the pepper flavoring composition.

[0070]

Thus, for cases when a garlic-oil oil and fat for evaluation was produced using any base oil from among rapeseed oil, soybean oil, and corn oil, a stronger garlic flavor was evident in the samples "rapeseed (+)," "soybean (+)," and "corn (+)" than in the samples "rapeseed (-)," "soybean (-)," and "corn (-)."

[0071]

It was understood that particularly for cases involving preservation for two days, the garlic flavor was evident in the samples "rapeseed (+)," "soybean (+)," and "corn (+)" even after cooking with heat because the samples were heated using a microwave oven. It was also understood that the samples "rapeseed (+)," "soybean (+)," and "corn (+)" had a high garlic flavor even after having been cooled because the experiment articles were refrigerated and stored until the experiment was implemented.

[0072]

As the number of days of preservation increased, a stronger garlic flavor was evident in the sample "soybean (+)" than in the samples "rapeseed (+)" and "corn (+)."

[0073]

(Evaluation of pepper flavor)

As shown in table 4 and fig. 4, no pepper flavor was evident at all for any period of preservation in the samples "rapeseed (+)" and "rapeseed (-)." However, a strong pepper flavor was evident for all periods of preservation in the sample "rapeseed (pepper)."

[0074]

As shown in table 4 and fig. 5, pepper flavor was vaguely evident in the sample "soybean (+)" for 0 and 1 day of preservation, but no pepper flavor was evident at all therein for 2 days of preservation. Moreover, no pepper flavor was evident at all for any period of preservation in the sample "soybean (-)."

[0075]

As shown in table 4 and fig. 6, no pepper flavor was evident at all for any period of preservation in the samples "corn (+)" and "corn (-)."

[0076]

(Component evaluation)

The caryophyllene, limonene, β -pinene, and diallyl disulfide contained in the samples "rapeseed (+)," "rapeseed (pepper)," "soybean (+)," and "corn (+)" shown in table 1 were measured using gas chromatography/mass spectrometry (GC/MS).

The conditions for measurement by gas chromatography/mass

spectrometry (GC/MS) are indicated below. The results of measurement are shown in table 5.

[0077]

(Conditions for gas chromatography/mass spectrometry

5 (GC/MS))

Device: Agilent 6890GC

Column: DB-WAX UI, 60 m (length)×0.25 mm (inside
diameter)×0.25 µm (film thickness)

Oven temperature: 40°C (10 min), raised by 2°C/min until
10 reaching 100°C (0 min), then raised by 5°C/min until reaching
210°C (10 min); total runtime: 72 min

Column flow rate: 2.2 mL/min (constant flow)

[0078]

(MS)

15 Device: Agilent 5975B MSD

Ion source type: EI

Ion source temperature: 250°C

Quadrupole temperature: 150°C

Scan range: m/z 29-400

20 MS/ODP: 1/2

[0079]

(Thermal desorption)

Device: GERSTEL MPS2, TDU, CIS4

TDU heating desorption: 40°C (1 min), raised by 720°C/min
25 until reaching 240°C (3 min)

TDU heating desorption flow rate: 50 mL/min

Mode: Splitless

CIS4 temperature: 10°C (0.5 min), raised by 12°C/s until reaching 240°C (2 min)

CISLiner: Tenax TA

5 [0080]

[Table 5]

Designation	Proportion (%)			
	Caryophyllene	Limonene	β-pinene	Diallyl disulfide
Rapeseed (+)	0.666	4.849	17.144	1.929
Rapeseed (pepper)	1.759	7.670	10.267	0.603
Soybean (+)	0.482	9.791	16.480	1.203
Corn (+)	0.621	9.350	15.310	0.839

The numeric values in the table indicate the relative proportions (%) for the amounts of each component contained in the garlic oil.

10

[0081]

The proportions of the caryophyllene, limonene, and β-pinene per unit of diallyl disulfide were calculated on the basis of the numeric values in table 5. The results are shown in table 6.

15

[0082]

[Table 6]

Designation	Proportion		
	Caryophyllene	Limonene	β-pinene
Rapeseed (+)	0.345	2.514	8.888
Rapeseed (pepper)	2.917	12.720	17.027
Soybean (+)	0.401	8.139	13.699
Corn (+)	0.740	11.144	18.248

[0083]

As shown in table 6, the samples "rapeseed (+)," "soybean (+)," and "corn (+)" contained caryophyllene in a proportion of 0.345 or greater and 0.740 or less per unit of diallyl disulfide. On the contrary, the sample "rapeseed (pepper)" contained caryophyllene in a proportion of 2.917 per unit of diallyl disulfide.

[0084]

The samples "rapeseed (+)," "soybean (+)," and "corn (+)" contained limonene in a proportion of 2.514 or greater and 11.144 or less per unit of diallyl disulfide. On the contrary, the sample "rapeseed (pepper)" contained limonene in a proportion of 12.720 per unit of diallyl disulfide.

[0085]

The samples "rapeseed (+)," "soybean (+)," and "corn (+)" contained β -pinene in a proportion of 8.888 or greater and 18.248 or less per unit of diallyl disulfide. On the contrary, the sample "rapeseed (pepper)" contained β -pinene in a proportion of 17.027 per unit of diallyl disulfide.

[0086]

(Experimental example 2) (Added amount experiment 1)

The blending ratio of the pepper flavoring composition and the garlic flavor oil was changed, and the optimal range for the added amount of the pepper flavoring composition was confirmed.

[0087]

(Production of oil and fat for evaluation)

Six types of oil and fat for evaluation were produced by setting the concentration of the garlic flavor oil to 12.5 mass%, and changing the component proportion for the pepper flavoring in the states shown in table 8, in the garlic oil containing the garlic flavor oil, the pepper flavoring, and the rapeseed oil. Within the blends, the same substances as in experimental example 1 were used as the garlic flavor oil, the pepper flavoring, and the rapeseed oil.

[0088]

(Method of experimentation)

The oils and fats for evaluation were prepared in 50-g vials, and three panel experts evaluated the aroma of the oils and fats for evaluation accommodated in the vials by sniffing the oils and fats for evaluation. The average of the points assigned by each of the panel experts was calculated. The evaluation was carried out according to the following tables.

[0089]

[Table 7]

Points	Degree of aroma
0	None
1	Minimal
2	Somewhat evident
3	Evident
4	Rather strong
5	Very strong

[0090]

Table 8 and fig. 7 show the evaluations for the degree of the garlic aroma and the degree of the pepper aroma in a case where the concentration of the garlic flavor oil was set to 12.5 mass%. Table 9 shows the expected component proportions for the caryophyllene, limonene, and β -pinene per unit of diallyl disulfide contained in the garlic oils shown in table 8. The expected component proportions were calculated on the basis of the numeric values listed in table 5.

[0091]

10 [Table 8]

Amount of pepper flavoring added (mass%)	Degree of aroma	
	Garlic	Pepper
0	3.0	0.0
0.002	3.2	0.0
0.005	4.0	0.0
0.01	4.0	1.2
0.02	3.7	2.2
0.03	2.7	3.0

[0092]

[Table 9]

Amount of pepper flavoring added (mass%)	Expected component proportion		
	Caryophyllene	Limonene	β -pinene
0	0.000	0.000	0.000
0.002	0.138	1.005	3.555
0.005	0.345	2.514	8.888
0.01	0.691	5.027	17.775
0.02	1.381	10.055	35.550
0.03	2.072	15.082	53.325

15 [0093]

(Evaluation of aroma)

As shown in table 8 and fig. 7, the degree of the garlic
aroma increased in association with increases in the
concentration of the pepper flavoring composition until the
5 added concentration of the pepper flavoring composition
reached 0.01 mass%. In addition, the pepper aroma was
practically imperceptible until the added concentration of the
pepper flavoring composition reached 0.01 mass%. When the
added concentration of the pepper flavoring composition
10 exceeded 0.01 mass%, the degree of the garlic aroma decreased
and the degree of the pepper aroma increased in association
with the increase in the concentration of the pepper flavoring
composition.

[0094]

15 (Experimental example 3) (Added amount experiment 2)

The blending ratio of the pepper flavoring composition
and the garlic flavor oil was changed, and the optimal range
for the added amount of the pepper flavoring composition was
confirmed.

20 [0095]

(Production of oil and fat for evaluation)

Six types of oil and fat for evaluation were produced by
setting the concentration of the garlic flavor oil to 50
mass%, and changing the component proportion for the pepper
25 flavoring in the states shown in table 10, in the garlic oil
containing the garlic flavor oil, the pepper flavoring, and

the rapeseed oil. Within the blends therefor, the same substances as in experimental example 1 were used as the garlic flavor oil, the pepper flavoring, and the rapeseed oil.

[0096]

5 (Method of experimentation)

The methods of experimentation and evaluation were the same as in experimental example 2, and therefore are not described here. Table 10 and fig. 8 show the results of experimentation. Table 11 shows the expected component

10 proportions for the caryophyllene, limonene, and β -pinene per unit of diallyl disulfide contained in the garlic oils shown in table 10.

[0097]

[Table 10]

Amount of pepper flavoring added (mass%)	Degree of aroma	
	Garlic	Pepper
0	3.0	0.0
0.005	2.7	0.0
0.01	3.7	0.0
0.02	3.8	0.7
0.03	3.8	0.8
0.04	3.5	2.0

15

[0098]

[Table 11]

Amount of pepper flavoring added (mass%)	Expected component proportion		
	Caryophyllene	Limonene	β - pinene
0	0.000	0.000	0.000
0.005	0.086	0.628	2.222
0.01	0.173	1.257	4.444
0.02	0.345	2.514	8.888
0.03	0.518	3.771	13.331
0.04	0.691	5.027	17.775

[0099]

5 (Evaluation of aroma)

As shown in table 10 and fig. 8, the degree of the garlic
aroma increased in association with increases in the
concentration of the pepper flavoring composition until the
added concentration of the pepper flavoring composition
10 reached 0.03 mass%. In addition, the pepper aroma was
practically imperceptible until the added concentration of the
pepper flavoring composition reached 0.03 mass%. When the
added concentration of the pepper flavoring composition
exceeded 0.03 mass%, the degree of the garlic aroma decreased
15 and the degree of the pepper aroma increased in association
with the increase in the concentration of the pepper flavoring
composition.

CLAIMS

1. A garlic oil characterized by containing a garlic flavor oil and a pepper flavoring composition.

2. The garlic oil according to claim 1, wherein the
5 garlic flavor oil contains an extract created from an edible oil of garlic or of a processed-garlic product.

3. The garlic oil according to claim 1 or 2, containing soybean oil.

4. The garlic oil according to any one of claims 1 to 3,
10 wherein the pepper flavoring composition contains either of an extract of pepper or of a processed-pepper product and an essential oil of pepper.

5. An agent for imparting garlic flavor to a food product, the agent containing the garlic oil according to any
15 one of claims 1 to 4 as an active ingredient.

6. A method for imparting garlic flavor to a food product, the method including a step for adding the garlic oil according to any one of claims 1 to 4 to the food product.