

Description

Title of Invention: FOOD IN SEALED CONTAINER, METHOD OF PRODUCING FOOD IN SEALED CONTAINER, USE OF FAT-SOLUBLE VITAMIN IN PRODUCTION OF FOOD IN SEALED CONTAINER, AND ORAL COMPOSITION

Technical Field

[0001] The present invention relates to a food in a sealed container containing a chicken extract-containing oral composition. The present invention also relates to a method of producing a food in a sealed container containing a chicken extract-containing oral composition. The present invention still also relates to use of a fat-soluble vitamin in production of a food in a sealed container containing a chicken extract-containing oral composition. The present invention still also relates to a chicken extract-containing oral composition.

Background Art

[0002] Chicken extract is considered to be the main nourishment in chicken meat. For example, in Southeast Asia, chicken extract is used as a "traditional medicine" that is beyond categories of food and food ingredients.

Consumer's preference for chicken extract has been increasing, and there is a demand for the development of chicken extract which provides a stronger chicken extract flavor such as umami. Chicken extract is a component extracted by hot water extraction from chicken meat, chicken bone, chicken leg, and/or chicken skin. The chicken extract generates an odor (for example, fishy smell), for example, after a long duration of high temperature and high pressure heating under retort or sterilization condition, and there is a demand for a technique that reduces the odor arising from the chicken extract.

[0003] Non-Patent Literature 1 discloses that the flavor of chicken meat is thermally induced, and that the Maillard reaction, pyrolysis of lipids, and interactions of these reactions are involved in generation of an odor component from heated chicken meat. According to the disclosure, deterioration of the flavor of chicken meat products and formation of undesirable "warmed over flavor" are mainly due to lack of α -tocopherol in the chicken meat. Non-Patent Literature 1 describes the flavor that is produced when chicken meat is reheated after cooked and refrigerated, but nowhere describes or suggests anything about a flavor that is produced when a component extracted from chicken meat and/or chicken bone by extraction is further heated.

Citation List

Non Patent Literature

- [0004] NPL 1: Dinesh D. Jayasena et al. "Flavour Chemistry of Chicken Meat: A Review"
Asian Australas. J. Anim. Sci. Vol. 26, No. 5: 732-742, May 2013

Summary of Invention

Technical Problem

- [0005] Products containing chicken extract obtained by extraction from chicken meat and/or chicken bone are generally produced by heat treating chicken extract. Thus, there is a demand for a technique to reduce an unpleasant odor (for example, fishy smell) that is generated when chicken extract is heated. In addition, there is a demand for a technique to reduce odor that is generated from products containing-chicken extract when it is stored at environment at 20 degrees Celsius or higher.
- [0006] The present invention aims to provide a food in a sealed container containing a chicken extract-containing oral composition, and a method of producing the food in a sealed container, wherein an unpleasant odor (for example, fishy smell) from chicken extract obtainable by extraction from chicken meat and/or chicken bone is reduced or prevented. The present invention also aims to provide use of a component in production of a food in a sealed container containing a chicken extract-containing oral composition, wherein the component can reduce or prevent odor caused by heating chicken extract. The present invention still also aims to provide an oral composition, wherein while the oral composition contains chicken extract, the amount of an odor component from the chicken extract is reduced.

Solution to Problem

- [0007] As a result of various studies on unpleasant odors (for example, fishy smell) caused by heating chicken extract, the present inventors found that adding a fat-soluble vitamin to the chicken extract can reduce or prevent the unpleasant odor caused by heating the chicken extract. Thus, the present invention was achieved.
- [0008] Specifically, the present invention is defined as follows.
- (1) A food in a sealed container including: a chicken extract-containing oral composition in a container, wherein the oral composition contains chicken extract and a fat-soluble vitamin, a head space of the container contains an odor component at a concentration of 100 ppm or less, and the concentration of the odor component is a total concentration of trimethylamine, butanedione, 3-methylbutanoic acid, and 2-methyl-3-furanthiol.
- (2) The food in a sealed container according to (1) above, wherein the fat-soluble vitamin is at least one selected from the group consisting of vitamin A, vitamin D, vitamin E, vitamin K, an analog of vitamin A, an analog of vitamin D, an analog of vitamin E, and an analog of vitamin K.

- (3) The food in a sealed container according to (2) above, wherein at least one of (A) or (B) described below is satisfied:
- (A) the fat-soluble vitamin includes at least one of vitamin A or its analog, and a total concentration of vitamin A and its analog in the oral composition is 10 mg/L or more;
- (B) the fat-soluble vitamin includes at least one selected from the group consisting of vitamin D, vitamin E, vitamin K, an analog of vitamin D, an analog of vitamin E, and an analog of vitamin K, and a total concentration of vitamin D, vitamin E, vitamin K, an analog of vitamin D, an analog of vitamin E, and an analog of vitamin K in the oral composition is 0.1 mg/L or more.
- (4) The food in a sealed container according to (2) or (3) above, wherein the vitamin A or its analog is at least one selected from the group consisting of α -carotene, β -carotene, β -cryptoxanthin, and retinol.
- (5) The food in a sealed container according to any one of (2) to (4) above, wherein the vitamin D or its analog is at least one of ergocalciferol or cholecalciferol.
- (6) The food in a sealed container according to any one of (2) to (5) above, wherein the vitamin E or its analog is tocopherol.
- (7) The food in a sealed container according to any one of (2) to (6) above, wherein the vitamin K or its analog is at least one of phylloquinone or menaquinone.
- (8) A method of producing a food in a sealed container containing a chicken extract-containing oral composition, including: heating a container containing a raw material composition containing chicken extract and a fat-soluble vitamin, wherein odor caused by heating the chicken extract in the heating is reduced or prevented due to the presence of the fat-soluble vitamin in the raw material composition.
- (9) The production method according to (8) above, wherein the odor caused by heating the chicken extract is derived from at least one odor component selected from the group consisting of trimethylamine, butanedione, 3-methylbutanoic acid, and 2-methyl-3-furanthiol.
- (10) The production method according to (8) or (9) above, wherein the fat-soluble vitamin is at least one selected from the group consisting of vitamin A, vitamin D, vitamin E, vitamin K, an analog of vitamin A, an analog of vitamin D, an analog of vitamin E, and an analog of vitamin K.
- (11) The production method according to (10) above, wherein at least one of (A) or (B) described below is satisfied:
- (A) the fat-soluble vitamin includes at least one of vitamin A or its analog, and a total concentration of vitamin A and its analog in the raw material composition is 10 mg/L or more;
- (B) the fat-soluble vitamin includes at least one selected from the group consisting of vitamin D, vitamin E, vitamin K, an analog of vitamin D, an analog of vitamin E, and

an analog of vitamin K, and a total concentration of vitamin D, vitamin E, vitamin K, an analog of vitamin D, an analog of vitamin E, and an analog of vitamin K in the raw material composition is 0.1 mg/L or more.

(12) The production method according to (10) or (11) above, wherein the vitamin A or its analog is at least one selected from the group consisting of α -carotene, β -carotene, β -cryptoxanthin, and retinol.

(13) The production method according to any one of (10) to (12) above, wherein the vitamin D or its analog is at least one of ergocalciferol or cholecalciferol.

(14) The production method according to any one of (10) to (13) above, wherein the vitamin E or its analog is tocopherol.

(15) The production method according to any one of (10) to (14) above, wherein the vitamin K or its analog is at least one of phyloquinone or menaquinone.

(16) Use of a fat-soluble vitamin in production of a food in a sealed container containing a chicken extract-containing oral composition, wherein the use is for reducing or preventing odor caused by heating chicken extract.

(17) The use according to (16) above, wherein the odor caused by heating the chicken extract is derived from at least one odor component selected from the group consisting of trimethylamine, butanedione, 3-methylbutanoic acid, and 2-methyl-3-furanthiol.

(18) The use according to (16) or (17) above, wherein the fat-soluble vitamin is at least one selected from the group consisting of vitamin A, vitamin D, vitamin E, vitamin K, an analog of vitamin A, an analog of vitamin D, an analog of vitamin E, and an analog of vitamin K.

(19) The use according to (18) above, wherein at least one of (A) or (B) described below is satisfied:

(A) the fat-soluble vitamin includes at least one of vitamin A or its analog, and the at least one of vitamin A or its analog is used such that a total concentration of vitamin A and its analog in the oral composition is 10 mg/L or more;

(B) the fat-soluble vitamin includes at least one selected from the group consisting of vitamin D, vitamin E, vitamin K, an analog of vitamin D, an analog of vitamin E, and an analog of vitamin K, and the at least one selected from the group consisting of vitamin D, vitamin E, vitamin K, an analog of vitamin D, an analog of vitamin E, and an analog of vitamin K is used such that a total concentration of vitamin D, vitamin E, vitamin K, an analog of vitamin D, an analog of vitamin E, and an analog of vitamin K in the oral composition is 0.1 mg/L or more.

(20) The use according to (18) or (19) above, wherein the vitamin A or its analog is at least one selected from the group consisting of α -carotene, β -carotene, β -cryptoxanthin, and retinol.

(21) The use according to any one of (18) to (20) above, wherein the vitamin D or its

analog is at least one of ergocalciferol or cholecalciferol.

(22) The use according to any one of (18) to (21) above, wherein the vitamin E or its analog is tocopherol.

(23) The use according to any one of (18) to (22) above, wherein the vitamin K or its analog is at least one of phyloquinone or menaquinone.

(24) A chicken extract-containing oral composition including: chicken extract; and a fat-soluble vitamin, wherein the chicken extract contains histidine, carnosine, and anserine, the oral composition contains 0.00001 to 10 wt% histidine, 0.00001 to 3 wt% carnosine, 0.00005 to 5 wt% anserine, the fat-soluble vitamin is at least one selected from the group consisting of vitamin A, vitamin D, vitamin E, vitamin K, an analog of vitamin A, an analog of vitamin D, an analog of vitamin E and an analog of vitamin K, and at least one of (A) or (B) described below is satisfied:

(A) the fat-soluble vitamin includes at least one of vitamin A or its analog, and a total concentration of vitamin A and its analog in the oral composition is 10 mg/L or more;

(B) the fat-soluble vitamin includes at least one selected from the group consisting of vitamin D, vitamin E, vitamin K, an analog of vitamin D, an analog of vitamin E, and an analog of vitamin K, and a total concentration of vitamin D, vitamin E, vitamin K, an analog of vitamin D, an analog of vitamin E, and an analog of vitamin K in the oral composition is 0.1 mg/L or more.

(25) The oral composition according to (24) above, wherein the vitamin A or its analog is at least one selected from the group consisting of α -carotene, β -carotene, β -cryptoxanthin, and retinol.

(26) The oral composition according to (24) or (25) above, wherein the vitamin D or its analog is at least one of ergocalciferol or cholecalciferol.

(27) The oral composition according to any one of (24) to (26) above, wherein the vitamin E or its analog is tocopherol.

(28) The oral composition according to any one of (24) to (27) above, wherein the vitamin K or its analog is at least one of phyloquinone or menaquinone.

(29) A chicken extract-containing oral composition including: chicken extract; and a fat-soluble vitamin, wherein the chicken extract contains cyclo-phenylalanyl-phenylalanine, the fat-soluble vitamin is at least one selected from the group consisting of vitamin A, vitamin D, vitamin E, vitamin K, an analog of vitamin A, an analog of vitamin D, an analog of vitamin E and an analog of vitamin K, and at least one of (A) or (B) described below is satisfied:

(A) the fat-soluble vitamin includes at least one of vitamin A or its analog, and a total concentration of vitamin A and its analog in the oral composition is 10 mg/L or more;

(B) the fat-soluble vitamin includes at least one selected from the group consisting of vitamin D, vitamin E, vitamin K, an analog of vitamin D, an analog of vitamin E, and

an analog of vitamin K, and a total concentration of vitamin D, vitamin E, vitamin K, an analog of vitamin D, an analog of vitamin E, and an analog of vitamin K in the oral composition is 0.1 mg/L or more.

(30) The oral composition according to (29) above, wherein the vitamin A or its analog is at least one selected from the group consisting of α -carotene, β -carotene, β -cryptoxanthin, and retinol.

(31) The oral composition according to (29) or (30) above, wherein the vitamin D or its analog is at least one of ergocalciferol or cholecalciferol.

(32) The oral composition according to any one of (29) to (31) above, wherein the vitamin E or its analog is tocopherol.

(33) The oral composition according to any one of (29) to (32) above, wherein the vitamin K or its analog is at least one of phylloquinone or menaquinone.

Advantageous Effects of Invention

[0009] The present invention can provide a food in a sealed container containing a chicken extract-containing oral composition, and a method of producing the food in a sealed container, wherein an unpleasant odor (for example, fishy smell) from chicken extract obtainable by extraction from chicken meat and/or chicken bone is reduced or prevented. The present invention can also provide use of a component in production of a food in a sealed container containing a chicken extract-containing oral composition, wherein the component can reduce or prevent odor caused by heating chicken extract. The present invention can still also provide an oral composition, wherein while the oral composition contains chicken extract, the amount of an odor component from the chicken extract is reduced.

Brief Description of Drawings

[0010] [Fig.1]FIG. 1 is a graph for visual comparison between smell evaluation for a liquid oral composition according to Example 1 and smell evaluation for a liquid oral composition according to Comparative Example 1.

[Fig.2]FIG. 2 is a graph for visual comparison between smell evaluation for a liquid oral composition according to Example 2 and smell evaluation for a liquid oral composition according to Comparative Example 1.

[Fig.3]FIG. 3 is a graph for visual comparison between smell evaluation for a liquid oral composition according to Example 3 and smell evaluation for a liquid oral composition according to Comparative Example 1.

[Fig.4]FIG. 4 is a graph showing the ratio of the amount of trimethylamine generated from the chicken extract containing the fat-soluble vitamin according to Examples 4 to 21 to the amount of trimethylamine generated from the chicken extract according to Comparative Example 2 which is taken as 100%.

[Fig.5]FIG. 5 is a graph showing the ratio of the amount of butanedione generated from the chicken extract containing the fat-soluble vitamin according to Examples 4 to 21 to the amount of butanedione generated from the chicken extract according to Comparative Example 2 which is taken as 100%.

[Fig.6]FIG. 6 is a graph showing the ratio of the amount of 3-methylbutanoic acid generated from the chicken extract containing the fat-soluble vitamin according to Examples 4 to 18 to the amount of 3-methylbutanoic acid generated from the chicken extract according to Comparative Example 2 which is taken as 100%.

[Fig.7]FIG. 7 is a graph showing the ratio of the amount of 2-methyl-3-furanthiol generated from the chicken extract containing the fat-soluble vitamin according to Examples 4 to 21 to the amount of 2-methyl-3-furanthiol generated from the chicken extract according to Comparative Example 2 which is taken as 100%.

Description of Embodiments

- [0011] The present invention provides a food in a sealed container containing a chicken extract-containing oral composition, wherein the oral composition contains chicken extract and a fat-soluble vitamin, and an unpleasant odor from the chicken extract is reduced or prevented due to the presence of the fat-soluble vitamin in the oral composition. The present invention also provides a method of producing a food in a sealed container containing a chicken extract-containing oral composition, including heating a container containing a raw material composition containing chicken extract and a fat-soluble vitamin, wherein odor caused by heating the chicken extract in the heating is reduced or prevented due to the presence of the fat-soluble vitamin in the raw material composition.
- [0012] The present invention also provides use of a fat-soluble vitamin to reduce or prevent odor caused by heating chicken extract in production of a food in a sealed container containing a chicken extract-containing oral composition.
- [0013] The present invention also provides an oral composition containing chicken extract and a fat-soluble vitamin.
- [0014] Herein, the food in a sealed container, the production method, the use, and the oral composition of the present invention are sometimes simply described as "the present invention". In such a case, a description is given which applies to the food in a sealed container, the production method, the use, and the oral composition of the present invention.
- [0015] According to an embodiment, the present invention provides a food in a sealed container containing a chicken extract-containing oral composition, wherein the oral composition contains chicken extract and a fat-soluble vitamin, a head space of the container contains an odor component at a concentration of 100 ppm or less, and the

concentration of the odor component is a total concentration of trimethylamine, butanedione, 3-methylbutanoic acid, and 2-methyl-3-furanthiol. An unpleasant odor from the chicken extract is reduced or prevented due to the presence of the fat-soluble vitamin in the oral composition.

[0016] <Chicken extract>

The chicken extract (hereinafter sometimes referred to as "CE") for use in the present invention may be, for example, an extract that can be obtained by heating chicken meat used as a raw material in a liquid. The chicken extract may be a commercial product. The raw material may contain bone, cartilage, legs, or the like, but preferably, the raw material does not contain the head or internal organs of the chicken. The chicken extract in the present invention is preferably an extract of chicken meat and/or chicken bone, more preferably an extract of chicken meat and chicken bone, or an extract of chicken meat.

[0017] When producing the chicken extract for use in the present invention by extraction, the chicken extract can be produced by a method that is usually used in this field. For example, the chicken extract can be produced by performing normal pressure extraction and/or pressurized extraction using a liquid at a temperature of 100°C or higher, preferably 125°C or higher, and membrane-treating or filtering the resulting extract. Specifically, the extract is obtained by a pre-treatment step (1) in which chicken meat and optionally chicken bone and the like are heated in a solvent to remove water-soluble protein contained in the chicken meat, and an extraction step (2) in which a water-soluble protein-containing solvent is replaced with a fresh solvent after the pre-treatment and heating the chicken meat in the solvent. The liquid as solvent is preferably water, ethanol, or a mixture of these, for example.

The chicken extract encompasses a liquid extract obtained by the method described above; a diluted solution, concentrate, or dry powder of the liquid extract; and purified products of these. The purified products may be obtained by, for example, subjecting a chicken extract liquid to fractionation by ultrafiltration, membrane treatment, liquid separation operation, or fraction treatment with resin or the like so as to increase the purity. After increasing the purity of the chicken extract, the purified product may be formed into powder by freeze-drying or spray-drying, for example.

[0018] Preferably, the chicken extract for use in the present invention contains at least one of histidine, carnosine, anserine, or a salt thereof. Carnosine is β -alaninyl $\cdot$ histidine, which is a dipeptide of β -alanine and histidine. Anserine is β -alaninyl $\cdot$ 1-methylhistidine in which histidine is methylated.

Histidine, carnosine, and anserine can be contained in the form of a salt with an inorganic acid or an organic acid or a salt with an inorganic base or an organic base in the chicken extract for use in the present invention. Such an acid or a base can be

selected based on the application of the salt. In view of application to food, beverages, and medicines, the following dietary or pharmaceutically acceptable salts are preferred. Examples of the inorganic acid salt include hydrochloride, nitrate, sulfate, methane-sulfonate, and p-toluenesulfonate. Examples of the organic acid salt include salts with dicarboxylic acids such as oxalic acid, malonic acid, succinic acid, maleic acid, and fumaric acid, and salts with monocarboxylic acids such as acetic acid, propionic acid, and butyric acid. Examples of the inorganic base include hydroxides, carbonates, and bicarbonates of sodium, lithium, calcium, magnesium, and aluminum and ammonia. Examples of the salt with the organic base include mono-, di-, or tri-alkylamine salts such as salts of methylamine, dimethylamine, and triethylamine, mono-, di-, or tri-hydroxyalkylamine salts, guanidine salt, and N-methylglucosamine salt.

[0019] When the chicken extract for use in the present invention contains histidine, for example, the amount of histidine in the chicken extract is preferably 0.01 wt% or more, more preferably 0.1 wt% or more, and is preferably 10 wt% or less, more preferably 1 wt% or less. In one embodiment, the amount of histidine in the chicken extract is preferably 0.01 to 10 wt%, more preferably 0.01 to 1 wt%, still more preferably 0.1 to 1 wt%. When histidine is in the form of a salt, the amount of histidine is expressed in terms of histidine. The amount of histidine represents the total amount of histidine and its salts.

In one embodiment, the amount of histidine in the solid content of the chicken extract is preferably 0.01 to 10 wt%, more preferably 0.01 to 5 wt%, still more preferably 0.1 to 3 wt%.

[0020] When the chicken extract for use in the present invention contains carnosine, for example, the amount of carnosine in the chicken extract is preferably 0.001 wt% or more, more preferably 0.01 wt% or more, and is preferably 3 wt% or less, more preferably 0.3 wt% or less. In one embodiment, the amount of carnosine in the chicken extract is preferably 0.001 to 3 wt%, more preferably 0.001 to 0.3 wt%, still more preferably 0.01 to 0.3 wt%. When carnosine is in the form of a salt, the amount of carnosine is expressed in terms of carnosine. The amount of carnosine represents the total amount of carnosine and its salts.

In one embodiment, the amount of carnosine in the solid content of the chicken extract is preferably 0.001 to 10 wt%, more preferably 0.001 to 0.5 wt%, still more preferably 0.01 to 2 wt%.

[0021] When the chicken extract for use in the present invention contains anserine, for example, the amount of anserine in the chicken extract is preferably 0.005 wt% or more, more preferably 0.05 wt% or more, and is preferably 5 wt% or less, more preferably 0.5 wt% or less. In one embodiment, the amount of anserine in the chicken extract is preferably 0.005 to 5 wt%, more preferably 0.005 to 0.5 wt%, still more

preferably 0.05 to 0.5 wt%. When anserine is in the form of a salt, the amount of anserine is expressed in terms of anserine. The amount of anserine represents the total amount of anserine and its salts.

In one embodiment, the amount of anserine in the solid content of the chicken extract is preferably 0.005 to 10 wt%, more preferably 0.005 to 6 wt%, still more preferably 0.05 to 3 wt%.

[0022] Histidine, carnosine, and anserine can be quantitated by HPLC, for example.

[0023] In one embodiment, for example, the amount of chicken extract (in terms of solids) in the oral composition of the present invention is preferably 0.1 wt% or more, more preferably 0.5 wt% or more, and is preferably 99 wt% or less, more preferably 90 wt% or less. In one embodiment, the amount of chicken extract (in terms of solids) in the oral composition is preferably 0.01 to 99 wt%, more preferably 0.1 to 90 wt%, still more preferably 0.5 to 90 wt%. Herein, the amount of chicken extract (in terms of solids) contains the amounts of histidine, carnosine, and anserine.

[0024] Preferably, the chicken extract for use in the present invention contains cyclo-phenylalanyl-phenylalanine. The cyclo-phenylalanyl-phenylalanine is a kind of cyclic dipeptide having an amino acid as a constituent unit. Cyclo-phenylalanyl-phenylalanine may be in the free form or in the form of a salt. Examples of the salt of cyclo-phenylalanyl-phenylalanine include those mentioned above for histidine, carnosine, and anserine.

[0025] When the chicken extract for use in the present invention contains cyclo-phenylalanyl-phenylalanine, for example, the amount of cyclo-phenylalanyl-phenylalanine in the chicken extract (100 g) is preferably 1 μ g or more, more preferably 60 μ g or more, still more preferably 75 μ g wt% or more. In other words, the amount of cyclo-phenylalanyl-phenylalanine in the chicken extract is preferably 0.1×10^{-5} wt% or more, more preferably 6.0×10^{-5} wt% or more, still more preferably 7.5×10^{-5} wt% or more. In one embodiment, the amount of cyclo-phenylalanyl-phenylalanine in the chicken extract is preferably 0.1×10^{-5} to 0.01 wt%, more preferably 6.0×10^{-5} to 0.01 wt%, still more preferably 7.5×10^{-5} to 0.01 wt%. When cyclo-phenylalanyl-phenylalanine is in the form of a salt, the amount of cyclo-phenylalanyl-phenylalanine is expressed in terms of cyclo-phenylalanyl-phenylalanine. The amount of cyclo-phenylalanyl-phenylalanine represents the total amount of cyclo-phenylalanyl-phenylalanine and its salts.

[0026] Cyclo-phenylalanyl-phenylalanine in the chicken extract for use in the present invention or in the oral composition of the present invention can be quantitated by LCMS or HPLC, for example.

[0027] Preferably, the oral composition of the present invention contains at least one selected from the group consisting of histidine, carnosine, anserine, and cyclo-

phenylalanyl-phenylalanine. When the oral composition of the present invention contains histidine, carnosine, and anserine, for example, the amount of histidine in the oral composition is preferably 0.00001 to 10 wt%, more preferably 0.0001 to 10 wt%, still more preferably 0.0001 to 1 wt%. For example, the amount of carnosine in the oral composition of the present invention is preferably 0.00001 to 3 wt%, more preferably 0.0001 to 3 wt%, still more preferably 0.0001 to 0.3 wt%. For example, the amount of anserine in the oral composition of the present invention is preferably 0.00005 to 5 wt%, more preferably 0.0005 to 5 wt%, still more preferably 0.005 to 0.5 wt%. In one embodiment, The amount of histidine in the oral composition, when the oral composition is liquid, is preferably, 0.0001 to 10 mg/mL, more preferably 0.001 to 9 mg/mL, still more preferably 0.01 to 5 mg/mL. The amount of carnosine in the oral composition, when the oral composition is liquid, is preferably, 0.00001 to 3 mg/mL, more preferably 0.0001 to 3 mg/mL, still more preferably 0.0001 to 2 mg/mL. The amount of anserine in the oral composition, when the oral composition is liquid, is preferably, 0.0001 to 10 mg/mL, more preferably 0.001 to 7 mg/mL, still more preferably 0.01 to 5 mg/mL. When the histidine, carnosine, and anserine are each in the form of a salt, the amount of histidine is expressed in terms of histidine, the amount of carnosine is expressed in terms of carnosine, and the amount of anserine is expressed in terms of anserine, respectively. The total amount of histidine, carnosine, and anserine in the oral composition represents the total amount of histidine and its salt, the total amount of carnosine and its salt, and the total amount of anserine and its salt. When the oral composition of the present invention contains cyclo-phenylalanyl-phenylalanine, for example, the amount of cyclo-phenylalanyl-phenylalanine in the oral composition is preferably 0.1×10^{-5} to 0.01 wt%, more preferably 6.0×10^{-5} to 0.01 wt%, still more preferably 7.5×10^{-5} to 0.01 wt%.

The amount of cyclo-phenylalanyl-phenylalanine in the oral composition, When the cyclo-phenylalanyl-phenylalanine is in the form of a salt, the amount of the cyclo-phenylalanyl-phenylalanine is expressed in term of cyclo-phenylalanyl-phenylalanine. The amount of cyclo-phenylalanyl-phenylalanine in the oral composition, represent the total amount of cyclo-phenylalanyl-phenylalanine and its salts.

[0028] <Fat-soluble vitamin>

Examples of the fat-soluble vitamin for use in the present invention include vitamin A, vitamin D, vitamin E (tocopherol), vitamin K, and analogs of these vitamins. Analogs of these vitamins include esters and the like. Commercial products can also be used. One or more fat-soluble vitamins may be used. Preferably, the fat-soluble vitamin is at least one selected from the group consisting of vitamin A, vitamin D, vitamin E, vitamin K, an analog of vitamin A, an analog of vitamin D, an analog of vitamin E and an analog of vitamin K.

- [0029] Preferably, the vitamin A or its analog is provitamin A or its analog. More preferably, the vitamin A or its analog is at least one selected from the group consisting of α -carotene, β -carotene, β -cryptoxanthin, and retinol.
- [0030] Preferably, the vitamin D or its analog is ergocalciferol and/or cholecalciferol. And more preferably, the vitamin D or its analog is cholecalciferol.
- [0031] Preferably, the vitamin E or its analog is tocopherol.
Examples of the tocopherol include α -tocopherol, β -tocopherol, γ -tocopherol, δ -tocopherol, and esters of tocopherol. When the fat-soluble vitamin for use in the present invention is tocopherol, preferably, the tocopherol is at least one selected from the group consisting of α -tocopherol, β -tocopherol, γ -tocopherol, δ -tocopherol, and an ester of tocopherol. The ester of tocopherol is not limited, but is preferably at least one selected from the group consisting of tocopheryl acetate, tocopheryl nicotinate, and tocopheryl linolate esters.
- [0032] Preferably, the vitamin K or its analog is phyloquinone and/or menaquinone. And more preferably, the vitamin K or its analog is a menaquinone. Preferably, the menaquinone is menaquinone 4.
- [0033] Preferably, the fat-soluble vitamin for use in the present invention include two or more vitamins selected from the group consisting of vitamin A and/or its analog, vitamin D and/or its analog, vitamin E and/or its analog and vitamin K and/or its analog. Use of two or more vitamins selected from the group consisting of vitamin A and/or its analog, vitamin D and/or its analog, vitamin E and/or its analog and vitamin K and/or its analog in combination as the fat-soluble vitamin enables more comprehensive reduction or prevention of odor caused by heating the chicken extract under retort or sterilization conditions. Preferred embodiments of vitamin A, vitamin D, vitamin E, vitamin K, and their analogs are as described above. Further, more preferably, the fat-soluble vitamin for use in the present invention include vitamin A and/or its analog and vitamin E and/or its analog. In one embodiment, preferably, the fat-soluble vitamin is at least one selected from the group consisting of α -carotene, β -carotene, β -cryptoxanthin, retinol, tocopherol, ergocalciferol, cholecalciferol, and menaquinone. More preferably, the fat-soluble vitamin is at least one selected from the group consisting of β -carotene, tocopherol, cholecalciferol and menaquinone. In one embodiment, preferably, the fat-soluble vitamin is β -carotene and/or tocopherol.
- [0034] In the present invention, preferably, the fat-soluble vitamin in the oral composition has a concentration that satisfies at least one of (A) or (B) described below:
(A) the fat-soluble vitamin includes at least one of vitamin A or its analog, and a total concentration of vitamin A and its analog in the oral composition is 10 mg/L or more;
(B) the fat-soluble vitamin includes at least one selected from the group consisting of vitamin D, vitamin E, vitamin K, an analog of vitamin D, an analog of vitamin E, and

an analog of vitamin K, and a total concentration of vitamin D, vitamin E, vitamin K, an analog of vitamin D, an analog of vitamin E, and an analog of vitamin K in the oral composition is 0.1 mg/L or more.

In addition, preferably, the fat-soluble vitamin has a total concentration of 500 mg/L or less in the oral composition, because while the odor from the chicken extract can be reduced or prevented due to the presence of the fat-soluble vitamin in the oral composition, it is possible to more effectively reduce or prevent the odor from the chicken extract when the fat-soluble vitamin in the oral composition has a concentration in the above range.

The total concentration of the fat-soluble vitamin in the oral composition is more preferably 480 mg/L or less, still more preferably 475 mg/L or less. The total concentration of the fat-soluble vitamin in the oral composition is preferably 1.4×10^{-5} mg/L or more.

Preferably, in the production method of the present invention, the concentration of the fat-soluble vitamin in the raw material composition is adjusted such that the concentration of the fat-soluble vitamin in the oral composition is in the above ranges. The production method may include adjusting the concentration of the fat-soluble vitamin in the oral composition such that the concentration of the fat-soluble vitamin in the raw material composition is in the above ranges.

[0035] When the present invention provides a method of producing a food in a sealed container containing a chicken extract-containing oral composition, preferably, the fat-soluble vitamin in the raw material composition has a concentration that satisfies at least one of (A) or (B) described below:

(A) the fat-soluble vitamin includes at least one of vitamin A or its analog, and a total concentration of vitamin A and its analog in the raw material composition is 10 mg/L or more;

(B) the fat-soluble vitamin includes at least one selected from the group consisting of vitamin D, vitamin E, vitamin K, an analog of vitamin D, an analog of vitamin E, and an analog of vitamin K, and a total concentration of vitamin D, vitamin E, vitamin K, an analog of vitamin D, an analog of vitamin E, and an analog of vitamin K in the raw material composition is 0.1 mg/L or more.

In addition, preferably, the fat-soluble vitamin has a total concentration of 500 mg/L or less in the raw material composition, because when the concentration of the fat-soluble vitamin in the raw material composition containing chicken extract is in the above ranges, it is possible to more effectively reduce or prevent the odor from the chicken extract in the raw material composition when a container containing the raw material composition is heated.

Preferably, the production method of the present invention includes adding a fat-

soluble vitamin to the raw material composition such that the concentration of the fat-soluble vitamin in the raw material composition satisfies at least one of (A) or (B) described above.

The total concentration of the fat-soluble vitamin in the raw material composition is preferably 480 mg/L or less, more preferably 475 mg/L or less. The total concentration of the fat-soluble vitamin in the raw material composition is preferably 1.4×10^{-5} mg/L or more.

Preferably, in the production method of the present invention, the concentration of the fat-soluble vitamin in the raw material composition is adjusted such that the concentration of the fat-soluble vitamin in the raw material composition is in the above ranges. The production method may include adjusting the concentration of the fat-soluble vitamin in the raw material composition such that the concentration of the fat-soluble vitamin in the raw material composition is in the above ranges.

In the above (A), preferably, the fat-soluble vitamin includes at least one selected from the group consisting of α -carotene, β -carotene, β -cryptoxanthin, and retinol, and more preferably, the fat-soluble vitamin includes β -carotene as the vitamin A or its analog. In the above (B), the fat-soluble vitamin includes preferably at least one selected from the group consisting of cholecalciferol, tocopherol, phylloquinone, and menaquinone. More preferably, the fat-soluble vitamin includes tocopherol and/or menaquinone. Still more preferably, the fat-soluble vitamin includes tocopherol.

[0036] When the fat-soluble vitamin for use in the present invention contains vitamin A and/or its analog, the total concentration of vitamin A and its analog in the oral composition or the raw material composition is preferably 10 mg/L or more, more preferably 15 mg/L or more, still more preferably 30 mg/L or more, still more preferably 50 mg/L or more. When the fat-soluble vitamin for use in the present invention contains vitamin A and/or its analog, the total concentration of vitamin A and its analog in the oral composition or the raw material composition is preferably 240 mg/L or less, more preferably 150 mg/L or less.

[0037] When the fat-soluble vitamin for use in the present invention contains vitamin D and/or its analog, the total concentration of vitamin D and its analog in the oral composition or the raw material composition is preferably 0.1 mg/L or more, more preferably 0.15 mg/L or more. When the fat-soluble vitamin for use in the present invention contains vitamin D and/or its analog, the total concentration of vitamin D and the analog thereof in the oral composition or the raw material composition is preferably 120 mg/L or less, more preferably 100 mg/L or less.

[0038] When the fat-soluble vitamin for use in the present invention contains vitamin E and/or its analog, the total concentration of vitamin E and its analog in the oral composition or the raw material composition is preferably 0.1 mg/L or more, more preferably 1 mg/

L or more, still more preferably 10 mg/L or more, still more preferably 15 mg/L or more, particularly preferably 50 mg/L or more. When the fat-soluble vitamin for use in the present invention contains vitamin E and/or its analog, the total concentration of vitamin E and its analog in the oral composition or the raw material composition is preferably 500 mg/L or less, more preferably 360 mg/L or less, still more preferably 160 mg/L or less.

[0039] When the fat-soluble vitamin for use in the present invention contains vitamin K and/or its analog, the total concentration of vitamin K and its analog in the oral composition or the raw material composition is preferably 0.1 mg/L or more, more preferably 1 mg/L or more, still more preferably 1.5 mg/L or more. When the fat-soluble vitamin for use in the present invention contains vitamin K and/or its analog, the total concentration of vitamin K and its analog in the oral composition or the raw material composition is preferably 120 mg/L or less, more preferably 100 mg/L or less.

[0040] The concentration of the fat-soluble vitamin for use in the present invention in the oral composition or the raw material composition can be quantitated by HPLC, for example. The quantification of fat-soluble vitamins by HPLC is performed by, for example, the following method.

[0041] <Quantification of vitamin A and analog of vitamin A>

The quantification of vitamin A and analog of vitamin A in the chicken extract is performed by HPLC following ISO Standards EN 12823-1:2014, EN 12823-2:2000, or EN 20633:2015

[0042] <Quantification of vitamin D and analog of vitamin D>

The quantification of vitamin D and analog of vitamin D in the chicken extract is performed by HPLC following ISO Standards EN 20636:2018 or AOAC Official Method 2011.11 (50.1.34).

[0043] <Quantification of vitamin E and analog of vitamin E>

The quantification of vitamin E and analog of vitamin E in the chicken extract is performed by HPLC following ISO Standards EN 12822:2014 or EN 20633:2015.

[0044] <Quantification of vitamin K and analog of vitamin K>

The quantification of vitamin K and analog of vitamin K in the chicken extract is performed by HPLC following ISO Standards EN 21446:2019 or AOAC Official Method 999.15.

It suffices as long as the raw material composition contains the chicken extract described above and the fat-soluble vitamin described above. Mixing conditions, adding order, and the like are not limited.

[0045] <Odor component>

In the food in a sealed container according to the present invention, the concentration of the odor component in a head space of the container is 100 ppm or less. The con-

centration of the odor component in the head space of the container is the total concentration of trimethylamine, butanedione, 3-methylbutanoic acid, and 2-methyl-3-furanthiol.

[0046] The odor component of an unpleasant odor (for example, fishy smell) includes the above-mentioned trimethylamine, butanedione, 3-methylbutanoic acid, 2-methyl-3-furanthiol, and other components. As a result of diligent studies by the inventors, regarding the chicken extract with no fat-soluble vitamins adding (i.e., a conventional production method), it was confirmed that the odor derived from the above four components (trimethylamine, butanedione, 3-methylbutanoic acid, and 2-methyl-3-furanthiol) is the main problem. In the chicken extract contained in the food in a sealed container produced by the conventional production method without adding any fat-soluble vitamins, the above four odorous components were periodically detected in the head space of the container. Further, in an example of a chicken extract production lot, when a chicken extract containing no fat-soluble vitamins is heated under retort conditions (sealed in a sealed container and heated at 121°C for 8 minutes), the total concentration of trimethylamine, butanedione, 3-methylbutanoic acid and 2-methyl-3-furanthiol in the head space of the container was 115 ppm. When tocopherol (118 mg/L) and β -carotene (15 mg/L) were added to the chicken extract of the same production lot and heated under the same retort conditions, the total concentration of trimethylamine, butanedione, 3-methylbutanoic acid and 2-methyl-3-furanthiol in the head space was less than 100 ppm. Thus, the odor caused by heating the chicken extract under retort conditions was reduced. In the food in a sealed container of the present invention and the method of producing the food in a sealed container, since the oral composition and the raw material composition contain one or more fat-soluble vitamins, the odor from the chicken extract can be reduced. In particular, the generation of trimethylamine, butanedione, 3-methylbutanoic acid and 2-methyl-3-furanthiol can be reduced or prevented, and the total concentration of them in the head space of the sealed container can be reduced to 100 ppm or less.

When the present invention provides a food in a sealed container containing a chicken extract-containing oral composition and a method of producing the food in a sealed container, the concentration of an odor component in the head space in the container is preferably 100 ppm or less, more preferably 50 ppm or less, still more preferably 10 ppm or less, yet still more preferably 5 ppm or less. No odor components may be present in the head space.

[0047] The concentration of the odor component can be measured by any method known in the relevant art. For example, gas chromatography can be used for measurement. As the analysis conditions for measuring the odor components by gas chromatography, for example, the analysis conditions for gas chromatography described in Examples can be

used.

[0048] The food in a sealed container containing the chicken extract-containing oral composition of the present invention contains chicken extract and one or more fat-soluble vitamins, wherein odor from the chicken extract is reduced. In particular, the food in a sealed container is one in which odor caused by heating the chicken extract is reduced. The heating the chicken extract in the food in a sealed container of the present invention may encompass, for example, heating under retort conditions and heating under sterilization conditions in the production process of the food in a sealed container, and may also encompass, for example, heating due to an increase in the temperature (for example, 20 degrees Celsius or higher) of a storage or the like during storage after the production of the food in a sealed container. Further, the food in a sealed container is one in which odor caused by storing the food in a sealed container containing a chicken extract-containing oral composition at environment at 20 degrees Celsius or higher is reduced.

[0049] <Method of producing a food in a sealed container>

The method of producing a food in a sealed container containing a chicken extract-containing oral composition according to one embodiment of the present invention includes heating a container containing a raw material composition containing chicken extract and a fat-soluble vitamin, wherein odor caused by heating the chicken extract in the heating is reduced or prevented due to the presence of the fat-soluble vitamin in the raw material composition. Preferably, the odor caused by heating the chicken extract is derived from at least one odor component selected from the group consisting of trimethylamine, butanedione, 3-methylbutanoic acid, and 2-methyl-3-furanthiol.

The raw material composition only requires containing the chicken extract and the fat-soluble vitamin. Mixing conditions, the order of adding, and the like are not limited.

Preferred embodiments of the chicken extract and the fat-soluble vitamin in the raw material composition are the same as those in the oral composition. A preferred range of the fat-soluble vitamin in the raw material composition is as described above.

[0050] Preferably, the food in a sealed container of the present invention is one in which odor caused by heating chicken extract under sterilization conditions, particularly under retort conditions is reduced or prevented. Preferably, the method of producing the food in a sealed container of the present invention can reduce or prevent odor caused by heating chicken extract under sterilization conditions, particularly under retort conditions. Preferably, in the food in a sealed container of the present invention and the production method thereof, the odor component in the head space of the container is one caused by heating chicken extract under sterilization conditions, particularly under retort conditions.

[0051] <Sterilization conditions>

In the production method of the present invention, preferably, heating in the heating is performed for sterilization.

As described above, the production method of the present invention preferably is a method of producing a chicken extract-containing oral composition or a method of producing a food in a sealed container containing a chicken extract-containing oral composition, wherein the methods reduce or prevent odor caused by heating chicken extract under sterilization conditions, particularly under retort conditions. Preferably, the present invention also provides use of a fat-soluble vitamin for reducing or preventing odor caused by heating chicken extract under sterilization conditions, particularly under retort conditions. The present invention also provides an oral composition or a food in a sealed container containing the oral composition, wherein odor caused by heating chicken extract under sterilization conditions, particularly under retort conditions is reduced or prevented. The pressure and temperature under sterilization conditions are not limited. Any conditions known in the relevant field of the art can be applied. Specifically, for example, the heating may be performed at 50°C or higher, preferably at 100°C to 130°C for not longer than 400 minutes (preferably 6 to 37 minutes). Heating under retort conditions can be performed under any conditions known in the relevant field of the art. Specifically, for example, the heating is performed at a temperature of 113°C to 120°C for 6 to 37 minutes, usually under pressure or normal pressure. The pressure under retort conditions can be, for example, 0.1 to 0.3 MPa (gauge pressure). The temperature under sterilization conditions (autoclaving conditions) is not limited. Heating under sterilization conditions can be performed under any conditions known in the relevant art. Specifically, for example, heating is performed at 100°C to 130°C for not longer than 400 minutes or 113°C to 120°C for 6 to 37 minutes.

[0052] When the present invention provides a food in a sealed container containing a chicken extract-containing oral composition and a method of producing the container-packed food, the form of the container is not limited. The container for use in the present invention, which is designed to maintain the commercial sterility of the oral composition as its contents after processing, may be, for example, a glass or plastic jar, a glass or plastic bottle, an aluminum foil or plastic retort pouch or boil-in-bag, a carton box or juice box containing paper, plastic, and aluminum, a bucket with lid, or a hermetically sealed can or any of the above-mentioned containers. In the method of producing a food in a sealed container of the present invention, when heating in the heating is performed under sterilization conditions, preferably, the container for use is heat resistance under sterilization conditions.

The "food in a sealed container" of the present invention can be referred to as a "food

sealed in a container". The food in a sealed container of the present invention is preferably a beverage in a sealed container.

[0053] <Oral composition>

In one embodiment, the present invention provides a chicken extract-containing oral composition, wherein the oral composition contains chicken extract and a fat-soluble vitamin, the chicken extract contains histidine, carnosine, and anserine, and the oral composition contains 0.00001 to 10 wt% histidine, 0.00001 to 3 wt% carnosine, 0.00005 to 5 wt% anserine, the fat-soluble vitamin is at least one selected from the group consisting of vitamin A, vitamin D, vitamin E, vitamin K, an analog of vitamin A, an analog of vitamin D, an analog of vitamin E, and an analog of vitamin K, and at least one of (A) or (B) described below is satisfied:

(A) the fat-soluble vitamin includes at least one of vitamin A or its analog, and a total concentration of vitamin A and an analog thereof in the oral composition is 10 mg/L or more;

(B) the fat-soluble vitamin includes at least one selected from the group consisting of vitamin D, vitamin E, vitamin K, an analog of vitamin D, an analog of vitamin E, and an analog of vitamin K, and a total concentration of vitamin D, vitamin E, vitamin K, an analog of vitamin D, an analog of vitamin E, and an analog of vitamin K in the oral composition is 0.1 mg/L or more.

In one embodiment, the present invention provides a chicken extract-containing oral composition, wherein the oral composition contains chicken extract and a fat-soluble vitamin, the chicken extract contains cyclo-phenylalanyl-phenylalanine, the fat-soluble vitamin is at least one selected from the group consisting of vitamin A, vitamin D, vitamin E, vitamin K, an analog of vitamin A, an analog of vitamin D, an analog of vitamin E and an analog of vitamin K, and at least one of (A) or (B) described below is satisfied:

(A) the fat-soluble vitamin includes at least one of vitamin A or its analog, and a total concentration of vitamin A and an analog thereof in the oral composition is 10 mg/L or more;

(B) the fat-soluble vitamin includes at least one selected from the group consisting of vitamin D, vitamin E, vitamin K, an analog of vitamin D, an analog of vitamin E, and an analog of vitamin K, and a total concentration of vitamin D, vitamin E, vitamin K, an analog of vitamin D, an analog of vitamin E, and an analog of vitamin K in the oral composition is 0.1 mg/L or more.

The preferred forms of the chicken extract and the fat-soluble vitamins in the oral composition of the present invention are as described above. Preferably, the oral composition of the present invention is one in which odor from the chicken extract is reduced or prevented. More preferably, it is one in which odor caused by heating the

chicken extract is reduced or prevented. Still more preferably, it is one in which odor caused by heating the chicken extract under retort or sterilization conditions is reduced or prevented. In the present invention, it suffices as long as the odor from the chicken extract is reduced or prevented as compared to the odor from the chicken extract in the oral composition to which no fat-soluble vitamin is added.

[0054] In the present invention, preferably, the oral composition and the raw material composition are liquid. In the production method of the present invention, the chicken extract which is a commercial product or which is produced by extraction (for examples, hot water extraction) can be directly mixed with the fat-soluble vitamin. When the chicken extract is in the form of a concentrate, dry powder, or a purified product of the concentrate or the dry powder, such a product may be diluted, dissolved, or the like in a liquid such as water, ethanol, or a mixture of water and ethanol before mixing with the fat-soluble vitamin.

[0055] Preferably, the oral composition of the present invention is used as a food or beverage or medicine. Examples of the food or beverage include foods with function claims, health-promoting foods, foods for special dietary uses, dietary supplements, health supplements, and general supplements. The form of the food or beverage is not limited. For example, it may be a solid food or a liquid beverage. A beverage is preferred.

Preferably, the food in a sealed container of the present invention described above is a food in a sealed container in which a liquid oral composition (preferably, a beverage) containing chicken extract and a fat-soluble vitamin is in a sealed container.

The form of the medicine is not limited. Non-limiting examples include preparations for internal administration such as capsules, tablets, powder, granules, and dry syrups.

[0056] The oral composition of the present invention may contain various pharmaceutically or food or beverage acceptable additives such as diluents, acidulants, antioxidants, stabilizers, preservatives, flavoring or masking agents, emulsifiers, pigments, seasonings, pH adjusters, and nutritional enhancers.

Emulsifiers are not limited. Any emulsifiers such as Habo P90 sucrose monopalmitate, L90 Sucrose Monolaurate, sorbitol solution, propylene glycol, medium-chain triglycerides, lecithin (Compass Foods Pte. Ltd., Singapore), orange oil, gum Arabic, sucrose acetate isobutyrate, lactic acid, citric acid (San-Ei Gen F.F.I., Inc., Japan), Kelcogel (registered trademark) gellan gum (CP Kelco U.S., Inc.), and Kelcotrol (registered trademark) xanthan gum (CP Kelco U.S., Inc.) can be used.

[0057] The oral composition of the present invention can be produced by mixing the components. The oral composition can also be produced by heating the raw material composition.

[0058] The oral composition of the present invention is applicable for either therapeutic use

(medical use) or non-therapeutic use (non-medical use). The "non-therapeutic" is a concept that does not include medical activities, i.e., a concept that does not include methods of surgery, therapy or diagnosis of humans.

[0059] The oral composition of the present invention is ingested orally (oral administration). The dose (which can also be described as "intake") of the oral composition of the present invention is not limited.

[0060] A subject to be fed or administered (which can be rephrased as a subject for administration) with the oral composition of the present invention is not limited. The subject for administration is preferably a human or non-human mammal, more preferably a human.

In one embodiment, the subject for administration in the present invention may be a middle-aged or older person.

[0061] Preferably, the oral composition of the present invention is used for at least one application selected from the group consisting of food application, beverage application, and health food application.

[0062] <Use of a fat-soluble vitamin for reducing or preventing odor generated from chicken extract>

The present invention includes use of a fat-soluble vitamin for reducing or preventing odor generated from chicken extract.

In one embodiment, the present invention provides use of a fat-soluble vitamin in production of a food in a sealed container containing a chicken extract-containing oral composition, wherein the use is for reducing or preventing odor caused by heating chicken extract.

In one embodiment, the present invention provides use of a fat-soluble vitamin for reducing or preventing odor caused by heating chicken extract or storing the food in a sealed container containing a chicken extract-containing oral composition at environment at 20 degrees Celsius or higher.

Preferably, the odor caused by heating chicken extract or storing the food in a sealed container containing a chicken extract-containing oral composition at environment at 20 degrees Celsius or higher is one derived from at least one odor component selected from the group consisting of trimethylamine, butanedione, 3-methylbutanoic acid, and 2-methyl-3-furanthiol.

The oral composition, the chicken extract, and the fat-soluble vitamin, and preferred formed thereof in the use of the present invention are the same as those in the food in a sealed container of the present invention described above. The oral composition for use of the present invention only requires containing the chicken extract and the fat-soluble vitamin. Mixing conditions, the order of adding, and the like are not limited.

In the use of the present invention, preferably, the use of the fat-soluble vitamin

satisfies at least one (A) or (B) described below:

(A) the fat-soluble vitamin includes at least one of vitamin A or its analog, and the at least one of vitamin A or its analog is used such that a total concentration of vitamin A and its analog in the oral composition is 10 mg/L or more;

(B) the fat-soluble vitamin includes at least one selected from the group consisting of vitamin D, vitamin E, vitamin K, an analog of vitamin D, an analog of vitamin E, and an analog of vitamin K, and the at least one selected from the group consisting of vitamin D, vitamin E, vitamin K, an analog of vitamin D, an analog of vitamin E, and an analog of vitamin K is used such that a total concentration of vitamin D, vitamin E, vitamin K, an analog of vitamin D, an analog of vitamin E, and an analog of vitamin K in the oral composition is 0.1 mg/L or more.

[0063] <Flavor retention method and flavor retainer>

The present invention relates to, for example, a method of producing a chicken extract-containing oral composition and a method of producing a food in a sealed container containing a chicken extract-containing oral composition, wherein the methods each include adding a fat-soluble vitamin to chicken extract and thus can reduce or prevent odor caused by heating the chicken extract under retort or sterilization conditions. Adding a fat-soluble vitamin to chicken extract reduces or prevents odor caused by heating the chicken extract under retort or sterilization conditions. Thus, the original favor of the chicken extract can be retained even after the chicken extract is heated under retort or sterilization conditions. Thus, in one embodiment, the present invention may provide a method of retaining the flavor of a chicken extract-containing oral composition, the method including adding a fat-soluble vitamin to chicken extract to reduce or prevent odor caused by heating the chicken extract under retort or sterilization conditions and retain the flavor of the chicken extract. In one embodiment, the present invention may also provide a flavor retainer for a chicken extract-containing oral composition, containing a fat-soluble vitamin as an active ingredient, wherein the flavor retainer reduces or prevents odor caused by heating chicken extract under retort or sterilization conditions. Examples of the flavor of the chicken extract include umami and/or thickness, for example. Preferred embodiments, amounts, and the like of the chicken extract and the fat-soluble vitamin are the same as those in the oral composition described above. In the method of maintaining the flavor and the agent for maintaining the flavor of the present invention, heating of chicken extract may be heating under sterilization conditions or heating by storing at an environment at 20°C or higher.

Herein, any numerical range defined by a lower limit and an upper limit, i.e., a lower limit to an upper limit, includes the lower limit and the upper limit.

For example, the range expressed by "1 to 2" means 1 or more and 2 or less and

includes 1 and 2. Herein, any of the above upper limits can be combined with any of the above lower limits to define the range.

Examples

- [0064] The present invention is more specifically described below with reference to examples. The present invention is not limited to these examples.
- [0065] Raw materials used in the examples and the comparative examples are described below.
- [0066] <Chicken extract>
Commercially available chicken extract (CE) (Brand's Essence of Chicken (BEC) (manufacturer: Brand's Suntory (Thailand) Co. Ltd., under licensed from Suntory Beverage & Food Asia Pacific)) was used. The chicken extract is an extract obtainable by heating chicken meat and chicken bone in hot water. The chicken extract contains cyclo-phenylalanyl-phenylalanine in an amount of 0.000079 wt%. In 1 ml of CE, the amount of histidine was 4.5 mg/ml, the amount of carnosine was 0.94 mg/ml, and the amount of anserine was 1.9 mg/ml.
- [0067] <Quantification of histidine, carnosine, and anserine>
Quantification of histidine, carnosine, and anserine in the chicken extract was performed by HPLC under the following conditions.
<Analysis conditions of HPLC>
Device: high performance liquid chromatography system with a UV detector (Agilent 1100 Series available from Agilent)
Column: Zorbax 300-SCX 4.6 mm ID × 250 mm available from Agilent.
Mobile phase: 50 mM potassium dihydrogen phosphate
Flow rate: 1.0 mL/min
Flow channel: channel A (50 mM potassium dihydrogen phosphate), channel B (acetonitrile), channel D (deionized water)
UV detector wavelength: 210 nm
Sample injection volume: 10 µL
- [0068] <Detection and quantification of cyclo-phenylalanyl-phenylalanine by LC-MS analysis>
Detection and quantification of cyclo-phenylalanyl-phenylalanine in the chicken extract was performed on an LC-MS. LC-MS analysis was performed on an Agilent HPLC 1290 series-coupled TripleTOF 5600 (AB Sciex) with a Duo Spray Turbo V ion source and a gas generator (Peak Scientific Ltd.). The mass spectrometer uses electrospray ionization and multiple reaction monitoring (MRM) in positive ion mode at unit mass resolution, with the following parameters: Collision Energy Spread (CES): 10; Ion Release Delay (IRD): 67; Ion Release Width (IRW): 25; Ion Source Gas: 40;

Curtain Gas (CUR): 30; Temperature: 500.0; IonSpray Voltage Floating (ISVF): 5500). MS compound-dependent parameter settings such as declustering potential (DP) and collision energy were optimized as 100.0 and 30.0 respectively. Analyst 1.8 (AB Sciex) was used for equipment control, data acquisition, and data processing.

[0069] Cyclo-phenylalanyl-phenylalanine was dissolved in dimethyl sulfoxide (DMSO) in the concentration of 1 mg/mL and diluted to the working concentrations with ultrapure water prior to injected on to an Zorbax Eclipse Plus C18 RRHD 1.8 μ m 2.1 x 50 mm column (Agilent), with a UHPLC Guard Zorbax Eclipse Plus C18 2.1 x 5 mm, 1.8 μ m (Agilent), and eluted with eluent A (ultrapure water: formic acid = 100: 0.1 (v/v)) and eluent B (acetonitrile: formic acid = 100: 0.1 (v/v)), with the following linear gradient: 0-0.5 min: 100% eluent A; 0.5-7.5 min: 100-65% eluent A; 7.5-10 min: 65-0% eluent A; 10-13 min: 0% eluent A; 13-13.1 min: 0-100% eluent A. The injection volume was 10 μ L at the flow rate of 300 μ L/min with the retention time of 7.6 min as quantifier and qualifier. A calibration curve was constructed by infusing 15.625, 31.25, 62.5, 125 ng/mL of standard cyclo-phenylalanyl-phenylalanine into the mass spectrometer. Chicken extract was reconstituted as 1000 μ g/mL solution as the working solution by using chicken extract powder. The quantification of the cyclo-phenylalanyl-phenylalanine in chicken extract was done by SCIEX OS 1.6.1.29803 Analytics (AB Sciex).

[0070] <Fat-soluble vitamin>

β -Carotene: β -Carotene C4582 (Merck KGaA, Germany) and SoluClear Carotene CALBP0127 (Compass Foods Pte. Ltd., Singapore)

Cholecalciferol: Cholecalciferol (VD Base No. 36875) (San-Ei Gen F.F.I., Inc., Japan)

Tocopherol: Natural vitamin E W530066 (Merck KGaA, Germany) and SoluClear Alpha-Tocopherol NAKAQ0078 (Compass Foods Pte. Ltd., Singapore)

Menaquinone: Vitamin K2 Menaquinone 4 V9378 (Merck KGaA, Germany)

Emulsifier: Habo P90 sucrose monopalmitate (Compass Foods Pte. Ltd., Singapore)

[0071] <Examples 1 to 3>

Oral compositions (solutions) of Examples 1 to 3 were prepared according to the amounts shown in Table 1 below. Specifically, tocopherol and/or β -carotene in an amount shown in Table 1 was added to chicken extract (CE) (68 mL) together with the emulsifier, and the mixture was sufficiently stirred to create a homogenous mixture, whereby a liquid oral composition was prepared in each of Examples 1 to 3. Each of the resulting liquid oral compositions of Examples 1 to 3 was dispensed into a sealed glass container, followed by sterilization at 121°C for 8 minutes. Table 1 shows the tocopherol and/or β -carotene concentration of each of the liquid oral composition of Examples 1 to 3. The concentration of tocopherol was 118 mg/L in the liquid oral com-

position of Example 1. The concentrations of β -carotene was 15 mg/L in the liquid oral composition of Example 2. The concentrations of tocopherol and β -carotene were 118 mg/L and 15 mg/L respectively in the liquid oral composition of Example 3.

[0072] <Comparative Example 1>

A liquid oral composition according to Comparative Example 1 was prepared by the same method as in Example 3, except that fat-soluble vitamins (tocopherol and β -carotene) were not added.

[0073] [Table 1]

	Example 1	Example 2	Example 3	Comparative Example 1
	CE with tocopherol	CE with β -carotene	CE with tocopherol and β -carotene	Chicken extract (CE)
Tocopherol (mg)	8	0	8	-
β -carotene (mg)	0	1	1	-
Tocopherol concentration in the composition (mg/g)	0.118	0.00	0.118	0.00
β -carotene concentration in the composition (mg/g)	0.00	0.015	0.015	0.00

[0074] <Smell evaluation>

Nine expert panelists evaluated the smell of the liquid oral compositions (about 20 mL, each) according to Examples 1 to 3 and Comparative Example 1 which were placed in glass tubes at room temperature. The evaluation criteria are as follows.

[0075] <Evaluation criteria>

Table 2 below shows sensory attributes (boiled chicken fat smell, buttery smell, burnt smell, cheesy smell, fishy smell, meaty smell, moldy smell, and roasted smell) of the smell. A reference sample to be used for evaluation of each sensory attribute was prepared as below. The sensory attributes, definitions of the sensory attributes, reference samples of the sensory attributes are as described in Table 2 below.

A standard was diluted in water to a concentration shown in "Reference samples and intensity" of Table 2 below, and the resulting diluted standard solution was used as a reference sample. Specifically, for example, one of the sensory attributes (fishy smell) of the aroma is defined as the aroma associated with fish and has the smell similar to the smell of a fish market. The score of the fishy smell is 1 when the diluted standard solution contains 0.005 mg/mL trimethylamine; the score is 5 when the diluted standard solution contains 0.025 mg/mL trimethylamine; and the score is 9 when the diluted standard solution contains 0.1 mg/mL trimethylamine. These scores were used as evaluation criteria.

[0076] [Table 2]

Sensory attributes	Definitions	Reference samples and intensity
Overall smell	Overall unpleasant aroma associated with chicken extract	-
Boiled chicken fat smell	Fatty, meaty aroma associated with chicken with skin that has been cooked in water to create broth	- 0.01 mg/mL Givaudan flavor house boiled chicken fat smell descriptor (1) - 0.07 mg/mL Givaudan flavor house boiled chicken fat smell descriptor (5) - 0.25 mg/mL Givaudan flavor house boiled chicken fat smell descriptor (9)
Burnt smell	Burnt, musty aroma associated with nuts that have been roasted and burnt	- 0.5 mg/mL Givaudan flavor house burnt smell descriptor (1) - 3.0 mg/mL Givaudan flavor house burnt smell descriptor (5) - 5.0 mg/mL Givaudan flavor house burnt smell descriptor (9)
Buttery smell	Chlorine-like aroma associated with cultured cream, butter or fermentation products	- 0.001 mg/mL butanedione (1) - 0.005 mg/mL butanedione (5) - 0.010 mg/mL butanedione (9)
Cheesy smell	Distinctive sour odor associated with fermented cheese	- 0.003 mg/mL 3-methylbutanoic acid (1) - 0.010 mg/mL 3-methylbutanoic acid (5) - 0.030 mg/mL 3-methylbutanoic acid (9)
Fishy smell	Cod-like aroma associated with fish; similar to the smell of a fish market	- 0.005 mg/mL trimethylamine (1) - 0.025 mg/mL trimethylamine (5) - 0.100 mg/mL trimethylamine (9)
Meaty smell	Aroma associated with cooked meat, meat extract or yeast broth	- 0.04 mg/mL Givaudan flavor house meaty smell descriptor (1) - 0.20 mg/mL Givaudan flavor house meaty smell descriptor (5) - 1.00 mg/mL Givaudan flavor house meaty smell descriptor (9)
Moldy smell	Sour and ammonia-like aroma associated with cheese products showing mold on their surface	- 2 μ L Givaudan flavor house moldy smell descriptor (1) - 5 μ L Givaudan flavor house moldy smell descriptor (5) - 15 μ L Givaudan flavor house moldy smell descriptor (9)
Roasted smell	Sulphury, meaty aroma associated with cooked chicken meat	- 0.001 mg/mL 2-methyl-3-furanthiol (1) - 0.005 mg/mL 2-methyl-3-furanthiol (5) - 0.025 mg/mL 2-methyl-3-furanthiol (9)

[0077] <Selection and training of expert panelists>

Nine panelists who live in Singapore participated in the evaluation. A group discussion on the differences and similarities between the liquid oral compositions (Examples 1 to 3 and Comparative Example 1) were led by a panel leader during evaluation. A list of sensory attributes that described the aroma (sensory characteristics) of the liquid oral composition, focusing on the attributes of the aroma of the chicken extract believed to be influenced by tocopherol and β -carotene, was developed by the panelists.

During the two-hour training session before the actual evaluation session, besides term generation, the panelists also learned to use a 9-point scale to rate attribute intensities. For example, evaluation criteria for the sensory attribute "fishy smell" are as follows: the score of the fishy smell is 1 when the diluted standard solution contains 0.005 mg/mL trimethylamine; the score is 5 when the diluted standard solution contains 0.025 mg/mL trimethylamine; and the score is 9 when the diluted standard solution contains 0.1 mg/mL trimethylamine. Each sample was tested at least twice during this training session.

[0078] <Evaluation>

For the evaluation of the smell of the liquid oral compositions according to Examples 1 to 3 and Comparative Example 1, the nine panelists sniffed each liquid oral composition (about 20 mL) at room temperature and rated the smell attributes described in Table 2 above. They then completed the rating for each sensory attribute on a 9-point scale. Human sensory analyses were conducted following the spirit of the Helsinki Declaration and informed consent was obtained from all panelists.

[0079] <Analysis of evaluation results>

The non-parametric Wilcoxon signed-rank statistical test was used to test for significant differences in scores between Control (Comparative Example 1) and each of the liquid oral compositions according to Examples 1 to 3. Data analysis was performed using the Stata statistical software package (StataCorp, TX, USA, 2017). Data was considered to be significant when $p < 0.05$.

Table 3 below shows analysis results. The results are expressed as mean $\pm$ standard deviation. The results in Table 3 below show that the liquid oral composition according to Example 1 to 3 in which tocopherol and/or β -carotene was added to chicken extract (CE) reduced the scores in the sensory attributes.

Table 4 below shows P values obtained using the non-parametric Wilcoxon signed-rank statistical test.

[0080]

[Table 3]

	Comparative Example 1	Example 1	Example 2	Example 3
Sensory attributes	Chicken extract (CE)	CE with tocopherol	CE with β -carotene	CE with tocopherol and β -carotene
Overall smell	7.0 $\pm$ 0.8	4.9 $\pm$ 2.0 *	4.8 $\pm$ 2.5 *	4.1 $\pm$ 2.2 **
Boiled chicken fat smell	6.3 $\pm$ 1.2	4.6 $\pm$ 1.6 *	5.6 $\pm$ 2.1	4.4 $\pm$ 1.8 *
Burnt smell	5.3 $\pm$ 1.8	4.3 $\pm$ 1.0	4.3 $\pm$ 1.1	4.1 $\pm$ 1.3
Buttery smell	5.8 $\pm$ 1.8	4.5 $\pm$ 1.4	3.8 $\pm$ 1.4 *	3.8 $\pm$ 1.6 *
Cheesy smell	4.4 $\pm$ 1.3	3.4 $\pm$ 1.1	2.9 $\pm$ 1.3 *	3.1 $\pm$ 1.1 *
Fishy smell	5.9 $\pm$ 1.1	4.6 $\pm$ 1.6 *	4.0 $\pm$ 1.5 **	3.8 $\pm$ 1.8 *
Meaty smell	6.0 $\pm$ 1.6	4.6 $\pm$ 1.4	4.4 $\pm$ 1.9	3.8 $\pm$ 1.4 *
Moldy smell	5.6 $\pm$ 1.0	4.2 $\pm$ 0.8 *	4.3 $\pm$ 0.7	4.4 $\pm$ 1.0 *
Roasted smell	5.0 $\pm$ 0.8	4.1 $\pm$ 0.9	4.2 $\pm$ 1.0 *	3.9 $\pm$ 1.1 *
1 Data represented as mean $\pm$ standard deviation.				
2 *p < 0.05, **p < 0.01				

[0081] [Table 4]

	Comparative Example 1	p-value of Example 1	p-value of Example 2	p-value of Example 3
Sensory attributes	Chicken extract (CE)	CE with tocopherol	CE with β -carotene	CE with tocopherol and β -carotene
Overall smell	-	0.020	0.038	0.009
Boiled chicken fat smell	-	0.020	0.441	0.021
Burnt smell	-	0.260	0.155	0.214
Buttery smell	-	0.110	0.020	0.021
Cheesy smell	-	0.097	0.028	0.033
Fishy smell	-	0.043	0.008	0.011
Meaty smell	-	0.095	0.122	0.044
Moldy smell	-	0.038	0.058	0.049
Roasted smell	-	0.085	0.044	0.044

[0082] The smell evaluation for the liquid oral compositions according to Examples 1, 2, and 3 are visually compared against the smell evaluation for the liquid oral composition according to Comparative Example 1 in graphs shown in FIG. 1, FIG. 2, and

FIG. 3, respectively.

[0083] The results in Table 3 above show that the liquid oral composition according to Example 1 in which 8 mg of tocopherol was added to chicken extract (CE) significantly reduced the "overall smell", "boiled chicken fat smell", "fishy smell", and "moldy smell" in the sensory attributes. The same can be observed also in FIG. 1. The results show that the liquid oral composition according to Example 2 in which 1 mg of β -carotene was added to chicken extract (CE) also significantly reduced the "overall smell", "buttery smell", "cheesy smell", "fishy smell", and "roasted smell" in the sensory attributes. The same can be observed also in FIG. 2. Further, the results in Table 3 and FIG. 3 show that the liquid oral composition according to Example 3 in which 8 mg of tocopherol and 1 mg of β -carotene were added to chicken extract (CE) significantly reduced the "overall smell", "boiled chicken fat smell", "buttery smell", "cheesy smell", "fishy smell", "meaty smell", "moldy smell", and "roasted smell" in the sensory attributes as a whole, as compared to the liquid oral composition according to the liquid oral composition according to Comparative Example 1.

In other words, the liquid oral composition according to Example 3 in which tocopherol and β -carotene were added as fat-soluble vitamins significantly reduced the odor in more sensory attributes, as compared to the liquid oral composition according to Example 1 or 2 in which tocopherol or β -carotene was added.

[0084] <Examples 4 to 21>

Oral compositions (solutions) of Examples 4 to 21 were prepared according to the amounts shown in Table 5 below. Specifically, tocopherol or/and β -carotene, cholecalciferol or menaquinone in an amount shown in Table 5 was added to chicken extract (CE) (68 mL) together with the emulsifier, and the mixture was sufficiently stirred to create a homogenous mixture, whereby a liquid oral composition was prepared in each of Examples 4 to 21.

[0085] <Comparative Example 2>

A liquid oral composition according to Comparative Example 2 was prepared by the same method as in Example 4 to 21, except that the tocopherol, β -carotene, cholecalciferol, and menaquinone were not added.

[0086] Each of the resulting liquid oral compositions of Examples 4 to 21 and Comparative Example 2 was dispensed into a sealed glass container, followed by sterilization at 121°C for 8 minutes. Table 5 shows the tocopherol or/and β -carotene or cholecalciferol or menaquinone concentration of each of the liquid oral compositions of Examples 4 to 21.

[0087]

[Table 5]

		Tocopherol (mg)	β -carotene (mg)	Cholecalciferol (mg)	Menaquinone (mg)	Tocopherol concentration in the composition (mg/L)	β -carotene concentration in the composition (mg/L)	Cholecalciferol concentration in the composition (mg/L)	Menaquinone concentration in the composition (mg/L)
Comparative Example 2	Chicken extract (CE)	-	-	-	-	0	0	0	0
Example 4	CE with tocopherol	4	-	-	-	59	0	0	0
Example 5		8	-	-	-	118	0	0	0
Example 6		16	-	-	-	236	0	0	0
Example 7		32	-	-	-	472	0	0	0
Example 8	CE with β -carotene	-	1	-	-	0	15	0	0
Example 9		-	2	-	-	0	30	0	0
Example 10		-	4	-	-	0	60	0	0
Example 11	CE with tocopherol and β -carotene	4	0.5	-	-	59	8	0	0
Example 12		8	1	-	-	118	15	0	0
Example 13		16	2	-	-	236	30	0	0
Example 14		32	4	-	-	472	60	0	0
Example 15	CE with cholecalciferol	-	-	1	-	0	0	15	0
Example 16		-	-	2	-	0	0	30	0
Example 17		-	-	4	-	0	0	59	0
Example 18		-	-	8	-	0	0	118	0
Example 19	CE with menaquinone	-	-	-	2	0	0	0	30
Example 20		-	-	-	4	0	0	0	59
Example 21		-	-	-	8	0	0	0	118

[0088] <Gas chromatography-mass spectrometry head space analysis>

The concentration of the unpleasant odor components (trimethylamine, butanedione, 3-methylbutanoic acid, and 2-methyl-3-furanthiol) in the head space of a container containing chicken extract was analyzed by Agilent 7890A-5975C GC-MS coupled with a head space-solid phase microextraction unit. 10 mL of the liquid oral composition was transferred out into a 20 mL extraction flask in which 40 μ L of the internal standard was spiked. After being acidified by 1 mL of 2 M sulphuric acid, the flask was sealed in water bath at 80 to 100°C for 20 min. The head space-solid phase microextraction was done 30 mins before the injection to GCMS. The data acquisition, qualitative data analysis, quantitative data analysis, and results reporting were done on Agilent MassHunter software suite for GC/MS.

<Analysis of GCMS analysis results>

Table 6 below shows analysis results. The results are expressed as mean $\pm$ standard deviation. The results in Table 6 below shows that the liquid oral composition according to Examples 4 to 21 in which tocopherol or/and β -carotene or cholecalciferol or menaquinone was added to CE reduced the concentration of odor components (trimethylamine, butanedione, 3-methylbutanoic acid, and 2-methyl-3-furanthiol).

The graphs in FIG. 4 to 7 show the ratio of the amount of each odor component generated from the chicken extract containing the fat-soluble vitamin according to Examples 4 to 21 to the amount of each odor component generated from the chicken extract according to Comparative Example 2 which is taken as 100%.

[0089] [Table 6]

		Trimethylamine	Butanedione	3-methylbutanoic acid	2-methyl-3-furanthiol
Comparative Example 2	Chicken extract (CE)	100% ± 36%	100% ± 33%	100% ± 27%	100% ± 35%
Example 4	CE with tocopherol	38% ± 23%	64% ± 20%	55% ± 11%	42% ± 22%
Example 5		16% ± 5%	44% ± 10%	30% ± 6%	26% ± 13%
Example 6		11% ± 6%	23% ± 16%	28% ± 19%	15% ± 4%
Example 7		11% ± 2%	15% ± 8%	25% ± 18%	25% ± 11%
Example 8	CE with β -carotene	38% ± 11%	51% ± 32%	47% ± 18%	65% ± 48%
Example 9		32% ± 18%	47% ± 23%	38% ± 20%	50% ± 18%
Example 10		22% ± 15%	69% ± 43%	38% ± 15%	41% ± 4%
Example 11	CE with tocopherol and β -carotene	25% ± 12%	53% ± 8%	55% ± 22%	36% ± 9%
Example 12		15% ± 1%	48% ± 2%	27% ± 5%	29% ± 1%
Example 13		15% ± 9%	18% ± 13%	25% ± 0%	27% ± 3%
Example 14		9% ± 3%	10% ± 7%	32% ± 10%	17% ± 0%
Example 15	CE with cholecalciferol	56% ± 25%	47% ± 23%	36% ± 18%	77% ± 46%
Example 16		38% ± 14%	26% ± 7%	33% ± 13%	37% ± 24%
Example 17		13% ± 8%	31% ± 14%	24% ± 3%	36% ± 22%
Example 18		6% ± 3%	18% ± 12%	23% ± 4%	27% ± 9%
Example 19	CE with menaquinone	65%	76%	-	46%
Example 20		52%	71%	-	49%
Example 21		31%	38%	-	31%

1 Data represented as mean ± standard deviation.

[0090] The results in Table 6 above show that the liquid oral composition according to Examples 4 to 21 in which tocopherol, β -carotene, tocopherol and β -carotene, cholecalciferol, or menaquinone added to CE reduced the concentration percentage of odor components (trimethylamine, butanedione, 3-methylbutanoic acid and 2-methyl-3-furanthiol), as compared to Comparative Example 2, with dose-dependent effects.

[0091] In the sensory evaluation in Examples 1 to 3 and Comparative Example 1, the odor reducing/preventing effect was confirmed in the chicken extract containing vitamin A (β -carotene) and/or vitamin E (tocopherol).

Further, according to the results of Examples 4 to 21 and Comparative Example 2, addition of any of the fat-soluble vitamins selected from vitamin A (β -carotene),

vitamin E (tocopherol), vitamin D (cholecalciferol), and vitamin K (menaquinone) was confirmed to provide an effect of reducing or preventing the generation of odor components, as compared to when no fat-soluble vitamins were added to the chicken extract (Comparative Example 2).

The above results show that the addition of fat-soluble vitamins has the effect of reducing or preventing the odor of the chicken extract.

Industrial Applicability

[0092] The present invention can provide a food in a sealed container containing a chicken extract-containing oral composition, and a method of producing the food in a sealed container, wherein an unpleasant odor (for example, fishy smell) from chicken extract obtainable by extraction from chicken meat and/or chicken bone is reduced or prevented. The present invention can also provide use of a component in production of a food in a sealed container containing a chicken extract-containing oral composition, wherein the component can reduce or prevent odor caused by heating chicken extract. The present invention can still also provide an oral composition, wherein while the oral composition contains chicken extract, the amount of an odor component from the chicken extract is reduced.

Claims

- [Claim 1] A food in a sealed container, comprising:
a chicken extract-containing oral composition in a container,
wherein the oral composition contains chicken extract and a fat-soluble vitamin,
a head space of the container contains an odor component at a concentration of 100 ppm or less, and
the concentration of the odor component is a total concentration of trimethylamine, butanedione, 3-methylbutanoic acid, and 2-methyl-3-furanthiol.
- [Claim 2] The food in a sealed container according to claim 1,
wherein the fat-soluble vitamin is at least one selected from the group consisting of vitamin A, vitamin D, vitamin E, vitamin K, an analog of vitamin A, an analog of vitamin D, an analog of vitamin E, and an analog of vitamin K.
- [Claim 3] The food in a sealed container according to claim 2,
wherein at least one of (A) or (B) described below is satisfied:
(A) the fat-soluble vitamin includes at least one of vitamin A or its analog, and a total concentration of vitamin A and its analog in the oral composition is 10 mg/L or more;
(B) the fat-soluble vitamin includes at least one selected from the group consisting of vitamin D, vitamin E, vitamin K, an analog of vitamin D, an analog of vitamin E, and an analog of vitamin K, and a total concentration of vitamin D, vitamin E, vitamin K, an analog of vitamin D, an analog of vitamin E, and an analog of vitamin K in the oral composition is 0.1 mg/L or more.
- [Claim 4] The food in a sealed container according to claim 2 or 3,
wherein the vitamin A or its analog is at least one selected from the group consisting of α -carotene, β -carotene, β -cryptoxanthin, and retinol.
- [Claim 5] The food in a sealed container according to claim 2 or 3,
wherein the vitamin D or its analog is at least one of ergocalciferol or cholecalciferol.
- [Claim 6] The food in a sealed container according to claim 2 or 3,
wherein the vitamin E or its analog is tocopherol.
- [Claim 7] The food in a sealed container according to claim 2 or 3,
wherein the vitamin K or its analog is at least one of phyloquinone or

menaquinone.

- [Claim 8] A method of producing a food in a sealed container containing a chicken extract-containing oral composition, comprising:
heating a container containing a raw material composition containing chicken extract and a fat-soluble vitamin,
wherein odor caused by heating the chicken extract in the heating is reduced or prevented due to the presence of the fat-soluble vitamin in the raw material composition.
- [Claim 9] The production method according to claim 8,
wherein the odor caused by heating the chicken extract is derived from at least one odor component selected from the group consisting of trimethylamine, butanedione, 3-methylbutanoic acid, and 2-methyl-3-furanthiol.
- [Claim 10] The production method according to claim 8 or 9,
wherein the fat-soluble vitamin is at least one selected from the group consisting of vitamin A, vitamin D, vitamin E, vitamin K, an analog of vitamin A, an analog of vitamin D, an analog of vitamin E, and an analog of vitamin K.
- [Claim 11] The production method according to claim 10,
wherein at least one of (A) or (B) described below is satisfied:
(A) the fat-soluble vitamin includes at least one of vitamin A or its analog, and a total concentration of vitamin A and its analog in the raw material composition is 10 mg/L or more;
(B) the fat-soluble vitamin includes at least one selected from the group consisting of vitamin D, vitamin E, vitamin K, an analog of vitamin D, an analog of vitamin E, and an analog of vitamin K, and a total concentration of vitamin D, vitamin E, vitamin K, an analog of vitamin D, an analog of vitamin E, and an analog of vitamin K in the raw material composition is 0.1 mg/L or more.
- [Claim 12] The production method according to claim 10,
wherein the vitamin A or its analog is at least one selected from the group consisting of α -carotene, β -carotene, β -cryptoxanthin, and retinol.
- [Claim 13] The production method according to claim 10,
wherein the vitamin D or its analog is at least one of ergocalciferol or cholecalciferol.
- [Claim 14] The production method according to claim 10,
wherein the vitamin E or its analog is tocopherol.

- [Claim 15] The production method according to claim 10, wherein the vitamin K or its analog is at least one of phyloquinone or menaquinone.
- [Claim 16] Use of a fat-soluble vitamin in production of a food in a sealed container containing a chicken extract-containing oral composition, wherein the use is for reducing or preventing odor caused by heating chicken extract.
- [Claim 17] The use according to claim 16, wherein the odor caused by heating the chicken extract is derived from at least one odor component selected from the group consisting of trimethylamine, butanedione, 3-methylbutanoic acid, and 2-methyl-3-furanthiol.
- [Claim 18] The use according to claim 16 or 17, wherein the fat-soluble vitamin is at least one selected from the group consisting of vitamin A, vitamin D, vitamin E, vitamin K, an analog of vitamin A, an analog of vitamin D, an analog of vitamin E, and an analog of vitamin K.
- [Claim 19] The use according to claim 18, wherein at least one of (A) or (B) described below is satisfied:
(A) the fat-soluble vitamin includes at least one of vitamin A or its analog, and the at least one of vitamin A or its analog is used such that a total concentration of vitamin A and its analog in the oral composition is 10 mg/L or more;
(B) the fat-soluble vitamin includes at least one selected from the group consisting of vitamin D, vitamin E, vitamin K, an analog of vitamin D, an analog of vitamin E, and an analog of vitamin K, and the at least one selected from the group consisting of vitamin D, vitamin E, vitamin K, an analog of vitamin D, an analog of vitamin E, and an analog of vitamin K is used such that a total concentration of vitamin D, vitamin E, vitamin K, an analog of vitamin D, an analog of vitamin E, and an analog of vitamin K in the oral composition is 0.1 mg/L or more.
- [Claim 20] The use according to claim 18, wherein the vitamin A or its analog is at least one selected from the group consisting of α -carotene, β -carotene, β -cryptoxanthin, and retinol.
- [Claim 21] The use according to claim 18, wherein the vitamin D or its analog is at least one of ergocalciferol or cholecalciferol.

- [Claim 22] The use according to claim 18,
wherein the vitamin E or its analog is tocopherol.
- [Claim 23] The use according to claim 18,
wherein the vitamin K or its analog is at least one of phyloquinone or menaquinone.
- [Claim 24] A chicken extract-containing oral composition comprising:
chicken extract; and
a fat-soluble vitamin,
wherein the chicken extract contains histidine, carnosine, and anserine,
the oral composition contains 0.00001 to 10 wt% histidine, 0.00001 to 3 wt% carnosine, 0.00005 to 5 wt% anserine,
the fat-soluble vitamin is at least one selected from the group consisting of vitamin A, vitamin D, vitamin E, vitamin K, an analog of vitamin A, an analog of vitamin D, an analog of vitamin E and an analog of vitamin K, and
at least one of (A) or (B) described below is satisfied:
(A) the fat-soluble vitamin includes at least one of vitamin A or its analog, and a total concentration of vitamin A and its analog in the oral composition is 10 mg/L or more;
(B) the fat-soluble vitamin includes at least one selected from the group consisting of vitamin D, vitamin E, vitamin K, an analog of vitamin D, an analog of vitamin E, and an analog of vitamin K, and a total concentration of vitamin D, vitamin E, vitamin K, an analog of vitamin D, an analog of vitamin E, and an analog of vitamin K in the oral composition is 0.1 mg/L or more.
- [Claim 25] A chicken extract-containing oral composition comprising:
chicken extract; and
a fat-soluble vitamin,
wherein the chicken extract contains cyclo-phenylalanyl-phenylalanine,
the fat-soluble vitamin is at least one selected from the group consisting of vitamin A, vitamin D, vitamin E, vitamin K, an analog of vitamin A, an analog of vitamin D, an analog of vitamin E and an analog of vitamin K, and
at least one of (A) or (B) described below is satisfied:
(A) the fat-soluble vitamin includes at least one of vitamin A or its analog, and a total concentration of vitamin A and its analog in the oral composition is 10 mg/L or more;
(B) the fat-soluble vitamin includes at least one selected from the group

consisting of vitamin D, vitamin E, vitamin K, an analog of vitamin D, an analog of vitamin E, and an analog of vitamin K, and a total concentration of vitamin D, vitamin E, vitamin K, an analog of vitamin D, an analog of vitamin E, and an analog of vitamin K in the oral composition is 0.1 mg/L or more.

- [Claim 26] The oral composition according to claim 24 or 25, wherein the vitamin A or its analog is at least one selected from the group consisting of α -carotene, β -carotene, β -cryptoxanthin, and retinol.
- [Claim 27] The oral composition according to claim 24 or 25, wherein the vitamin D or its analog is at least one of ergocalciferol or cholecalciferol.
- [Claim 28] The oral composition according to claim 24 or 25, wherein the vitamin E or its analog is tocopherol.
- [Claim 29] The oral composition according to claim 24 or 25, wherein the vitamin K or its analog is at least one of phyloquinone or menaquinone.