

[Description]

[Title of the Invention]

FOOD COMPOSITION AND METHOD FOR SUPPRESSING FATTY ODOR
OF SILKWORM POWDER

[Technical Field]

[0001]

The present disclosure relates to a food composition. The present application is based on Japanese Patent Application No. 2023-085511, filed on May 24, 2023, the contents of which are herein incorporated by reference.

[Background Art]

[0002]

Conventionally, silkworms (*Bombyx mori*) have been widely reared in Japan for the production of silk. In addition, it is known that a specific effect is produced by eating silkworms, and for example, PTL 1 describes an effect of treating diabetes by eating silkworms.

[Citation List]

[Patent Literature]

[0003]

[PTL 1] JP H08-337530 A

[Summary of Invention]

[Technical Problem]

[0004]

Silkworms are also attracting attention as a new protein source because they are relatively rich in proteins. However, the present inventors have found that silkworms have a fatty odor, which is likely to be an obstacle to continuous ingestion. Therefore, there is a demand for a technology capable of suppressing the fatty odor in a food composition containing silkworm powder.

[Solution to Problem]

[0005]

The present disclosure can be implemented in the following items.

[0006]

(1) An aspect of the present disclosure provides a food composition. This food composition contains the following components (A) and (B): (A) silkworm powder and (B) matcha powder. According to the food composition of this item, the fatty odor derived from silkworm powder can be suppressed.

[0007]

(2) In the food composition according to (1) above, the content of the component (A) may be 10 to 95 mass%. According to the food composition of this item, the fatty odor derived from silkworm powder can be suppressed while silkworm-specific effects are exerted.

[0008]

(3) In the food composition according to (1) or (2) above, the mass ratio [(A)/(B)] of the component (A) to the component (B) may be 1 to 30. According to the food composition of this item, the fatty odor derived from silkworm powder can be further suppressed.

[0009]

(4) In the food composition according to any one of (1) to (3) above, the food composition may be a solid food composition. According to the food composition of this item, it is possible to provide a food composition wherein the fatty odor derived from silkworm powder is suppressed.

[0010]

(5) In the food composition according to (4) above, the content of the component (A) may be 40 to 95 mass%. According to the food composition of this item, the fatty odor derived from silkworm powder can be suppressed while silkworm-specific effects are exerted.

[0011]

(6) In the food composition according to (4) above, the content of the component (B) may be 1 to 30 mass%. According to the food composition of this item, the fatty odor derived from silkworm powder can be further suppressed while silkworm-specific effects are further exerted.

[0012]

(7) In the food composition according to any one of (1) to (3) above, the food composition may be a beverage. According to the food composition of this item, it is possible to provide a beverage wherein the fatty odor derived from silkworm powder is suppressed.

[0013]

(8) In the food composition according to (7) above, the content of the component (A) may be 5 to 60 mass%. According to the food composition of this item, the fatty odor derived from silkworm powder can be suppressed while silkworm-specific effects are exerted.

[0014]

(9) In the food composition according to (7) above, the content of the component (B) may be 1 to 40 mass%. According to the food composition of this item, the fatty odor derived from silkworm powder can be further suppressed while silkworm-specific effects are exerted.

[0015]

(10) The food composition according to any one of (1) to (9) above may further contain, as a component (C), at least one citrus fruit selected from the group consisting of yuzu, lemon, and sudachi. According to the food composition of this item, the fatty odor derived from silkworm powder can be further suppressed.

[0016]

(11) In the food composition according to (10) above, the mass ratio $[(A)/(C)]$ of the component (A) to the component (C) in terms of solid content may be 1 to 40. According to the food composition of this item, umami can be improved while suppressing the fatty odor and astringency.

[0017]

(12) In the food composition according to (10) or (11) above, the mass ratio $[(C)/(B)]$ of the component (C) to the component (B) in terms of solid content may be 0.25 to 5. According to the food composition of this item, umami can be improved while suppressing the fatty odor and astringency.

[0018]

(13) In the food composition according to any one of (10) to (12) above, the content of the component (C) may be 1 to 40 mass% in terms of solid content. According to the food composition of this item, umami can be improved while suppressing a fatty odor and astringency.

[0019]

(14) Another aspect of the present disclosure provides a method for suppressing the fatty odor of silkworm powder. This suppression method includes containing the following components (A) and (B): (A) silkworm powder and (B) matcha powder. According to the suppression method of this item, the fatty odor derived from silkworm powder can be suppressed.

[0020]

Note that the present invention can be implemented in various forms. For example, the present invention can be realized in the form of a method for producing a food composition.

[Description of Embodiments]

[0021]

<Food composition>

The food composition of the present disclosure may be, for example, a solid or a liquid beverage, and may take an appropriate form. Note that the "liquid" in the present specification may include a jelly form or a liquid having relatively high viscosity.

[0022]

When the food composition of the present disclosure is a solid food composition, the shape of the food composition is not particularly limited as long as the food composition is a solid at normal temperature ($20^{\circ}\text{C} \pm 15^{\circ}\text{C}$), and the food composition can have various solid shapes such as a powder shape, a granular shape, a tablet shape, a rod shape, a plate shape, and a block shape. More specifically, examples of the solid food composition include a solid food composition such as a protein bar and a powdery food composition such as protein powder. In addition, the

size of the solid food composition of the present disclosure may be selected, if appropriate, according to the form of the food composition as long as it can be chewed and ingested.

[0023]

When the food composition of the present disclosure is a beverage, a single strength is preferable from the viewpoint of convenience. As used herein, the term "single strength" refers to a beverage that can be taken in as it is without being diluted. Examples of the beverage include a protein beverage.

[0024]

The pH of the beverage at 20°C is not particularly limited, but is preferably 2.0 to 8.0, more preferably 2.5 to 7.5, still more preferably 2.6 to 7.0, and still even more preferably 3.0 to 6.5 from the viewpoint of stability and flavor.

[0025]

The food composition of the present disclosure contains silkworm powder as the component (A). As used herein, the term "silkworm powder" refers to the powder obtained by drying and pulverizing silkworms.

[0026]

As the component (A), a commercially available product may be used, or a product produced from silkworms may be used. The method for producing silkworm powder is not particularly limited, but for example, silkworm powder produced by the method described in JP H08-337530 A may be used. JP H08-337530 A describes a method for producing powder by subjecting silkworms, from the fourth-instar stage to the fully grown silkworms at the end of the fifth instar stage, to an antioxidation treatment with nitrogen gas, followed by freeze-drying and pulverization.

[0027]

The content of the component (A) in the food composition of the present disclosure is not particularly limited, but is preferably 10 mass% or more, more preferably 15 mass% or more, still more preferably 20 mass% or more, and still even more preferably 25 mass% or more from the viewpoint of obtaining the silkworm-specific effects; and is preferably 95 mass% or less, more preferably 93 mass% or

less, still more preferably 90 mass% or less, and still even more preferably 85 mass% or less from the viewpoint of suppressing the fatty odor. The content range of the component (A) is preferably 10 to 95 mass%, more preferably 15 to 93 mass%, still more preferably 20 to 90 mass%, and still even more preferably 25 to 85 mass% in the food composition. Here, the fatty odor indicates an oily odor. In the present disclosure, the content of the component (A) in the food composition corresponds to the amount of the component (A) blended in the food composition. In the present disclosure, the "content" of a certain component means the ratio of the mass of the component when the mass of the entire composition is set to 100 mass%.

[0028]

In addition, the content of the component (A) in the food composition of the present disclosure may be selected, if appropriate, according to the form of the food composition.

[0029]

When the food composition is a solid food composition, the content of the component (A) in the solid food composition is preferably 40 mass% or more, more preferably 50 mass% or more, still more preferably 60 mass% or more, still even more preferably 70 mass% or more, yet still more preferably 75 mass% or more, and particularly preferably 80 mass% or more from the viewpoint of obtaining the silkworm-specific effects; and is preferably 95 mass% or less, more preferably 90 mass% or less, still more preferably 88 mass% or less, and still even more preferably 85 mass% or less from the viewpoint of suppressing the fatty odor. The content range of the component (A) is preferably 40 to 95 mass%, more preferably 50 to 90 mass%, still more preferably 60 to 88 mass%, and still even more preferably 70 to 85 mass% in the solid food composition.

[0030]

When the food composition of the present disclosure is a beverage, the content of the component (A) in the beverage is preferably 5 mass% or more, more preferably 10 mass% or more, still more preferably 15 mass% or more, still even more preferably 20 mass% or more, yet still more preferably 25 mass% or more, and

particularly preferably 27 mass% or more from the viewpoint of obtaining the silkworm-specific effects; and is preferably 60 mass% or less, more preferably 50 mass% or less, still more preferably 40 mass% or less, still even more preferably 35 mass% or less, and yet still more preferably 30 mass% or less from the viewpoint of suppressing the fatty odor. The content range of the component (A) is preferably 5 to 60 mass%, more preferably 10 to 50 mass%, still more preferably 15 to 40 mass%, still even more preferably 20 to 35 mass%, yet still more preferably 25 to 30 mass%, and particularly preferably 27 to 30 mass% in the beverage.

[0031]

The food composition of the present disclosure contains matcha powder as the component (B) in order to suppress the fatty odor derived from silkworm powder. In the present disclosure, the term "matcha powder" means powdered matcha. In addition, in the present disclosure, the term "matcha" refers to pulverized and powdered green tea. Accordingly, the component (B) is not particularly limited to powder derived from tencha as the raw material; it may also be powder obtained by pulverizing green teas such as gyokuro or sencha. The component (B) is not particularly limited, but is preferably commercially available matcha powder from the viewpoint of availability.

[0032]

The content of the component (B) in the food composition of the present disclosure is preferably 0.1 mass% or more, more preferably 1 mass% or more, still more preferably 3 mass% or more, and still even more preferably 5 mass% or more from the viewpoint of suppressing the fatty odor; and is preferably 40 mass% or less, more preferably 30 mass% or less, still more preferably 20 mass% or less, and still even more preferably 10 mass% or less from the viewpoint of suppressing astringency derived from matcha. The content range of the component (B) is preferably 0.1 to 40 mass%, more preferably 1 to 30 mass%, still more preferably 3 to 20 mass%, and still even more preferably 5 to 10 mass% in the food composition. Here, the "astringency" means a flavor that brings a feeling of tingling of the tongue and gives an uncomfortable feeling as a food. In the present disclosure, the content of the

component (B) in the food composition corresponds to the amount of the component (B) blended in the food composition.

[0033]

The content of the component (B) in the food composition of the present disclosure can be selected, if appropriate, according to the form of the food composition.

[0034]

For example, when the food composition is a solid food composition, the content of the component (B) in the solid food composition is preferably 1 mass% or more, more preferably 3 mass% or more, still more preferably 5 mass% or more, and still even more preferably 7 mass% or more from the viewpoint of suppressing the fatty odor; and is preferably 30 mass% or less, more preferably 20 mass% or less, still more preferably 15 mass% or less, and still even more preferably 10 mass% or less from the viewpoint of suppressing astringency derived from matcha. The content range of the component (B) is preferably 1 to 30 mass%, more preferably 3 to 20 mass%, still more preferably 5 to 15 mass%, and still even more preferably 7 to 10 mass% in the solid food composition.

[0035]

When the food composition of the present disclosure is a beverage, the content of the component (B) in the beverage is preferably 1 mass% or more, more preferably 3 mass% or more, still more preferably 5 mass% or more, and still even more preferably 7 mass% or more from the viewpoint of suppressing the fatty odor; and is preferably 40 mass% or less, more preferably 30 mass% or less, still more preferably 20 mass% or less, and still even more preferably 10 mass% or less from the viewpoint of suppressing astringency derived from matcha. The content range of the component (B) is preferably 1 to 40 mass%, more preferably 3 to 30 mass%, still more preferably 5 to 20 mass%, and still even more preferably 7 to 10 mass% in the beverage.

[0036]

Note that the food composition of the present disclosure may be in the form of

a concentrated beverage. However, when the composition is a concentrated beverage, it is preferable that, upon dilution in accordance with the prescribed usage to prepare a reconstituted beverage, the contents of components (A) and (B) in the reconstituted beverage satisfy the above requirements.

[0037]

The mass ratio [(A)/(B)] of the component (A) to the component (B) in the food composition of the present disclosure is preferably 1 or more, more preferably 2 or more, and still more preferably 3 or more from the viewpoint of suppressing the fatty odor; and is preferably 30 or less, more preferably 20 or less, still more preferably 15 or less, and still even more preferably 12 or less from the viewpoint of suppressing the fatty odor. The range of the mass ratio [(A)/(B)] is preferably 1 to 30, more preferably 2 to 20, and still more preferably 3 to 15.

[0038]

In addition, the mass ratio [(A)/(B)] of the component (A) to the component (B) in the food composition of the present disclosure may be selected, if appropriate, according to the form of the food composition.

[0039]

For example, when the food composition is a solid food composition, the mass ratio [(A)/(B)] is preferably 1 or more, more preferably 2.5 or more, and still more preferably 5 or more from the viewpoint of suppressing the fatty odor. In addition, when the food composition is a solid food composition, the mass ratio [(A)/(B)] is preferably 30 or less, more preferably 20 or less, still more preferably 15 or less, and still even more preferably 12 or less from the viewpoint of suppressing the fatty odor. When the food composition is a solid food composition, the range of the mass ratio [(A)/(B)] is preferably 1 to 30, more preferably 2.5 to 20, still more preferably 5 to 15, and still even more preferably 5 to 12.

[0040]

When the food composition of the present disclosure is a beverage, the mass ratio [(A)/(B)] is preferably 1 or more, more preferably 2 or more, and still more preferably 3 or more from the viewpoint of suppressing the fatty odor. In addition,

the mass ratio [(A)/(B)] is preferably 10 or less, more preferably 7 or less, and still more preferably 5 or less from the viewpoint of suppressing the fatty odor. The range of the mass ratio [(A)/(B)] is preferably 1 to 10, more preferably 2 to 7, and still more preferably 3 to 5.

[0041]

Further, the following embodiments of the food composition of the present disclosure are also suitable.

[0042]

When the food composition of the present disclosure is a solid food composition, it is preferable that the content of the component (A) is 60 to 95 mass%, the content of the component (B) is 3 to 15 mass%, and the mass ratio [(A)/(B)] is 5 to 20; and it is more preferable that the content of the component (A) is 70 to 90 mass%, the content of the component (B) is 5 to 10 mass%, and the mass ratio [(A)/(B)] is 7 to 15, from the viewpoint of suppressing the fatty odor and astringency and improving the umami.

[0043]

When the food composition of the present disclosure is a beverage, it is preferable that the content of the component (A) is 20 to 40 mass%, the content of the component (B) is 5 to 20 mass%, and the mass ratio [(A)/(B)] is 1 to 7; and it is more preferable that the content of the component (A) is 25 to 35 mass%, the content of the component (B) is 7 to 15 mass%, and the mass ratio [(A)/(B)] is 2 to 5, from the viewpoint of suppressing the fatty odor and astringency and improving the umami.

[0044]

Further, the food composition of the present disclosure may contain a component (C) citrus fruit in order to further suppress the fatty odor derived from silkworm powder. The component (C) is not particularly limited; however, examples thereof include one or more kinds selected from the group consisting of mandarin orange, orange, natsumikan (summer orange), lemon, yuzu, sudachi, kabosu, grapefruit, shikuwasa (*Citrus depressa*), hassaku, and lime. From the viewpoint of further suppressing the fatty odor derived from silkworm powder, the component (C)

is preferably one or more kinds selected from the group consisting of yuzu, lemon, and sudachi; and more preferably contains yuzu. In other words, the food composition of the present disclosure preferably contains, as the component (C), one or more citrus fruits selected from the group consisting of yuzu, lemon, and sudachi; and more preferably contains yuzu. When multiple kinds of citrus fruit components are contained as the component (C), both the blending amount and the content mean the total amount. Furthermore, the food composition of the present disclosure may contain, as the component (C), one or more other citrus fruits other than yuzu, lemon, and sudachi, in order to further suppress the fatty odor derived from silkworm powder. Such other citrus fruits are not particularly limited, and may be, for example, one or more kinds selected from the group consisting of mandarin orange, orange, summer orange, kabosu, grapefruit, shikuwasa, hassaku, and lime.

[0045]

The form of the component (C) is not particularly limited, and may be a liquid or a solid. When the food composition is a solid food composition, it is preferable to use the solid component (C) from the viewpoint of workability at the time of mixing. Specifically, when the food composition is a solid food composition, it is preferable to use the powdery component (C), i.e., citrus fruit powder.

[0046]

The content of the component (C) in the food composition of the present disclosure is, in terms of solid content, preferably 1 mass% or more, more preferably 2 mass% or more, still more preferably 3 mass% or more, and still even more preferably 4 mass% or more from the viewpoint of suppressing the fatty odor and astringency and improving the umami; and is preferably 40 mass% or less, more preferably 30 mass% or less, still more preferably 20 mass% or less, and still even more preferably 10 mass% or less from the viewpoint of suppressing the fatty odor and astringency and improving the umami. The content range of the component (C) in the food composition is preferably 1 to 40 mass%, more preferably 2 to 30 mass%, still more preferably 3 to 20 mass%, and still even more preferably 4 to 10 mass% in terms of solid content. In the present disclosure, the content of the component (C) in

the food composition in terms of solid content corresponds to the amount of the component (C) blended in the food composition in terms of solid content. In the present disclosure, the wording "in terms of solid content" means to convert the mass of a sample into the mass of a residue after the sample is dried at 120°C for 12 hours under a nitrogen stream.

[0047]

In addition, the content of the component (C) in the food composition of the present disclosure may be selected, if appropriate, according to the form of the food composition.

[0048]

For example, when the food composition is a solid food composition, the content of the component (C) in the solid food composition is preferably 1 mass% or more, more preferably 3 mass% or more, and still more preferably 5 mass% or more in terms of solid content from the viewpoint of suppressing the fatty odor and astringency and improving the umami; and is preferably 40 mass% or less, more preferably 30 mass% or less, still more preferably 20 mass% or less, and still even more preferably 10 mass% or less from the viewpoint of suppressing the fatty odor and astringency and improving the umami. The content range of the component (C) in the solid food composition is preferably 1 to 40 mass%, more preferably 3 to 30 mass%, still more preferably 5 to 20 mass%, and still even more preferably 5 to 10 mass% in terms of solid content.

[0049]

When the food composition of the present disclosure is a beverage, the content of the component (C) in the beverage is, in terms of solid content, preferably 1 mass% or more, more preferably 2 mass% or more, still more preferably 3 mass% or more, and still even more preferably 5 mass% or more from the viewpoint of suppressing the fatty odor and astringency and improving the umami; and is preferably 40 mass% or less, more preferably 30 mass% or less, still more preferably 20 mass% or less, and still even more preferably 10 mass% or less from the viewpoint of suppressing the fatty odor and astringency and improving the umami. The content

range of the component (C) in the beverage is preferably 1 to 40 mass%, more preferably 2 to 30 mass%, still more preferably 3 to 20 mass%, and still even more preferably 5 to 10 mass% in terms of solid content.

[0050]

The mass ratio $[(A)/(C)]$ of the component (A) to the component (C) in terms of solid content in the food composition of the present disclosure is preferably 1 or more, more preferably 3 or more, and still more preferably 5 or more from the viewpoint of suppressing the fatty odor and astringency and improving the umami; and is preferably 40 or less, more preferably 30 or less, and still more preferably 20 or less from the viewpoint of suppressing the fatty odor and astringency and improving the umami. The range of the mass ratio $[(A)/(C)]$ is preferably 1 to 40, more preferably 3 to 30, and still more preferably 5 to 20.

[0051]

In addition, the mass ratio $[(A)/(C)]$ of the component (A) to the component (C) in terms of solid content in the food composition of the present disclosure may be selected, if appropriate, according to the form of the food composition.

[0052]

For example, when the food composition is a solid food composition, the mass ratio $[(A)/(C)]$ in terms of solid content is preferably 2.5 or more, more preferably 5 or more, and still more preferably 7 or more from the viewpoint of suppressing the fatty odor and astringency and improving the umami. In addition, when the food composition is a solid food composition, the mass ratio $[(A)/(C)]$ is preferably 30 or less, more preferably 20 or less, still more preferably 15 or less, and still even more preferably 12 or less from the viewpoint of suppressing the fatty odor and astringency and improving the umami. When the food composition is a solid food composition, the range of the mass ratio $[(A)/(C)]$ is preferably 2.5 to 30, more preferably 5 to 20, still more preferably 7 to 15, and still even more preferably 7 to 12.

[0053]

When the food composition of the present disclosure is a beverage, the mass ratio $[(A)/(C)]$ in terms of solid content is preferably 1 or more, more preferably 2 or

more, and still more preferably 3 or more from the viewpoint of suppressing the fatty odor and astringency and improving the umami. In addition, the mass ratio $[(A)/(C)]$ is preferably 10 or less, more preferably 7 or less, and still more preferably 5 or less from the viewpoint of suppressing the fatty odor and astringency and improving the umami. The range of the mass ratio $[(A)/(B)]$ is preferably 1 to 10, more preferably 2 to 7, and still more preferably 3 to 5.

[0054]

The mass ratio $[(C)/(B)]$ of the component (C) to the component (B) in terms of solid content in the food composition of the present disclosure is preferably 0.25 or more, more preferably 0.4 or more, and still more preferably 0.5 or more from the viewpoint of suppressing the fatty odor and astringency and improving the umami; and is preferably 5 or less, more preferably 4 or less, and still more preferably 2 or less from the viewpoint of suppressing the fatty odor and astringency and improving the umami. The range of the mass ratio $[(C)/(B)]$ is preferably 0.25 to 5, more preferably 0.4 to 4, and still more preferably 0.5 to 2.

[0055]

The mass ratio $[(C)/(B)]$ of the component (C) to the component (B) in terms of solid content in the food composition of the present disclosure may be selected, if appropriate, according to the form of the food composition.

[0056]

For example, when the food composition is a solid food composition, the mass ratio $[(C)/(B)]$ in terms of solid content is preferably 0.25 or more, more preferably 0.5 or more, and still more preferably 0.75 or more from the viewpoint of suppressing the fatty odor and astringency and improving the umami. In addition, when the food composition is a solid food composition, the mass ratio $[(C)/(B)]$ is preferably 5 or less, more preferably 3 or less, still more preferably 1.5 or less, and still even more preferably 12 or less from the viewpoint of suppressing the fatty odor and astringency and improving the umami. When the food composition is a solid food composition, the range of the mass ratio $[(C)/(B)]$ is preferably 0.25 to 5, more preferably 0.5 to 3, and still more preferably 0.75 to 1.5.

[0057]

When the food composition of the present disclosure is a beverage, the mass ratio $[(C)/(B)]$ in terms of solid content is preferably 0.25 or more, more preferably 0.4 or more, and still more preferably 0.5 or more from the viewpoint of suppressing the fatty odor and astringency and improving the umami. In addition, the mass ratio $[(C)/(B)]$ is preferably 5 or less, more preferably 3 or less, and still more preferably 1 or less from the viewpoint of suppressing the fatty odor and astringency and improving the umami. The range of the mass ratio $[(C)/(B)]$ is preferably 0.25 to 5, more preferably 0.4 to 3, and still more preferably 0.5 to 1.

[0058]

The food composition of the present disclosure may optionally contain, for the purpose of improving palatability and the like, one or two or more additives selected from the group consisting of acidulants, sweeteners, amino acids, proteins, vitamins, minerals, flavoring agents, fruit juices, plant extracts, esters, colorants, dairy ingredients, cocoa powder, seasonings, oils and fats, antioxidants, preservatives, pH adjusters, and quality stabilizers. Note that the content of the additive can be appropriately set within a range not impairing the purpose of the present disclosure.

[0059]

Further, when the food composition of the present invention is in a solid form, an acceptable carrier may be included, as necessary. Examples of the carrier include excipients (e.g., monosaccharides such as glucose, galactose, and fructose; disaccharides such as sucrose, lactose, and maltose; sugar alcohols such as xylitol and sorbitol; and starch decomposition products such as dextrin and malt syrup); binders (e.g., hydroxypropyl methylcellulose, hydroxypropyl cellulose, gelatin, pregelatinized starch, polyvinylpyrrolidone, polyvinyl alcohol, pullulan, methylcellulose, and hardened oils); disintegrants (e.g., carmellose, carmellose calcium, croscarmellose sodium, crospovidone, corn starch, and low-substituted hydroxypropyl cellulose); lubricants (e.g., calcium stearate, magnesium stearate, sucrose fatty acid esters, sodium stearyl fumarate, talc, and silicon dioxide); flavoring agents (e.g., stevia); and other carriers such as oligosaccharides, crystalline cellulose, light anhydrous silicic

acid, calcium hydrogen phosphate, bulking agents, surfactants, dispersants, buffers, and diluents. Note that the content of the carrier may be set, if appropriate, within a range not impairing the purpose of the present invention.

[0060]

The food composition of the present disclosure can be produced according to a conventional method, and an appropriate method can be adopted. For example, the food composition of the present disclosure can be produced by mixing specific amounts of the component (A), the component (B), and the optional component (C), and if necessary, a carrier and/or an additive, preferably within the above ranges of the content and mass ratio. The order of mixing the component (A), the component (B), and the optional component (C) is not particularly limited, and a certain component may be added to another component and mixed, or all the components may be added almost simultaneously and mixed. As the mixing method, an appropriate method such as stirring or shaking can be adopted, and a mixing device may be used. In addition, when the food composition of the present disclosure is in a solid form, for example, the food composition may be molded by compression or the like in order to obtain a desired shape, or may be granulated by a known granulation method or the like.

[0061]

When the food composition of the present disclosure is a beverage, it may be filled into and provided in conventional packaging containers such as molded containers mainly composed of polyethylene terephthalate (so-called PET bottles), metal cans, paper containers laminated with metal foil and/or plastic film, or bottles. In addition, the beverage may also be subjected to heat sterilization. For example, in cases where the beverage is filled into a container such as a metal can that can be heat-sterilized, it may be produced under sterilization conditions specified by the applicable laws and regulations (the Food Sanitation Act in Japan). In the case of containers that cannot be subjected to retort sterilization, such as PET bottles or paper containers, a method may be employed in which the beverage is previously sterilized under conditions equivalent to those described above, for example, by high-

temperature short-time sterilization using a plate-type heat exchanger, and subsequently cooled to a predetermined temperature before being filled into the container.

[0062]

<Method for suppressing fatty odor of silkworm powder>

A method for suppressing the fatty odor of silkworm powder according to the present disclosure includes containing the following components (A) and (B):

(A) silkworm powder; and

(B) matcha powder.

[0063]

In the suppression method of the present disclosure, it is only required that components (A) and (B) be finally contained in the food composition, and there is no particular limitation on the timing or blending order of their inclusion. The form of the food composition is not particularly limited as long as it can be orally ingested, and may be a solid form or a liquid form. Note that the specific configuration of the food composition and the specific configurations (e.g., each content, the mass ratio) of the components (A) and (B) are as described above.

[0064]

The suppression method of the present disclosure may further include containing the component (C). Also in the method of this embodiment, it is sufficient that the component (A), the component (B), and the component (C) are finally contained in the food composition, and the timing and blending order of their inclusion are not particularly limited. The form of the food composition is not particularly limited as long as it can be orally ingested, and may be a solid form or a liquid form. Note that the specific configuration of the food composition and the specific configurations (e.g., each content, the mass ratio) of the components (A), (B), and (C) are as described above.

[Examples]

[0065]

Hereinafter, the present invention will be described more specifically with

reference to Examples. The present invention, however, is not limited to the following Examples.

[0066]

<Sensory test>

Four expert panelists performed sensory tests on each of the powdered foods and beverages for the "strength of fatty odor", "strength of astringency", and "strength of umami". Each sensory test was performed after each panelist agreed to the following evaluation criteria. The expert panelists then determined the final rating through consultation.

[0067]

(1) Evaluation criteria for strength of fatty odor

The score "1" means not preferable because the fatty odor is strongest, and the score "5" means preferable because the fatty odor is weakest. For the powdered foods, the strength of the fatty odor of the powdered food of Example 1 was rated as "5", the strength of the fatty odor of the powdered food of Example 9 was rated as "3", and the strength of the fatty odor of the powdered food of Comparative Example 1 was rated as "1". For the beverages, the strength of the fatty odor of the beverage of Example 11 was rated as "5", the strength of the fatty odor of the beverage of Example 15 was rated as "3", and the strength of the fatty odor of the beverage of Comparative Example 2 was rated as "1".

[0068]

Specific evaluation criteria are as follows.

5: No fatty odor (it is equivalent to or less than that of Example 1 or Example 11)

4: Fatty odor is weak (it is superior to Example 9 or Example 15, but inferior to Example 1 or Example 11)

3: Fatty odor is somewhat weak (it is equivalent to or less than that of Example 9 or Example 15)

2: Fatty odor is somewhat strong (it is superior to Comparative Example 1 or Comparative Example 2, but inferior to Example 9 or Example 15)

1: Fatty odor is strong (it is equivalent to or more than that of Comparative Example 1 or Comparative Example 2)

[0069]

(2) Evaluation criteria for strength of astringency

The score "1" means not preferable because the astringency is strongest, and the score "5" means preferable because the astringency is weakest. For the powdered foods, the strength of the astringency of the powdered food of Example 1 was rated as "5", the strength of the astringency of the powdered food of Example 9 was rated as "3", and the strength of the astringency of the powdered food of Comparative Example 1 was rated as "1". For the beverages, the strength of the astringency of the beverage of Example 11 was rated as "5", the strength of the astringency of the beverage of Example 15 was rated as "3", and the strength of the astringency of the beverage of Comparative Example 2 was rated as "1".

[0070]

Specific evaluation criteria are as follows.

5: No astringency (it is equivalent to or less than that of Example 1 or Example 11)

4: Astringency is weak (it is superior to Example 9 or Example 15, but inferior to Example 1 or Example 11)

3: Astringency is somewhat weak (it is equivalent to or less than that of Example 9 or Example 15)

2: Astringency is somewhat strong (it is superior to Comparative Example 1 or Comparative Example 2, but inferior to Example 9 or Example 15)

1: Astringency is strong (it is equivalent to or more than that of Comparative Example 1 or Comparative Example 2)

[0071]

(3) Evaluation criteria for strength of umami

The score "1" means not preferable because the umami is weakest, and the score "5" means preferable because the umami is strongest. For the powdered foods, the strength of the umami of the powdered food of Example 1 was rated as "5", the

strength of the umami of the powdered food of Example 9 was rated as "3", and the strength of the umami of the powdered food of Comparative Example 1 was rated as "1". For the beverages, the strength of the umami of the beverage of Example 11 was rated as "5", the strength of the umami of the beverage of Example 15 was rated as "3", and the strength of the umami of the beverage of Comparative Example 2 was rated as "1".

[0072]

Specific evaluation criteria are as follows.

5: Umami is strong (it is equivalent to or more than that of Example 1 or Example 11)

4: Umami is somewhat strong (it is superior to Example 9 or Example 15, but inferior to Example 1 or Example 11)

3: Umami is somewhat weak (it is equivalent to or more than that of Example 9 or Example 15)

2: Umami is weak (it is superior to Comparative Example 1 or Comparative Example 2, but inferior to Example 9 or Example 15)

1: No umami (it is equivalent to or less than that of Comparative Example 1 or Comparative Example 2)

[0073]

<Examples 1 to 10 and Comparative Example 1>

Each component was mixed according to the formulation shown in Table 1 to obtain a powdered food. The results of sensory evaluation of the obtained powdered food are also shown in Table 1.

[0074]

Table 1

		Example 1	Example 2	Example 3	Example 4	Example 5	Example 6	Example 7	Example 8	Example 9	Example	Comparative Example 1
		100	100	100	100	100	100	100	100	100	100	100
Formulation	(A)	Silkworm powder	100	100	100	100	100	100	100	100	100	100
	(B)	Matcha powder	10	10	20	40	10	10	10	10	10	
	(C)	Yuzu powder	10	10	10	10	5	20	40			
		Lemon powder								10		
		Sudachi powder								10		
Mass%		Silkworm powder	83.333	90.909	86.957	76.923	66.667	86.957	76.923	66.667	83.333	100.000
		Matcha powder	8.333	9.091	4.348	15.385	26.667	8.696	7.692	6.667	8.333	0.000
		Citrus fruit	8.333	0.000	8.696	7.692	6.667	4.348	15.385	26.667	8.333	0.000

Mass ratio	(A)/(B)	10	10	10	20	5	2.5	10	10	10	10	10	10	10	10		
	(A)/(C)	10			10	10	10	20	5		2.5	10	10	10	10		
	(C)/(B)	1		0	2	0.5	0.25	0.5	2		4	1	1	1	1		
Evaluation	Fatty odor	5		4	4	4	5	4	4	4	4		3	3	3	1	
	Astringency	5		3	4	3	3	4	4	4	3		3	3	3	1	
	Umami	5		4	4	4	4	3	3	3	3		3	3	3	1	

[0075]

<Examples 11 to 18 and Comparative Example 2>

Each component was mixed according to the formulation shown in Table 2 to obtain a single strength beverage. The results of sensory evaluation of the obtained beverage are also shown in Table 2.

[0076]

Table 2

Formulation		Example 11	Example 12	Example 13	Example 14	Example 15	Example 16	Example 17	Example 18	Comparative Example 2
Formulation	(A)	Silkworm powder	100	100	100	100	100	100	100	100
	(B)	Matcha powder	30	30	20	40	30	30	30	
	(C)	Yuzu powder	20		20	20	10	30		
		Lemon powder						20		
		Sudachi powder							20	
		Water	200	200	200	200	200	200	200	200
Mass%		Silkworm powder	28.571	30.303	29.412	27.778	29.412	27.778	28.571	33.333
		Matcha powder	8.571	9.091	5.882	11.111	8.824	8.333	8.571	0.000
		Citrus fruit	5.714	0.000	5.882	5.556	2.941	8.333	5.714	0.000

Mass ratio	(A)/(B)	3.33	3.33	5	2.5	3.33	3.33	3.33	3.33	3.33	
	(A)/(C)	5		5	5	10	3.33	5	5		
	(C)/(B)	0.67	0	1	0.5	0.33	1	0.67	0.67		
Evaluation	Fatty odor	5	4	4	4	3	4	4	4	1	
	Astringency	5	4	4	3	3	4	4	3	1	
	Umami	5	4	4	4	3	4	3	3	1	

[0077]

Tables 1 to 2 show that the fatty odor of silkworm powder can be suppressed by mixing matcha powder into silkworm powder.

[0078]

The present invention is not limited to the above-described embodiments, and can be realized by various configurations without departing from the spirit of the present invention. For example, the technical features in the embodiments and Examples corresponding to the technical features in the respective aspects described in the Summary of Invention section can be appropriately replaced or combined in order to solve part or all of the above-described problems or achieve part or all of the above-described effects. Besides, when the technical features are not herein described as essential, they can be deleted if appropriate.

[Claims]

[Claim 1] A food composition comprising the following components (A) and (B):

(A) silkworm powder; and

(B) matcha powder.

[Claim 2] The food composition according to claim 1, wherein a content of the component (A) is 10 to 95 mass%.

[Claim 3] The food composition according to claim 1, wherein a mass ratio [(A)/(B)] of the component (A) to the component (B) is 1 to 30.

[Claim 4] The food composition according to claim 1, wherein the food composition is a solid food composition.

[Claim 5] The food composition according to claim 4, wherein a content of the component (A) is 40 to 95 mass%.

[Claim 6] The food composition according to claim 4, wherein a content of the component (B) is 1 to 30 mass%.

[Claim 7] The food composition according to claim 1, wherein the food composition is a beverage.

[Claim 8] The food composition according to claim 7, wherein a content of the component (A) is 5 to 60 mass%.

[Claim 9] The food composition according to claim 7, wherein a content of the component (B) is 1 to 40 mass%.

[Claim 10] The food composition according to claim 1, further comprising, as a component (C), at least one citrus fruit selected from the group consisting of yuzu, lemon, and sudachi.

[Claim 11] The food composition according to claim 10, wherein a mass ratio [(A)/(C)] of the component (A) to the component (C) in terms of solid content is 1 to 40.

[Claim 12] The food composition according to claim 10, wherein a mass ratio [(C)/(B)] of the component (C) to the component (B) in terms of solid content is 0.25

to 5.

[Claim 13] The food composition according to claim 10, wherein a content of the component (C) in terms of solid content is 1 to 40 mass%.

[Claim 14] A method for suppressing a fatty odor of silkworm powder, the method comprising containing the following components (A) and (B):

(A) silkworm powder; and

(B) matcha powder.