

JELLY-LIKE FOOD CONTAINING COLLAGEN PEPTIDES

[CROSS-REFERENCE TO RELATED APPLICATION]

5 [0001]

This application is based on JP application no. 2014-004840 (filing date: January 15, 2014) that is a preceding Japanese patent application, and claims benefit of the priority thereof, the disclosure of which is hereby incorporated by reference in its entirety.

10

[0002] Technical Field

The present invention relates to a suppressant for reaction between collagen peptide and acidic polysaccharide in foods or drinks. In addition, the present invention relates to a jelly-like food including
15 collagen peptide. More specifically, the present invention relates to an acidic jelly-like food including collagen peptide excellent in transparency and having no smell peculiar to collagen peptide.

[0003] Background Art

20 Collagen is one of the components composing dermis, ligament, tendon, cartilage, bone and the like, and is reported to have physiological effects capable of relieving the symptom of joint pain, promoting the formation of bone, etc. by the intake of collagen. Collagen peptide which is hydrolyzed collagen is also reported to have
25 bioactivities such as beauty effect and joint reinforcement, and thus various forms of foods or drinks are proposed.

[0004]

In general, collagen peptides have broad molecular weight, because they are obtained through decomposition of collagens having
30 weight average molecular weights of approximately 100,000 Da. However, such general collagen peptides have a unique smell like an animal or fishy smell (for example, a smell we feel when eating pettitoes) which is called as a collagen smell. Such a smell could not be said to be desirable for tasty and easy ingestion.

35 [0005]

Until now, as foods or drinks such as a jelly including collagen

peptide, for example, Japanese Patent Application Laid-Open Publication No. 2002-051734 A discloses collagen-added foods or drinks (a fruit jelly, drink jelly, seasoning jelly and the like) including collagen peptide and acidic polysaccharide (carrageenan, gellan gum, Arabian gum, xanthan gum, pectin), into which a low molecular weight collagen peptide having a molecular weight of 4000 Da or less is added. Using a low molecular weight collagen peptide secures transparency, gel property and the like. In addition, therein, it is also disclosed that it is preferable to use collagen peptides having weight average molecular weights of 500 or more which will not be decomposed to amino acids (paragraph 0012 in the same Literature). It is not disclosed that a neutral or basic amino acid is combined.

[0006]

Japanese Patent Application Laid-Open Publication No. S62-058695 A discloses jellylike acidic dessert foods in which alkali-treated gelatin, LM pectin, carrageenan, milk raw material and organic acid are combined, having a pH of the isoelectric point of 4.7 to 5.1.

[0007]

In addition, Japanese Patent Application Laid-Open Publication No. 2008-79565 A discloses foods or drinks having no unclarity nor precipitation including plant polyphenol, collagen and basic amino acid. Therein, it is considered that the unclarity and precipitation considered to be a problem are observed when plant polyphenol and collagen are mixed (paragraph 0010 in the same Literature). In addition, therein, it is considered to be important that the pH of foods or drinks is adjusted to 7.5 or higher (claim 9 etc. in the same Literature).

[SUMMARY OF THE INVENTION]

[0008]

In this way, any of these Literatures does not disclose nor suggest that combining a neutral or basic amino acid to prepare a jelly including collagen peptide suppresses a reaction of collagen peptide to acidic polysaccharide even under an acidic condition. In addition, it is considered desirable that actually used collagen peptide have low

molecular weight from the viewpoint of securing of transparency. It is not suggested at all, in case of collagen peptides having molecular weights of larger than 4000 Da, whether the reaction of collagen peptide to acidic polysaccharide is suppressed by an amino acid or not.

5 [0009]

Accordingly, it is said that development is still desired of a jelly-like food including collagen peptide excellent in transparency and having no smell peculiar to collagen peptide.

[0010]

10 The inventors have now produced jelly-like foods including collagen peptide using as the collagen peptide having a weight average molecular weight of 4000 to 6000 Da in combination with a neutral or basic amino acid, and thus unexpectedly succeeded in obtaining acidic jelly-like foods excellent in transparency while a smell
15 peculiar to collagen peptide is suppressed. In the course, the inventors have found that the neutral or basic amino acid can effectively suppress the white turbidity which may occur in jelly-like foods including collagen peptide and acidic polysaccharide, which makes it possible to improve the transparency of jelly-like foods and
20 suppress occurrence of the precipitation. It has been considered that this means that a neutral or basic amino acid can effectively suppress the reaction occurring between collagen peptide and acidic polysaccharide. The present invention is based on such findings.

[0011]

25 Therefore, it is an object of the present invention to provide a suppressant capable of effectively suppressing a reaction occurring between collagen peptide and acidic polysaccharide in foods or drinks. In addition, it is an object of the present invention to provide an acidic jelly-like food including collagen peptide excellent in transparency and
30 having a smell peculiar to collagen peptide suppressed.

[0012]

In other words, according to the present invention, the following inventions are provided.

[0013]

35 <1> A suppressant for reaction between collagen peptide and acidic polysaccharide in a food or drink, including a neutral or basic

amino acid as an active component.

[0014]

5 <2> A suppressant for the white turbidity in a jelly-like food including collagen peptide and acidic polysaccharide, including a neutral or basic amino acid as an active component.

[0015]

<3> As to the suppressant according to <1> or <2>, improvement of the transparency and/or suppression of occurrence of the precipitation in a jelly-like food may be provided.

10 [0016]

<4> As to the suppressant according to any one of <1> to <3>, the collagen peptide and the acidic polysaccharide may be under an acidic condition of pH 5.5 or lower.

[0017]

15 <5> As to the suppressant according to any one of <1> to <4>, the neutral or basic amino acid may be one or more selected from the group consisting of glutamine, serine, alanine, proline, histidine and arginine.

[0018]

20 <6> As to the suppressant according to <5>, the neutral or basic amino acid may be arginine.

[0019]

25 <7> As to the suppressant according to any one of <1> to <6>, the weight average molecular weight of the collagen peptide may be 4000 to 6000 Da, and the acidic polysaccharide may be κ-carrageenan.

[0020]

30 <8> An acidic jelly-like food having a pH of 5.5 or lower, including a collagen peptide having a weight average molecular weight of 4000 to 6000 Da and the suppressant according to any one of <1> to <7>.

[0021]

<9> As to the jelly-like food according to <8>, the acidic polysaccharide may be κ-carrageenan.

35 [0022]

<10> A method for producing the jelly-like food according to

<8> or <9>, including adding water to a collagen peptide having a weight average molecular weight of 4000 to 6000 Da, an acidic polysaccharide, and a neutral or basic amino acid, followed by mixing, dissolving and gelating.

5 [0023]

<11> A method for suppressing a reaction between collagen peptide and acidic polysaccharide in a food or drink, including using a neutral or basic amino acid in the presence of the collagen peptide and the acidic polysaccharide.

10 [0024]

<12> A method for improving the transparency or suppressing occurrence of the precipitation in a jelly-like food including collagen peptide and acidic polysaccharide, including using a neutral or basic amino acid in the jelly-like food including collagen peptide and acidic polysaccharide.

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[0025]

<13> Use of a neutral or basic amino acid for suppressing a reaction between collagen peptide and acidic polysaccharide in a food or drink.

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[ADVANTAGEOUS EFFECTS OF THE INVENTION]

[0026]

According to the suppressant of the present invention, it is possible to effectively suppress a reaction of collagen peptide to acidic polysaccharide in foods or drinks. In this way, for example, it is possible to suppress the white turbidity which may occur in jelly-like foods including collagen peptide, and (tend to) improve the transparency and suppress occurrence of the precipitation in the jelly-like foods.

30 [0027]

In addition, according to the present invention, provided is an acidic jelly-like food including collagen peptide excellent in transparency, having a smell peculiar to collagen suppressed, and having a preferable flavor. In addition, it is possible to produce a jelly-like food at a relatively lower price with the use of a collagen peptide having a weight average molecular weight of 4000 to 6000 Da

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available at a relatively lower price.

[BRIEF DESCRIPTION OF THE DRAWINGS]

[0028]

5 Fig. 1 is a graph showing the result of Example 2.

Fig. 2 is a graph showing the result of Example 3, which represents a relationship between the added amount of κ -carrageenan and the reactivity (transmittance).

10 Fig. 3 is a graph showing the result of Example 4, which represents a relationship between the kind of amino acid and the reactivity (transmittance).

Fig. 4 is a graph showing the result of Example 5 in which an influence of amino acid and pH on the reactivity is examined.

15 [MODE FOR CARRYING OUT THE INVENTION]

[0029]

Hereinafter, a description is made of embodiments according to the present invention.

[0030]

20 **Suppressant**

The suppressant for reaction according to the present invention may suppress a reaction of collagen peptide to acidic polysaccharide in foods or drinks as mentioned above, including a neutral or basic amino acid as an active component. Herein, "including as an active component" means that the suppressant for reaction according to the present invention contains a sufficient used amount (i.e., effective amount) of neutral or basic amino acid to suppress the reaction of collagen peptide to acidic polysaccharide.

30 Note that the "suppressant for reaction" according to the present invention may be expressed as, for example, a composition for suppressing reaction, a reaction suppressive agent composition or the like in other words.

[0031]

35 Herein, the reaction of collagen peptide to acidic polysaccharide means a reaction possibly occurring when the collagen peptide coexists with the acidic polysaccharide (e.g., a chemical

reaction). For example, it may be said that a condition where these components are brought into an aqueous solution or aqueous sol or gel state, which may produce aggregate or precipitate, or lead to a whitened state, is a reacted condition. The reaction herein is a reaction in foods or drinks, in other words, a reaction in foods or drinks including collagen peptide and acidic polysaccharide, preferably a reaction in jelly-like foods as mentioned below.

[0032]

In addition, a suppression of reaction herein means that the occurrence of the reaction is prevented, the reaction that has actually occurred is suppressed, and the progress of the reaction is stopped or delayed. It is actually confirmed in Examples 2 to 4 that the active component according to the present invention has a suppressive effect for such a reaction. In the present invention, the reaction may be effectively suppressed in fact even when collagen peptide and acidic polysaccharide are under an acidic condition of pH 5.5 or lower, under which it has been conventionally considered difficult to suppress the reaction.

[0033]

The suppressant for white turbidity according to the present invention is capable of suppressing the white turbidity in jelly-like foods including collagen peptide and acidic polysaccharide as mentioned above, and includes a neutral or basic amino acid as an active component. Herein, "as an active component" means that the suppressant for white turbidity according to the present invention contains a sufficient used amount (i.e., effective amount) of neutral or basic amino acid to suppress the white turbidity occurring in jelly-like foods including collagen peptide and acidic polysaccharide.

[0034]

Herein, the white turbidity in jelly-like foods including collagen peptide and acidic polysaccharide means white turbidity in foods possibly occurring when collagen peptide coexists with acidic polysaccharide in jelly-like foods. The white turbidity herein may occur due to denaturation of some components, occurrence of aggregate, etc. However, in the present invention, such white turbidity may be suppressed. In addition, the suppression of white

turbidity herein means improvement, reduction or dissolution of the white turbid state in foods or drinks, typically means improvement of the transparency and suppression of occurrence of the precipitation in jelly-like foods. Accordingly, the white turbidity in jelly-like foods preferably means improvement of the transparency and/or suppression of occurrence of the precipitation in jelly-like foods.
[0035]

It is actually confirmed in Examples 2 to 4 that the active component according to the present invention has a suppressive effect for such white turbidity. In the present invention, the white turbidity may be effectively suppressed in fact even when collagen peptide and acidic polysaccharide are under an acidic condition of pH 5.5 or lower, under which it has been conventionally considered difficult to suppress the white turbidity.

[0036]

According to one preferable aspect of the present invention, a food or drink (preferably jelly-like food) including collagen peptide and acidic polysaccharide, and including the suppressant for reaction or the inhibitor for white turbidity according to the present invention is provided.

[0037]

Jelly-like food

The jelly-like food according to the present invention, as mentioned above, includes a collagen peptide having a weight average molecular weight of 4000 to 6000 Da, an acidic polysaccharide, and the above-mentioned suppressant according to the present invention (i.e., the suppressant for reaction or suppressant for white turbidity according to the present invention), and is acidic with a pH of 5.5 or lower. Specifically, the jelly-like food according to the present invention includes a collagen peptide having a weight average molecular weight of 4000 to 6000 Da, an acidic polysaccharide, and a neutral or basic amino acid, and is acidic with a pH of 5.5 or lower.

[0038]

Herein, the jelly-like food means a food that has gelled to a degree at which the fluidity is not impaired, and examples thereof include a fruit jelly, seasoning jelly, coffee jelly, tea jelly, liqueur jelly,

drink jelly, bite-size jelly and the like.

[0039]

Neutral or basic amino acid

5 In the present invention, the reaction of collagen peptide to acidic polysaccharide in a jelly-like food may be suppressed with the use of the neutral or basic amino acid. This makes it possible to suppress the white turbidity in jelly-like foods, as well as improve the transparency and suppress occurrence of the precipitation in jelly-like foods. Herein, the neutral or basic amino acid in the present invention
10 is not limited in particular, as long as the amino acid has its own property, and thus is preferably one or more selected from the group consisting of glutamine, serine, alanine, proline, histidine and arginine, more preferably arginine.

[0040]

15 In the present invention, it is confirmed that combining the amino acid to prepare a jelly including collagen peptide suppresses the reaction of the collagen peptide to acidic polysaccharide even under an acidic condition.

[0041]

20 The combined amount of the amino acid in a food or drink according to the present invention is usually 0.01 to 10% by weight, preferably 0.05 to 7% by weight, more preferably 0.1 to 4% by weight, with respect to the whole weight of the food or drink.

[0042]

25 **Collagen peptide**

In the present invention, the actually used collagen peptide has typically a weight average molecular weight of 4000 to 6000 Da, preferably a weight average molecular weight of more than 4000 Da but 5500 Da or less, more preferably a weight average molecular
30 weight of more than 4000 Da but 5000 Da or less. In this case, when the weight average molecular weight is 4000 Da or more that is the above-mentioned lower limit value, it becomes hard to feel a flavor such as a smell peculiar to collagen peptide in foods or drinks such as a jelly, which is desirable from the viewpoint of preference etc. In
35 addition, from the viewpoint of transparency of the appearance etc., it is advantageous that the weight average molecular weight in foods or

drinks such as a jelly is 6000 Da or less that is the above-mentioned upper limit value.

[0043]

5 In the present invention, it is confirmed that using the predetermined (weight average) molecular weight of the collagen peptide to prepare a jelly including collagen peptide suppresses the reaction of the collagen peptide to acidic polysaccharide (herein, κ -carrageenan) even under an acidic condition. This makes it possible to suppress the white turbidity in jelly-like foods, as well as improve
10 the transparency and suppress occurrence of the precipitation in jelly-like foods.

[0044]

Herein, the weight average molecular weight of the collagen peptide may be measured by a method described in a testing method
15 for photographic gelatin (PAGI), 10th edition, Gelatin Manufacturers Association of Japan.

[0045]

In the present invention, the actually used collagen peptide may be a commercial product, or may be obtained, for example,
20 through hydrolysis of collagen.

[0046]

In the present invention, to a method or treatment condition for hydrolysis of the collagen, a usual technology for producing hydrolyzed collagen is applicable. Specifically, to a method for
25 hydrolysis of collagen, a method for treatment with protease such as papain, a method for chemical treatment with acid or alkali, a heating method and the like are applicable. Herein, in order to obtain the collagen peptide having a desired weight average molecular weight in the present invention, for example, a reference may be made to the
30 description of Japanese Patent Application Laid-Open Publication No. 2003-238597 A. Specifically, 20 L of water is added to 10 kg of fish skin, followed by heat and pressure extraction (100°C, 3 hours). The solid and liquid are cooled and then separated through a 16 mesh wire gauge, followed by filtration through a filter paper to yield 26 L of
35 extract including collagen. Subsequently, the extract is adjusted to a pH of 7.0, and then heated to 50°C. To the heated extract, 4.0 g of

protease formulation (trade name "PROTEAZE M", made by Amano Enzyme Inc.) is added, followed by enzymatic reaction for 60 minutes. The reactant is filtered through a filter paper to yield 22 L of filtrate. Furthermore, the filtrate is subjected to a membrane treatment with
5 the use of a reverse osmotic membrane (the common salt-blocking rate: 30%, trade name "NTR-7430", made by Nitto Denko Corporation) to yield 9 L of concentrate. Finally, the concentrate is spray-dried to yield collagen peptides (weight average molecular weights of 4500). Furthermore, the obtained collagen peptides are
10 appropriately selected with the use of a method for identifying the weight average molecular weight of collagen peptide described in a testing method for photographic gelatin (PAGI), 10th edition, Gelatin Manufacturers Association of Japan, to yield a collagen peptide having a desired weight average molecular weight.

15 [0047]

Because the collagen peptides obtained through hydrolysis of collagen have a distribution of (weight average) molecular weight, those having a larger (weight average) molecular weight or smaller (weight average) molecular weight than a desired weight average
20 molecular weight to some extent may be included, as long as the above-mentioned reaction condition for weight average molecular weight and the like are met.

[0048]

The combined amount of the collagen peptide in a food or
25 drink according to the present invention is usually 0.01 to 10% by weight, preferably 0.5 to 8% by weight, more preferably 1 to 5% by weight, with respect to the whole weight of the food or drink.

[0049]

Note that in the present invention, the collagen peptide may
30 be added to foods or drinks in a powdered state, or added to foods or drinks in a solution state or a dispersion liquid state.

[0050]

Acidic polysaccharide

In the present invention, the actually used acidic
35 polysaccharide is typically a polysaccharide including uronic acid or ester sulfate. Herein, in the present invention, the acidic

polysaccharide is not limited in particular, as long as the acidic polysaccharide is a component used for the purpose of gelation in jelly-like foods or the like, and examples thereof include κ-carrageenan, gellan gum, Arabia gum, xanthan gum, pectin, and preferably κ-carrageenan. In this case, it is desirable to use κ-carrageenan from the viewpoint of texture having moderate hardness or smoothness, etc.

[0051]

The combined amount of the acidic polysaccharide in a food or drink according to the present invention is usually 0.01 to 3% by weight, preferably 0.05 to 1% by weight, more preferably 0.1 to 0.5% by weight, with respect to the whole weight of the food or drink.

[0052]

Note that in the present invention, it is confirmed that increasing the used amount (combined amount) of the acidic polysaccharide to prepare a jelly including collagen peptide promotes the reaction of the collagen peptide to the acidic polysaccharide. In this case, it is confirmed that when a predetermined used amount of the predetermined amino acid is included, the reaction of collagen peptide to acidic polysaccharide is suppressed at the same level, with no relationship (proportion) to the used amount of acidic polysaccharide.

[0053]

pH

The jelly-like food according to the present invention is acidic, and the process for preparing the same is also in an acidic condition. Herein, the acidity of the food or drink such as a jelly in the present invention has a pH value of 5.5 or lower, preferably 5 or lower, more preferably 4.5 or lower, further preferably 4.2 or lower, still more preferably 4 or lower, for example, in the range of 4 to 3.2. Because when the pH value is below 3.2, acidic polysaccharide (e.g., carrageenan) may not gelate, it is desirable for the pH value to be 3.2 or higher.

[0054]

Optional components

The jelly-like food according to the present invention may

further include another optional component (component which may be optionally added). Such another optional component is not limited in particular, but is a component usually combined in foods or drinks, such as a sweetening agent, acidulant, fruit juice, dairy product, fragrance, pH adjuster, excipient, acidulant, coloring agent, emulsifier and preservative.

[0055]

In the present invention, as the sweetening agent, for example, powder sugars such as sugar, glucose, fructose, trehalose and dextrin, liquid sugars such as starch syrup, glucose fructose liquid sugar and oligosaccharide, as well as sugar alcohols such as maltitol and sorbitol may be used.

[0056]

In addition, in the present invention, another optional component includes acidulants such as citric acid, malic acid and the like, and a salt thereof, fruit juices from those such as grape, apple, orange and strawberry, milk, dairy products such as yogurt, various kinds of vitamins etc.

[0057]

20 **Producing method**

The jelly-like food according to the present invention may be produced by, as mentioned above, adding water to the above-mentioned collagen peptide, acidic polysaccharide and neutral or basic amino acid, followed by mixing, dissolving and gelating. Specifically, the jelly-like food may be produce by the following steps or the like. That is, included are the steps of adding and mixing the collagen peptide, the acidic polysaccharide, the neutral or basic amino acid, another optional component if needed, and an appropriate amount of water, heating (e.g., 85°C to 100°C) while stirring the mixture to dissolve, filling a container with the resultant and then sealing and sterilizing the container (or sterilizing the resultant before filling the container, and sealing the container), and cooling the container to allow for gelation.

[0058]

35 **Suppressing method**

According to another preferable aspect of the present

invention, a method for suppressing the reaction between collagen peptide and acidic polysaccharide in a food or drink, including using the neutral or basic amino acid in the presence of the collagen peptide and the acidic polysaccharide is provided.

5 [0059]

According to another preferable aspect of the present invention, a method for suppressing the white turbidity in a jelly-like food including collagen peptide and acidic polysaccharide, including using the neutral or basic amino acid in the presence of the collagen peptide and the acidic polysaccharide is provided.

10 [0060]

According to another preferable aspect of the present invention, a method for improving the transparency or suppressing occurrence of the precipitation in a jelly-like food including collagen peptide and acidic polysaccharide, including using the neutral or basic amino acid in the jelly-like food including collagen peptide and acidic polysaccharide is provided.

[0061]

Use

20 According to another aspect of the present invention, use of the neutral or basic amino acid for suppressing the reaction between the collagen peptide and the acidic polysaccharide in a food or drink is provided. The use herein is usually carried out in the presence of the collagen peptide and the acidic polysaccharide.

25 [0062]

According to another aspect of the present invention, use of the neutral or basic amino acid for suppressing the white turbidity in a jelly-like food including collagen peptide and acidic polysaccharide is provided. The use herein is usually carried out in the presence of the collagen peptide and the acidic polysaccharide.

30 [0063]

According to another aspect of the present invention, use of the neutral or basic amino acid for improving the transparency or suppressing occurrence of the precipitation in a jelly-like food including collagen peptide and acidic polysaccharide is provided. The use herein is usually carried out in a jelly-like food including collagen

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peptide and acidic polysaccharide.

[EXAMPLES]

5 [0064]

Hereinafter, a detailed description is made of the present invention with reference to the following Examples, but the present invention is not limited thereto.

[0065]

10 Example 1: Relationship between the weight average molecular weight and the flavor of collagen

A collagen peptide having a weight average molecular weight of 2000 Da (Ikuosu MS-01, Nitta Gelatin Inc.), a collagen peptide having a weight average molecular weight of 3000 Da (Ikuosu HDL-30DR, Nitta Gelatin Inc.), and a collagen peptide having a weight average molecular weight of 5000 Da (Ikuosu HDL-50OH, Nitta Gelatin Inc.) were prepared.

[0066]

Ten grams of the collagen peptide, 8 g of a gelling agent (San-Ei Gen F. F. I., Inc., SAN SUPPORT MJG-EN), 3 g of sodium citrate, 80 g of sugar, 28.6 g of 7-times concentrated fruit juice of apple, 120 g of glucose fructose liquid sugar, and 570 g of water were added, stirred and dispersed, and melted by heating at 70°C for 10 minutes. Subsequently, the pH was adjusted to 4.0 with the use of 10% citric acid solution, 1.5 g of apple flavor (Givaudan Japan K. K., apple flavor GIV10006) was added, and water was added for adjusting the weight so as to become 1000 g. The resultant was maintained at 90°C for 5 minutes for dissolution and sterilization, then cooled to 70°C, and filled in a container. Then, the container was cooled to 10°C or below to allow for gelation. In this way, a jelly (jelly-like food) was prepared.

[0067]

Subsequently, an evaluation panel of five people evaluated the flavor of each of the collagen peptides according to the flavor evaluation standard in the following Table 1.

35 [0068]

(Flavor evaluation standard)

[0069]

[Table 1]

TABLE 1:

5

	FLAVOR EVALUATION
GOOD (HAVING LITTLE ANIMAL SMELL)	A
TOLERABLE TO EAT (HAVING ANIMAL SMELL)	B
POOR (HAVING STRONG ANIMAL SMELL)	C

[0070]

The result was as indicated in the following Table 2.

[0071]

10 [Table 2]

TABLE 2:

WEIGHT AVERAGE MOLECULAR WEIGHT	FLAVOR EVALUATION
2000	C
3000	B
5000	A

15 [0072]

From the result, the flavor of the collagen peptide having a weight average molecular weight of 3000 Da caused to feel an animal smell, but was tolerable to eat. In addition, the flavor of the collagen peptide having a weight average molecular weight of 5000 Da was good.

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[0073]

Example 2: Relationship between the molecular weight of collagen and the reactivity (transmittance)

A collagen peptide having a weight average molecular weight of 1200 Da (Ikuosu MS-02A, Nitta Gelatin Inc.), and collagen peptides having weight average molecular weights of 2000 Da, 3000 Da and

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5000 Da (Nitta Gelatin Inc.) were prepared.

The weight average molecular weight of the collagen peptide was measured by a method described in a testing method for photographic gelatin (PAGI), 10th edition, Gelatin Manufacturers Association of Japan.

[0074]

Three point zero percent by weight of the collagen peptide, 0.16% by weight of carrageenan, each amount (0% by weight, 0.3% by weight, 0.6% by weight, 0.9% by weight, 1.2% by weight, 1.5% by weight, 1.8% by weight, 2.1% by weight, 2.4% by weight, 2.7% by weight, 3.0% by weight, 3.3% by weight, or 3.6% by weight) of arginine as shown in the horizontal axis of Fig. 1, and 70% by weight of water were added, stirred and dispersed, and heated at 70°C for 10 minutes. Subsequently, the pH was adjusted to 4.0 with the use of 10% citric acid solution and water was added for adjusting so as to become 100% by weight as the total volume. The resultant was maintained at 90°C for 5 minutes for dissolution and sterilization, then cooled to 70°C, and filled in a container. Then, the container was cooled to 10°C or below to allow for gelation. In this way, a jelly was prepared.

Note that because arginine is a basic amino acid, the acid taste is not influenced at the above-mentioned addition level.

[0075]

After the prepared jelly was maintained at 65°C, 4 g of the jelly was inserted in a cell, and then the transmittance at 550 nm was measured on a spectrophotometer (Shimadzu Corporation, UV-1600PC).

[0076]

The result was as shown in Fig. 1. From the result, the transmittance may be evaluated as indicated in the following Table 3.

[0077]

[Table 3]

TABLE 3:

EVALUATION STANDARD:

TRANSMITTANCE	TRANSPARENCY	REACTION SUPPRESSION
85% OR HIGHER	TRANSPARENT	AA: STATE WHERE REACTION IS SUPPRESSED
70% TO LOWER THAN 85%	LITTLE BIT TURBID	A: STATE WHERE REACTION IS ALMOST SUPPRESSED
50% TO LOWER THAN 70%	WHITE TURBID SLIGHTLY	B: STATE WHERE REACTION IS INSUFFICIENTLY SUPPRESSED
LOWER THAN 50%	WHITE TURBID	C: STATE WHERE REACTION IS HARDLY SUPPRESSED

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[0078]

Example 3: Relationship between the added amount of κ -carrageenan and the reactivity

10 Jelly-like foods were prepared in the same way as Example 2, except that the added amount of arginine and the added amount of carrageenan should be as shown in Fig. 2, and a collagen having a weight average molecular weight of 2000 Da was used. The transmittivity of each of the obtained jelly-like foods was measured in the same way as Example 2.

15 [0079]

The result was as shown in Fig. 2.

[0080]

20 From the result, as the added amount of κ -carrageenan increased, the transmittance of the jelly-like food lowered, and the reaction of the collagen peptide to κ -carrageenan (acidic polysaccharide) was promoted.

On the other hand, as the added amount of arginine (basic amino acid) increased, the transmittance of the jelly rose, and the reaction of the collagen peptide to κ -carrageenan was suppressed.

25 [0081]

Example 4: Relationship between the kind of amino acid and the

reactivity

Jelly-like foods were prepared in the same way as Example 2, except that amino acids for use should be as shown in Fig. 3, and a collagen having a weight average molecular weight of 2000 Da was used. The transmittivity of each of the obtained jelly-like foods was measured in the same way as Example 2.

[0082]

The result was as shown in Fig. 3.

[0083]

From the result, when glutamine or serine was used, the transmittance of the jelly-like food was improved, when alanine or proline was used, the transmittance of the jelly-like food was more improved to be high, and when histidine or arginine was used, the transmittance of the jelly-like food was further improved.

[0084]

Example 5: Influence of amino acid and pH on the reactivity

Arginine was prepared as the amino acid for use. A collagen peptide having a weight average molecular weight of 2000 Da (Ikuosu MS-01, Nitta Gelatin Inc.) and a collagen peptide having a weight average molecular weight of 5000 Da (Ikuosu HDL-50OH, Nitta Gelatin Inc.) were prepared.

Three grams of the collagen peptide, 1 g of a gelling agent (San-Ei Gen F. F. I., Inc., FG-2364, carrageenan formulation), 15 g of sugar, 60 g of water were added, and 3 g of arginine was added thereto when arginine was further added, stirred and dispersed, and melted by heating at 70°C for 10 minutes. Subsequently, each pH was adjusted to 4.0, 5.0 or 6.0 with the use of 10% citric acid solution and water was added for adjusting the weight so as to become 100 g. The resultants were maintained at 90°C for 5 minutes for dissolution and sterilization, then cooled to 70°C, and filled in a container. Then, the container was cooled to 10°C or below to allow for gelation. In this way, a jelly (jelly-like food) was prepared.

[0085]

The transmittance of each of the obtained jelly-like foods was measured in the same way as Example 2.

[0086]

The result was as shown in Fig. 4.

[0087]

From the result, at pH 6.0, the transmittance was high, and there was almost no difference due to addition of arginine. At pH 4.0 or pH 5.0, it could be confirmed that the transmittance rose by addition of arginine. Accordingly, when the pH decreased below 6 (at lower than pH 6, e.g., around pH 5.5), improvement of the transmittance by addition of arginine could be definitely confirmed.

[0088]

Furthermore, when the firmness of jelly of each of the prepared jelly-like food was tested, a tendency that the firmness increased by addition of arginine could be confirmed (data not shown). From this, the suppressive effect of the reaction between the collagen peptide and carrageenan (acidic polysaccharide) could be confirmed.

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CLAIMS

1. A suppressant for reaction between collagen peptide and acidic polysaccharide in a food or drink, comprising a neutral or basic amino acid as an active component.
2. A suppressant for white turbidity in a jelly-like food including collagen peptide and acidic polysaccharide, comprising a neutral or basic amino acid as an active component.
3. The suppressant according to claim 1 or 2, wherein improvement of transparency and/or suppression of occurrence of precipitation in a jelly-like food is provided.
4. The suppressant according to any one of claims 1 to 3, wherein the collagen peptide and the acidic polysaccharide are under an acidic condition of pH 5.5 or lower.
5. The suppressant according to any one of claims 1 to 4, wherein the neutral or basic amino acid is one or more selected from the group consisting of glutamine, serine, alanine, proline, histidine and arginine.
6. The suppressant according to claim 5, wherein the neutral or basic amino acid is arginine.
7. The suppressant according to any one of claims 1 to 6, wherein a weight average molecular weight of the collagen peptide is 4000 to 6000 Da, and
the acidic polysaccharide is κ -carrageenan.
8. An acidic jelly-like food having a pH of 5.5 or lower, comprising a collagen peptide having a weight average molecular weight of 4000 to 6000 Da and the suppressant according to any one of claims 1 to 7.
9. The jelly-like food according to claim 8, wherein the acidic

polysaccharide is κ -carrageenan.

10. A method for producing the jelly-like food according to claim 8 or 9, comprising adding water to a collagen peptide having a weight average molecular weight of 4000 to 6000 Da, an acidic polysaccharide, and a neutral or basic amino acid, followed by mixing, dissolving and gelating.
11. A method for suppressing a reaction between collagen peptide and acidic polysaccharide in a food or drink, comprising using a neutral or basic amino acid in the presence of the collagen peptide and the acidic polysaccharide.
12. A method for improving transparency or suppressing occurrence of precipitation in a jelly-like food containing collagen peptide and acidic polysaccharide, comprising using a neutral or basic amino acid in the jelly-like food containing collagen peptide and acidic polysaccharide.
13. Use of a neutral or basic amino acid for suppressing a reaction between collagen peptide and acidic polysaccharide in a food or drink.