

DESCRIPTION

Title of the Invention: MUSHROOM EXTRACT, AND TASTE IMPROVING AGENT

Technical Field

5 [0001]

The present invention relates to a mushroom extract obtained from at least one of a mushroom of the genus Boletus and a mushroom of the genus Amanita.

Background Art

10 [0002]

Heretofore, in order to satisfy the demands for requests of more delicious foods or drinks from consumers, there have been developed not only materials that enhance or suppress basic five tastes of taste shown by sweet taste, salty taste, bitter taste, sour taste, and umami but also materials that improve various tastes such as fruit juice feeling, oily feeling, and richness.

For example, there may be mentioned a material that imparts umami and richness by a tea extract (Patent Document 1), a material that improves odd smell and enhances rich taste by a protease-treated product of whey protein and a lipase-treated product of milk fat (Patent Document 2), and the like.

20 [0003]

Moreover, there has been hitherto proposed a taste improving material using a mushroom extract. As methods for producing the mushroom extract, for example, there may be mentioned a method for obtaining it by heat extraction from truffles or porcini under a reduced pressure atmosphere (Patent Document 3) and a method for obtaining it by a known extraction method such as hot-water extraction or extraction with an organic solvent (Patent Document 4).

Background Art Documents

Patent Documents

30 [0004]

Patent Document 1: JP-A-2005-137286

Patent Document 2: JP-A-9-37735

Patent Document 3: JP-A-2000-14353

Patent Document 4: JP-A-7-115933

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Summary of the Invention

Problems that the Invention is to Solve

[0005]

However, since the material of Patent Document 3 is characterized by containing a flavor characteristic to a mushroom as described therein, there is a disadvantage that usable kinds of foods or drinks and the amount to be added are greatly limited. Moreover, in Patent Document 4, as in Patent Document 3, an effect of reducing harsh taste of potassium chloride is disclosed but there is not shown an effect of enhancing senses of taste such as umami, richness, and salty taste along with an improvement in the bitter taste of potassium chloride as disclosed by the present invention.

With regard to these taste improving materials, a certain degree of effect is observed but is not necessarily satisfactory. Therefore, it has been desired a material that can be utilized in a wide variety of objects, is inexpensive, and is excellent in improving effects.

[0006]

Thus, the mushroom extracts obtained by conventional methods have flavor characteristic to a mushroom and hence cannot be said to be sufficient for improving tastes of various kinds of foods or drinks.

[0007]

Therefore, an object of the present invention is to provide a mushroom extract that does not have a characteristic flavor of existing mushroom extracts, can enhance senses of taste such as umami, richness, salty taste, spicy feeling, milky feeling, sweet taste, and fruit juice feeling and can suppress sour taste and bitter and astringent taste, and thus can impart excellent taste improving properties to various kinds of foods or drinks.

[0008]

In addition, another object of the present invention is to provide a taste improving agent containing the mushroom extract having aforementioned preferable properties.

Means for Solving the Problems

[0009]

The present invention relates to a mushroom extract, a process for producing the mushroom extract, a taste improving agent containing the mushroom extract, and a food containing the mushroom extract as described below.

[0010]

[1] A mushroom extract, which is obtained by a production process including a step of solvent-extracting at least one of a mushroom of the genus *Boletus* and a mushroom of the genus *Amanita* and a step of removing a flavor component from a solvent extract.

[2] The mushroom extract according to [1], in which a solvent to be used in the solvent extraction is water, ethanol, or hydrous ethanol.

[3] The mushroom extract according to [1] or [2], in which the flavor component is removed by performing an adsorption treatment using a synthetic adsorbent or active carbon and removing an adsorbed fraction.

5 [4] The mushroom extract according to [1] or [2], in which the flavor component is removed by performing a liquid-liquid extraction with water and an organic solvent and removing an organic solvent layer portion.

[5] The mushroom extract according to [1] or [2], in which the flavor component is removed by distilling the solvent extract and removing a distilled liquid.

10 [6] The mushroom extract according to any one of [1] to [5], in which the mushroom of the genus *Boletus* is at least one selected from *Boletus edulis*, *Boletus aestivalis*, *Boletus hiratsukae* Nagasawa, and *Boletus violaceofuscus* and the mushroom of the genus *Amanita* is at least one of *Amanita hemibapha* and *Amanita caesarea*.

[7] A taste improving agent for a food or drink, which contains the mushroom extract according to any one of [1] to [6].

15 [8] A food or drink containing the mushroom extract according to any one of [1] to [6] or the taste improving agent according to [7].

Advantage of the Invention

[0011]

20 Compared to the existing mushroom extract, the mushroom extract of the present invention can be added to a variety of foods or drinks, does not have characteristic flavor, can enhance senses of taste such as umami, richness, salty taste, spicy feeling, milky feeling, sweet taste, and fruit juice feeling, and can suppress sour taste and bitter and astringent taste. Therefore, it becomes possible to improve taste properties that are related to various
25 preferences.

[0012]

Moreover, as for the mushroom extract of the present invention, the mushroom extract can be easily produced by using commercial mushrooms or mushroom processed products (e.g., dry mushroom, powder products thereof, and mushroom extracts).

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Modes for Carrying Out the Invention

[0013]

The present invention will be explained in detail in the following.

35 Herein, "% by mass" and "% by weight", "ppm by mass" and "ppm by weight", "ppb by mass" and "ppb by weight", and "parts by mass" and "parts by weight" have the same meanings, respectively. In addition, the case of being simply described as "ppm" indicates that it means "ppm by weight".

[0014]

The mushroom usable in the present invention includes mushrooms of the genus *Boletus* and the genus *Amanita* and is not particularly limited as long as it is a mushroom of these suitable to eat. As the mushroom of the genus *Boletus*, there may be preferably
5 mentioned *Boletus edulis*, *Boletus aestivalis*, *Boletus hiratsukae* Nagasawa, *Boletus violaceofuscus*, and the like and, as the mushroom of the genus *Amanita*, there may be mentioned *Amanita hemibapha* *Amanita caesarea*, and the like. Further preferably, there may be mentioned *Boletus edulis* and *Amanita hemibapha*.

[0015]

10 At the time of producing the mushroom extract of the present invention, a raw mushroom can be used. In addition, commercially available mushroom processed products such as dry mushrooms, powder products thereof, and mushroom extracts can also be used.

[0016]

15 Moreover, as solvents for use in solvent extraction, there may be mentioned water, acetone, ethanol, glycerin, ethyl acetate, methyl acetate, carbon dioxide, 1-butanol, 2-butanol, butane, 1-propanol, 2-propanol, propylene glycol, water, methanol, and the like. Of these, from the standpoints of easy handling, safety, and health, there may be mentioned preferably water or hydrous ethanol, more preferably water. These solvents may be used singly or two or more thereof may be used in combination.

20 [0017]

Water is not particularly limited but there may be mentioned ultrapure water, ion-exchange water, filtered water through a reverse osmosis membrane (RO), distilled water, and tap water and, from the standpoint of production of foods or drinks, ion-exchange water is preferable.

25 [0018]

Furthermore, the temperature at the time of solvent extraction is not particularly limited but, from the standpoint of extraction efficiency, it is preferably from 15 to 90 degrees Celsius, further preferably from 40 to 70 degrees Celsius.

[0019]

30 The time for extraction is not particularly limited but, from the standpoint of extraction efficiency, it is preferably from 30 minutes to 20 hours, further preferably from 1 hour to 5 hours.

The pressure for extraction is not particularly limited and may be under any of a normal pressure condition, a reduced pressure condition, and a pressurized condition but,
35 from the standpoint of easy handling, preferably, extraction under a normal pressure condition may be mentioned.

[0020]

Then, a flavor component is removed from the thus obtained solvent extract.

The method for removing the flavor component is not particularly limited and commonly used methods for removing the flavor component can be used. Of these, there may be preferably mentioned adsorption treatment, liquid-liquid extraction, supercritical
5 extraction, distillation, concentration, drying, membrane separation, and the like. From the standpoints of working efficiency and easy handling, the adsorption treatment may be more preferably mentioned. Further preferably, a combined method of these methods may be mentioned.

[0021]

10 The flavor adsorbent for use in the adsorption treatment is not particularly limited but there may be mentioned active carbon, silica gel, alumina, zeolite, synthetic adsorbents, ion-exchange resins, porous glass, cyclodextrins, and the like. From the standpoints of adsorption efficiency and economical efficiency, there may be mentioned preferably active carbon and synthetic adsorbents, further preferably synthetic adsorbents.

15 [0022]

As a method for the liquid-liquid extraction, it can be performed by adding water and an organic solvent to the solvent extract and removing an organic solvent layer portion. The organic solvent is not particularly limited but ethyl acetate, hexane, or the like can be used.

20 [0023]

Moreover, as a method for the distillation, it can be performed by distilling the solvent extract and removing a distilled liquid.

[0024]

The extract after the flavor removal may be further concentrated by a known
25 concentration method such as membrane concentration or vacuum concentration and also may be dried into a powder by a known drying method such as freeze drying or hot-air drying.

[0025]

It is also possible to obtain an objective mushroom extract by performing solvent extraction after a flavor component characteristic to a mushroom is removed beforehand from
30 a raw mushroom, a dry mushroom, a powdered product, or the like by performing a commonly known method such as a steam distillation method, a processing method under reduced pressure, or an extraction method with supercritical carbon dioxide.

[0026]

By the addition of the taste improving agent containing the mushroom extract of
35 the present invention to a food or drink, it is possible to produce the food or drink having improved taste. Specifically, senses of taste such as umami, richness, salty taste, spicy feeling, milky feeling, sweet taste, and fruit juice feeling can be enhanced and also sour taste and

bitter and astringent taste can be suppressed. In addition, the bitter taste characteristic to potassium chloride can be reduced. Therefore, the taste improving agent containing the mushroom extract of the present invention is useful.

[0027]

5 As an amount of the taste improving agent to be added to a food or drink, the agent can be added in such an amount that an original flavor is not impaired. In terms of solid content of the extract, the amount is preferably in the range of 10 ppb by mass to 5 % by mass, further preferably in the range of 100 ppb by mass to 1% by mass.

[0028]

10 Moreover, it is possible to add the taste improving agent containing the mushroom extract of the present invention to any foods or drinks. As such foods or drinks, there may be mentioned drinks such as fruit juices, carbonated drinks, dairy drinks, vinegar drinks, soft drinks, milk, lactic acid bacteria beverages, and soy milk, soups such as soup stocks, Chinese soups, stews, and curries, processed foods using meats, chicken meat, and
15 fishes as ingredients, seasonings, furikake (dried seasoning powders), instant foods, snack foods, canned foods, dairy products, confectionaries, frozen desserts, and the like but the foods or drinks are not limited thereto.

[0029]

20 In the present invention, the taste improving agent of the present invention may be used in combination with a component or additive that can be added or blended to ordinary foods or drinks or oral compositions to form a taste improving agent composition.

As the component or additive that can be added or blended to ordinary foods or drinks or oral compositions, there may be, for example, mentioned taste improving agents (e.g., hesperidin-based compounds such as hesperidin glycoside) other than the agent of the
25 present invention; pH adjusting agents such as tartaric acid and sodium hydrogen carbonate; preservatives, antibacterial agents, and antiseptics such as sodium benzoate and potassium sorbate; functional substances having a nutritious function or a biology control function, such as docosahexaenoic acid (DHA), eicosapentaenoic acid (EPA), various animal or plant
30 extracts (rosemary, sage, chitin and chitosan, royal jelly, propolis, etc.), and dietary fibers such as hardly digestive dextrin; antioxidants such as L-ascorbic acid and tocopherol; thickeners such as carboxymethyl cellulose calcium and methyl cellulose; colorants and pigments such as β -carotene, caramel, paprika, annatto, and monascus; sweeteners such as aspartame, acesulfame potassium, xylitol, and sucralose; acidulants such as lactic acid, citric acid, and malic acid; seasonings such as sodium glutamate and L-theanine; emulsifiers such
35 as sucrose fatty acid esters, glycerol fatty acid esters, and lecithin; fragrances, flavors, and the like. Examples of the flavors include citrus flavors, fruit flavors, savory flavors, and the like. Examples of the kinds of the citrus flavors include lemon, lime, grapefruit, orange, and the

like. Examples of the kinds of fruit flavors include strawberry, apple, melon, pear, pineapple, grapes, peach, banana, and the like. Of the sweeteners, particularly, aspartame, acesulfame potassium, xylitol, and sucralose that are synthetic sweeteners have miscellaneous taste such as bitter taste and harsh taste and the taste improving agent of the present invention can
 5 improve the miscellaneous taste.

Examples

[0030]

The following will illustrate the present invention in detail based on Examples.

10 However, it is to be understood that the present invention is not restricted to the Examples.

[Example 1] *Boletus edulis* extract

To 100 g of a dry *Boletus edulis* powder was added 2000 g of ion-exchange water, followed by stirring and extracting at 50°C for 2 hours. After cooling to room temperature, solid-liquid separation was conducted by using a centrifuge to obtain 1534 g of an extract
 15 liquid. The obtained extract liquid was allowed to pass through a column packed with a synthetic adsorbent DIAION HP-20 (manufactured by Mitsubishi Chemical Corporation) at a rate of SV=5/h and the resulting resin-treated liquid was freeze-dried, thereby obtaining 33.16 g of a *Boletus edulis* extract of Example 1.

[0031]

20 [Example 2] *Amanita hemibapha* extract

To 20 g of dry *Amanita hemibapha* was added 300 g of ion-exchange water, followed by stirring and extracting at 50°C for 2 hours. After cooling to room temperature, solid-liquid separation was conducted by using a centrifuge to obtain 190 g of an extract
 25 liquid. The obtained extract liquid was allowed to pass through a column packed with a synthetic adsorbent DIAION HP-20 (manufactured by Mitsubishi Chemical Corporation) at a rate of SV=5/h and the resulting resin-treated liquid was freeze-dried, thereby obtaining 4.15 g of an *Amanita hemibapha* extract of Example 2.

[0032]

[Comparative Example 1]

30 To 100 g of dry *Boletus edulis* powder was added 2000 g of ion-exchange water, followed by stirring and extracting at 50°C for 2 hours. After cooling to room temperature, solid-liquid separation was conducted by using a centrifuge to obtain 1534 g of an extract liquid. The obtained extract liquid was freeze-dried and the product was taken as a *Boletus edulis* extract of Comparative Example 1.

35 [0033]

[Comparative Example 2]

To 20 g of dry *Amanita hemibapha* was added 300 g of ion-exchange water, followed by stirring and extracting at 50°C for 2 hours. After cooling to room temperature, solid-liquid separation was conducted by using a centrifuge to obtain 190 g of an extract liquid. The obtained extract liquid was freeze-dried and the product was taken as an *Amanita hemibapha* extract of Comparative Example 2.

[0034]

[Example 3] Preparation of taste-improved reduced-salt noodle soup

The *Boletus edulis* extract of Example 1 was added to a reduced-salt noodle soup having a formulation 1 shown in Table 1 so as to be 20 ppm. Thus, a taste-improved reduced-salt noodle soup was obtained.

[0035]

[Table 1]

[Formulation 1]

Item	Blending amount (g)
Soy sauce	50.0
Sugar	24.0
Dried bonito extract	16.0
Sodium chloride	1.2
Potassium chloride	6.0
Water	902.8
Total	1000.0

[0036]

[Test Example 1] Sensory Evaluation

According to the following procedure, the sensory evaluation of the taste-improved reduced-salt noodle soup of Example 3 was conducted.

[Procedure]

The reduced-salt noodle soup of Example 3 and a control sample [reduced-salt noodle soup to which the taste improving agent was not blended] were tasted and the taste-improved reduced-salt noodle soup of Example 3 was sensorily evaluated according to the evaluation criteria of Table 2. The evaluation was conducted by 7 expert panelists and an average value thereof was calculated. Table 3 shows the results of the sensory evaluation.

[0037]

[Table 2]

Very strong (very delicious)	7 points
Strong (delicious)	6 points
Slightly strong (slightly delicious)	5 points
Comparable to control	4 points
Slightly weak (slightly bad)	3 points
Weak (bad)	2 points
Very weak (very bad)	1 point

[0038]

5 [Table 3]

	Umami	Richness	Salty taste	Deliciousness	Comment
Control	4.0	4.0	4.0	4.0	
Example 3	6.0	5.9	5.3	6.3	Umami and richness increase. Bitter taste characteristic to potassium chloride is reduced.

[0039]

[Example 4] Preparation of taste-improved reduced-salt miso soup

10 The Boletus edulis extract prepared in Example 1 was added to a commercially available reduced-salt miso soup (a product in which 25% of sodium chloride was reduced) so as to be 40 ppm. Thus, a taste-improved reduced-salt miso soup was obtained.

[0040]

[Test Example 2]

Sensory Evaluation

15 The sensory evaluation of the reduced-salt miso soup prepared in Example 4 was conducted in the same manner as in Test Example 1. The control sample is a commercially available reduced salt miso soup to which no Boletus edulis extract was blended.

Table 4 shows the results of the evaluation.

[0041]

[Table 4]

	Umami	Richness	Salty taste	Deliciousness	Comment
Control	4.0	4.0	4.0	4.0	
Example 4	5.9	5.7	5.6	6.4	Umami and richness increase. Salty taste is enhanced.

[0042]

5 [Example 5] Preparation of taste-improved reduced-salt Chinese soup

The *Boletus edulis* extract prepared in Example 1 was added to a commercially available reduced-salt Chinese soup (a product in which 40% of sodium chloride was reduced) so as to be 20 ppm. Thus, a taste-improved reduced-salt soup was obtained.

[0043]

10 [Test Example 3] Sensory Evaluation

The sensory evaluation of the reduced-salt Chinese soup prepared in Example 5 was conducted in the same manner as in Test Example 1. The control sample is a commercially available reduced-salt Chinese soup to which no *Boletus edulis* extract was blended.

15 Table 5 shows the results of the evaluation.

[0044]

[Table 5]

	Umami	Richness	Salty taste	Spicy feeling	Deliciousness	Comment
Control	4.0	4.0	4.0	4.0	4.0	
Example 5	5.7	5.6	5.6	6.4	6.6	Umami and richness increase. Salty taste and spicy feeling are enhanced.

[0045]

20 [Example 6] Preparation of taste-improved retort curry

The *Boletus edulis* extract prepared in Example 1 was added to a commercially available retort curry so as to be 1000 ppm. Thus, a taste-improved retort curry was obtained.

[0046]

[Comparative Example 3] Preparation of retort curry

The *Boletus edulis* extract prepared in Comparative Example 1 was added to a commercially available retort curry so as to be 1000 ppm. Thus, a retort curry of Comparative Example 3 was obtained.

[0047]

5 [Test Example 4] Sensory Evaluation

The sensory evaluation of the retort curries prepared in Example 6 and Comparative Example 3 was conducted in the same manner as in Test Example 1. The control sample is a commercially available retort curry to which no *Boletus edulis* extract was blended.

10 Table 6 shows the results of the evaluation.

[0048]

[Table 6]

	Richness	Spicy feeling	Deliciousness	Comment
Control	4.0	4.0	4.0	
Comparative Example 3	5.1	4.9	4.6	Richness increases.
Example 6	5.9	6.4	6.3	Richness increases. Spicy feeling is emphasized.

[0049]

15 [Example 7] Preparation of taste-improved cream stew

The *Boletus edulis* extract prepared in Example 1 was added to a commercially available cream stew so as to be 100 ppm. Thus, a taste-improved cream stew was obtained.

[0050]

[Comparative Example 4] Preparation of cream stew

20 The *Boletus edulis* extract prepared in Comparative Example 1 was added to a commercially available cream stew so as to be 100 ppm. Thus, a cream stew of Comparative Example 4 was obtained.

[0051]

[Test Example 5] Sensory Evaluation

25 The sensory evaluation of the cream stews prepared in Example 7 and Comparative Example 4 was conducted in the same manner as in Test Example 1. The control sample is a commercially available cream stew to which no *Boletus edulis* extract was blended.

Table 7 shows the results of the evaluation.

30

[0052]

[Table 7]

	Richness	Milky feeling	Deliciousness	Comment
Control	4.0	4.0	4.0	
Comparative Example 4	5.0	4.6	4.4	Richness increases.
Example 7	5.7	5.6	5.7	Richness increases. Milky feeling is emphasized.

[0053]

5 [Example 8] Preparation of taste-improved 20% orange juice

The *Boletus edulis* extract prepared in Example 1 was added to a commercially available 20% orange juice so as to be 10 ppm. Thus, a taste-improved 20% orange juice was obtained.

[0054]

10 [Comparative Example 5] Preparation of 20% orange juice

The *Boletus edulis* extract prepared in Comparative Example 1 was added to a commercially available 20% orange juice so as to be 10 ppm. Thus, a 20% orange juice of Comparative Example 5 was obtained.

[0055]

15 [Test Example 6] Sensory Evaluation

The sensory evaluation of the orange juices prepared in Example 8 and Comparative Example 5 was conducted in the same manner as in Test Example 1. The control sample is a commercially available 20% orange juice to which no *Boletus edulis* extract was blended.

20 Table 8 shows the results of the evaluation.

[0056]

[Table 8]

	Sweet taste	Fruit juice feeling	Deliciousness	Comment
Control	4.0	4.0	4.0	
Comparative Example 5	4.1	4.0	1.9	Odd taste and odd smell derived from the extract are present and unpleasant feeling is given.
Example 8	5.3	5.4	6.0	Natural sweet taste and juicy feeling are enhanced.

[0057]

[Example 9] Preparation of taste-improved café au lait drink

The Boletus edulis extract prepared in Example 1 was added to a commercially available café au lait drink so as to be 10 ppm. Thus, a taste-improved café au lait drink was obtained.

[0058]

[Comparative Example 6] Preparation of café au lait drink

The Boletus edulis extract prepared in Comparative Example 1 was added to a commercially available café au lait drink so as to be 10 ppm. Thus, a café au lait drink of Comparative Example 6 was obtained.

[0059]

[Test Example 7] Sensory Evaluation

The sensory evaluation of the café au lait drinks prepared in Example 9 and Comparative Example 6 was conducted in the same manner as in Test Example 1. The control sample is a commercially available café au lait drink to which no Boletus edulis extract was blended.

Table 9 shows the results of the evaluation.

[0060]

[Table 9]

	Richness	Milky feeling	Sweet taste	Bitter taste	Deliciousness	Comment
Control	4.0	4.0	4.0	4.0	4.0	
Comparative Example 6	4.9	4.3	4.3	3.9	1.7	Odd taste and odd smell derived from the extract are present and unpleasant feeling is given.
Example 9	5.6	5.7	5.3	4.3	5.6	Natural milky feeling, richness, and sweet taste are enhanced.

[0061]

[Example 10] Preparation of taste-improved non-calorie cola drink

The Boletus edulis extract prepared in Example 1 was added to a commercially available non-calorie cola drink so as to be 20 ppm. Thus, a taste-improved non-calorie cola drink was obtained.

[0062]

[Comparative Example 7] Preparation of non-calorie cola drink

The *Boletus edulis* extract prepared in Comparative Example 1 was added to a commercially available non-calorie cola drink so as to be 20 ppm. Thus, a non-calorie cola drink of Comparative Example 7 was obtained.

[0063]

5 [Test Example 8] Sensory Evaluation

The sensory evaluation of the non-calorie cola drinks prepared in Example 10 and Comparative Example 7 was conducted in the same manner as in Test Example 1. The control sample is a commercially available non-calorie cola drink to which no *Boletus edulis* extract was blended.

10 Table 10 shows the results of the evaluation.

[0064]

[Table 10]

	Taste thickness	Sweet taste	Deliciousness	Comment
Control	4.0	4.0	4.0	
Comparative Example 7	4.9	4.3	1.6	Odd taste and odd smell derived from the extract are present and unpleasant feeling is given.
Example 10	5.6	5.3	5.9	Rich sweetness is felt.

[0065]

15 [Example 11] Preparation of taste-improved stevia-containing non-calorie soda pop (saida) drink

The *Boletus edulis* extract prepared in Example 1 was added to a commercially available stevia-containing non-calorie soda pop drink so as to be 0.1 ppm. Thus, a taste-improved stevia-containing non-calorie soda pop drink was obtained.

20 [0066]

[Comparative Example 8] Preparation of stevia-containing non-calorie soda pop drink

The *Boletus edulis* extract prepared in Comparative Example 1 was added to a commercially available stevia-containing non-calorie soda pop drink so as to be 0.1 ppm. Thus, a stevia-containing non-calorie soda pop drink of Comparative Example 8 was obtained.

25 [0067]

[Test Example 9] Sensory Evaluation

The sensory evaluation of the stevia-containing non-calorie soda pop drinks prepared in Example 11 and Comparative Example 8 was conducted in the same manner as in Test Example 1. The control sample is a commercially available stevia-containing non-calorie soda pop drink to which no *Boletus edulis* extract was blended.

30

Table 11 shows the results of the evaluation.

[0068]

[Table 11]

	Taste thickness	Sweet taste	Deliciousness	Comment
Control	4.0	4.0	4.0	
Comparative Example 8	4.9	4.3	1.4	Odd taste and odd smell derived from the extract are present and unpleasant feeling is given.
Example 11	5.9	5.4	5.7	Characteristic miscellaneous taste and aftertaste sharpness are improved.

5 [0069]

[Example 12] Preparation of taste-improved sugar-free black coffee drink

The *Boletus edulis* extract prepared in Example 1 was added to a commercially available sugar-free black coffee drink so as to be 20 ppm. Thus, a taste-improved sugar-free black coffee drink was obtained.

10 [0070]

[Comparative Example 9] Preparation of sugar-free black coffee drink

The *Boletus edulis* extract prepared in Comparative Example 1 was added to a commercially available black coffee drink so as to be 20 ppm. Thus, a sugar-free black coffee drink of Comparative Example 9 was obtained.

15 [0071]

[Test Example 10] Sensory Evaluation

The sensory evaluation of the sugar-free black coffee drinks prepared in Example 12 and Comparative Example 9 was conducted in the same manner as in Test Example 1. The control sample is a commercially available sugar-free black coffee drink to which no *Boletus edulis* extract was blended.

20

Table 12 shows the results of the evaluation.

[0072]

[Table 12]

	Richness	Bitter taste	Deliciousness	Comment
Control	4.0	4.0	4.0	
Comparative Example 9	4.9	4.3	2.0	Odd taste and odd smell derived from the extract are present and unpleasant feeling is given.
Example 12	5.6	4.4	5.6	Richness is enhanced.

[0073]

[Example 13] Preparation of taste-improved vinegar drink

The Boletus edulis extract prepared in Example 1 was added to a solution, which
 5 was obtained by diluting a commercially available black vinegar six times with water, so as to
 be 20 ppm. Thus, a taste-improved vinegar drink was obtained.

[0074]

[Comparative Example 10] Preparation of vinegar drink

The Boletus edulis extract prepared in Comparative Example 1 was added to a
 10 solution, which was obtained by diluting a commercially available black vinegar six times
 with water, so as to be 20 ppm. Thus, a vinegar drink of Comparative Example 10 was
 obtained.

[0075]

[Test Example 11] Sensory Evaluation

15 The sensory evaluation of the vinegar drinks prepared in Example 13 and
 Comparative Example 10 was conducted in the same manner as in Test Example 1. The
 control sample is a commercially available vinegar drink to which no Boletus edulis extract
 was blended.

Table 13 shows the results of the evaluation.

20 [0076]

[Table 13]

	Richness	Suppression of sour taste	Deliciousness	Comment
Control	4.0	4.0	4.0	
Comparative Example 10	4.7	5.0	3.3	Sour taste felt on the tongue is reduced.
Example 13	5.1	5.7	5.9	Sour taste felt on the tongue is greatly reduced.

[0077]

[Example 14] Preparation of taste-improved reduced-salt noodle soup

25 The Amanita hemibapha extract prepared in Example 2 was added to a reduced-
 salt noodle soup having a formulation 1 so as to be 20 ppm. Thus, a taste-improved reduced-
 salt noodle soup was obtained.

[0078]

[Test Example 12] Sensory Evaluation

The sensory evaluation of the reduced-salt noodle soup prepared in Example 14 was conducted in the same manner as in Test Example 1. The control sample is a commercially available reduced-salt noodle soup to which no *Amanita hemibapha* extract was blended.

5 Table 14 shows the results of the evaluation.

[0079]

[Table 14]

	Umami	Richness	Salty taste	Deliciousness	Comment
Control	4.0	4.0	4.0	4.0	
Example 14	5.4	5.7	5.3	5.9	Umami and richness increase. Bitter taste characteristic to potassium chloride is reduced.

[0080]

10 [Example 15] Preparation of taste-improved reduced-salt Chinese soup

The *Amanita hemibapha* extract prepared in Example 2 was added to a commercially available reduced-salt Chinese soup (a product in which 40% of sodium chloride was reduced) so as to be 20 ppm. Thus, a taste-improved reduced-salt soup was obtained.

15 [0081]

[Test Example 13] Sensory Evaluation

The sensory evaluation of the reduced-salt Chinese soup prepared in Example 15 was conducted in the same manner as in Test Example 1. The control sample is a commercially available reduced-salt Chinese soup to which no *Amanita hemibapha* extract was blended.

20

Table 15 shows the results of the evaluation.

[0082]

[Table 15]

	Umami	Richness	Salty taste	Spicy feeling	Deliciousness	Comment
Control	4.0	4.0	4.0	4.0	4.0	
Example 15	5.4	5.3	5.6	5.9	6.3	Umami and richness increase. Salty taste and spicy feeling are enhanced.

25 [0083]

[Example 16] Preparation of taste-improved 20% orange juice

The *Amanita hemibapha* extract prepared in Example 2 was added to a commercially available 20% orange juice so as to be 10 ppm. Thus, a taste-improved 20% orange juice was obtained.

[0084]

5 [Comparative Example 11] Preparation of 20% orange juice

The *Boletus edulis* extract prepared in Comparative Example 2 was added to a commercially available 20% orange juice so as to be 10 ppm. Thus, a 20% orange juice of Comparative Example 11 was obtained.

[0085]

10 [Test Example 14] Sensory Evaluation

The sensory evaluation of the 20% orange juices prepared in Example 16 and Comparative Example 11 was conducted in the same manner as in Test Example 1. The control sample is a commercially available 20% orange juice to which no *Amanita hemibapha* extract was blended.

15 Table 16 shows the results of the evaluation.

[0086]

[Table 16]

	Sweet taste	Fruit juice feeling	Deliciousness	Comment
Control	4.0	4.0	4.0	
Comparative Example 11	4.0	4.1	1.7	Odd taste and odd smell derived from the extract are present and unpleasant feeling is given.
Example 16	5.0	5.1	5.4	Natural sweet taste and juicy feeling are enhanced.

[0087]

20 [Example 17] Preparation of taste-improved café au lait drink

The *Amanita hemibapha* extract prepared in Example 2 was added to a commercially available café au lait drink so as to be 10 ppm. Thus, a taste-improved café au lait drink was obtained.

[0088]

25 [Comparative Example 12] Preparation of café au lait drink

The *Amanita hemibapha* extract prepared in Comparative Example 2 was added to a commercially available café au lait drink so as to be 10 ppm. Thus, a café au lait drink of Comparative Example 12 was obtained.

[0089]

[Test Example 15] Sensory Evaluation

The sensory evaluation of the café au lait drinks prepared in Example 17 and Comparative Example 12 was conducted in the same manner as in Test Example 1. The control sample is a commercially available café au lait drink to which no *Amanita hemibapha* extract was blended.

Table 17 shows the results of the evaluation.

[0090]

[Table 17]

	Richness	Milky feeling	Sweet taste	Bitter taste	Deliciousness	Comment
Control	4.0	4.0	4.0	4.0	4.0	
Comparative Example 12	4.7	4.3	4.1	5.1	2.0	Odd taste and odd smell derived from the extract are present and unpleasant feeling is given.
Example 17	5.3	5.4	5.1	5.3	5.4	Natural milky feeling, richness, and sweet taste are enhanced.

[0091]

[Example 18] Preparation of taste-improved stevia-containing non-calorie soda pop drink

The *Amanita hemibapha* extract prepared in Example 2 was added to a commercially available stevia-containing non-calorie soda pop drink so as to be 0.1 ppm. Thus, a taste-improved stevia-containing non-calorie soda pop drink was obtained.

[0092]

[Comparative Example 13] Preparation of stevia-containing non-calorie soda pop drink

The *Amanita hemibapha* extract prepared in Comparative Example 2 was added to a commercially available stevia-containing non-calorie soda pop drink so as to be 0.1 ppm. Thus, a stevia-containing non-calorie soda pop drink of Comparative Example 13 was obtained.

[0093]

[Test Example 16] Sensory Evaluation

The sensory evaluation of the stevia-containing non-calorie soda pop drinks prepared in Example 18 and Comparative Example 13 was conducted in the same manner as in Test Example 1. The control sample is a commercially available stevia-containing non-calorie soda pop drink to which no *Amanita hemibapha* extract was blended.

Table 18 shows the results of the evaluation.

[0094]

[Table 18]

	Taste thickness	Sweet taste	Deliciousness	Comment
Control	4.0	4.0	4.0	
Comparative Example 13	4.9	4.3	1.3	Odd taste and odd smell derived from the extract are present and unpleasant feeling is given.
Example 18	5.4	4.7	5.4	Characteristic miscellaneous taste and aftertaste sharpness are improved.

[0095]

5 [Example 19] Preparation of taste-improved sugar-free black coffee drink

The Amanita hemibapha extract prepared in Example 2 was added to a commercially available sugar-free black coffee drink so as to be 20 ppm. Thus, a taste-improved sugar-free black coffee drink was obtained.

[0096]

10 [Comparative Example 14] Preparation of sugar-free black coffee drink

The Amanita hemibapha extract prepared in Comparative Example 2 was added to a commercially available stevia-containing non-calorie soda pop drink so as to be 20 ppm. Thus, a sugar-free black coffee drink of Comparative Example 14 was obtained.

[0097]

15 [Test Example 17] Sensory Evaluation

The sensory evaluation of the sugar-free black coffee drinks prepared in Example 19 and Comparative Example 14 was conducted in the same manner as in Test Example 1. The control sample is a commercially available sugar-free black coffee drink to which no Amanita hemibapha extract was blended.

20 Table 19 shows the results of the evaluation.

[0098]

[Table 19]

	Richness	Bitter taste	Deliciousness	Comment
Control	4.0	4.0	4.0	
Comparative Example 14	4.7	4.3	1.9	Odd taste and odd smell derived from the extract are present and unpleasant feeling is given.
Example 19	5.9	4.4	5.4	Richness is enhanced.

[0099]

[Example 20] Preparation of taste-improved vinegar drink

The Amanita hemibapha extract prepared in Example 2 was added to a solution,
 5 which was obtained by diluting a commercially available black vinegar six times with water,
 so as to be 20 ppm. Thus, a taste-improved vinegar drink was obtained.

[0100]

[Comparative Example 15] Preparation of vinegar drink

The Amanita hemibapha extract prepared in Comparative Example 2 was added
 10 to a solution, which was obtained by diluting a commercially available black vinegar six
 times with water, so as to be 20 ppm. Thus, a vinegar drink of Comparative Example 15 was
 obtained.

[0101]

[Test Example 18] Sensory Evaluation

15 The sensory evaluation of the vinegar drinks prepared in Example 20 and
 Comparative Example 15 was conducted in the same manner as in Test Example 1. The
 control sample is a commercially available vinegar drink to which no Amanita hemibapha
 extract was blended.

Table 20 shows the results of the evaluation.

20 [0102]

[Table 20]

	Richness	Suppression of sour taste	Deliciousness	Comment
Control	4.0	4.0	4.0	
Comparative Example 16	4.9	4.7	3.6	Sour taste felt on the tongue is reduced.
Example 20	5.1	5.6	5.6	Sour taste felt on the tongue is greatly reduced.

[0103]

From the results of the above-described sensory tests, an effect of enhancing
 25 specific tastes and suppressing a specific taste (sour taste) was exhibited on any foods or
 drinks by blending the Boletus edulis extract of Example 1 or the Amanita hemibapha extract
 of Example 2. On the other hand, in the cases where the Boletus edulis extract of
 Comparative Example 1 or the Amanita hemibapha extract of Comparative Example 2 is
 blended, the taste enhancing/suppressing effect is little as compared with the cases of
 30 Examples. Furthermore, there were obtained results that taste(s) become weak or bad as

compared with the control samples to which no extract is added. Accordingly, it was confirmed that the mushroom extracts of the present invention can be utilized in a wide range of objects and are more excellent in the taste improving effect.

[0104]

5 While the present invention has been explained in detail and with reference to specific embodiments, it is apparent to one skilled in the art that various changes and modifications can be made therein without departing from the spirit and scope of the present invention. This application is based on Japanese Patent Application (No. 2013-083234) filed on April 11, 2013, the contents of which are incorporated here by reference.

10 Industrial Applicability

[0105]

15 The mushroom extract of the present invention can be added to various foods or drinks, does not have a characteristic smell, can enhance specific senses of taste such as umami, richness, salty taste, spicy feeling, milky feeling, sweet taste, and fruit juice feeling, and can also suppress sour taste. Therefore, it becomes possible to improve taste properties that concern various preferences and thus the mushroom extract of the present invention is useful as a taste improving agent of foods or drinks.

CLAIMS

[Claim 1]

A mushroom extract, which is obtained by a production process comprising a step of solvent-extracting at least one of a mushroom of the genus *Boletus* and a mushroom of the genus *Amanita* and a step of removing a flavor component from a solvent extract.

[Claim 2]

The mushroom extract according to Claim 1, wherein a solvent to be used in the solvent extraction is water, ethanol, or hydrous alcohol.

[Claim 3]

The mushroom extract according to Claim 1 or 2, wherein the flavor component is removed by performing an adsorption treatment using a synthetic adsorbent or active carbon and removing an adsorbed fraction.

[Claim 4]

The mushroom extract according to Claim 1 or 2, wherein the flavor component is removed by performing a liquid-liquid extraction with water and an organic solvent and removing an organic solvent layer portion.

[Claim 5]

The mushroom extract according to Claim 1 or 2, wherein the flavor component is removed by distilling the solvent extract and removing a distilled liquid.

[Claim 6]

The mushroom extract according to any one of Claims 1 to 5, wherein the mushroom of the genus *Boletus* is at least one selected from *Boletus edulis*, *Boletus aestivalis*, *Boletus hiratsukae* Nagasawa, and *Boletus violaceofuscus* and the mushroom of the genus *Amanita* is at least one of *Amanita hemibapha* and *Amanita caesarea*.

[Claim 7]

A taste improving agent for a food or drink, which comprises the mushroom extract according to any one of Claims 1 to 6.

[Claim 8]

A food or drink comprising the mushroom extract according to any one of Claims 1 to 6 or the taste improving agent according to Claim 7.