

Package Green Tea Drink

Technical field

This invention relates to a package green tea drink which is
5 rich in taste and flavor with lessened astringency, the good taste and
astringency being well balanced; and to a method for making same.
More particularly, the invention relates to a package green tea drink
which has the taste and flavor of refined green tea or high-grade
green tea, although it is brewed from cheap, low-grade green tea
10 leaves.

Background art

In recent years, green tea drinks packed in cans or PET bottles,
i.e., package green tea drinks, have been commercialized, which
15 gained high support of consumers who tend to keep away from
sweet-stuff and their output goes on increasing. As a late tendency,
consumers favor green tea drinks rich in taste and flavor with
lessened astringency, the good taste and astringency being well
balanced.

20 Heretofore a number of methods have been proposed to treat
green tea with an enzymatic agent to raise extraction efficiency of
active ingredients of green tea and/or to prevent the extract from
becoming turbid and also to enhance its good taste. Those past
proposals include, for example, a method for extracting tea leaves
25 with concurrent use of protopectinase and cellulase (cf. JP-Sho
46(1971)-17958B); a method for making instant tea comprising
extracting tea leaves with an aqueous solution of a mixture of
glutinous starch with at least one enzyme selected from α -amylase,
 β -amylase, cellulase and protease, and drying the extract (cf. JP-Hei
30 1(1989)-47979B); a method comprising treating a hot water extract of
tea and the like with tannase in advance of freeze-concentrating the
same (cf. JP-Hei 5(1993)-328901A); a method of making tea drinks of
little turbidity, by acting chlorogenic acid esterase on tea extract (cf.
JP-Hei 11(1999)-308965A); and a method of extracting starting tea
35 materials in the presence of protease and tannase (cf.

JP-2003-144049A).

Furthermore, a method of making green tea extract having a high amino acid content and strong taste, comprising removing tannin from green tea extract by adsorption onto
5 polyvinylpolypyrrolidone (cf. JP Hei 9(1997)-220055A, JP Hei 9(1997)-220053A and JP 2003-204754A) has also been proposed.

Disclosure of the invention

Heretofore proposed methods as above do show some effect of
10 enhancing good taste of green tea extract in their own ways, respectively, but when the methods are applied to package green tea drinks which are offered for drink without dilution, the products are not fully satisfactory in respect of the balance between the taste and astringency.

15 Accordingly, therefore, the object of the present invention is to provide a package green tea drink which is rich in taste and flavor with lessened astringency, the good taste and astringency being well balanced; and to a method for making same.

20 We have engaged in concentrative studies with the view to solve the above problem, to now discover that a package green tea drink which is rich in taste and flavor with lessened astringency and good balance between the taste and astringency can be obtained by blending with green tea extract a specific amount of a concentrate of
25 enzyme-treated green tea extract and adjusting the amino acid component content and the ratio between the tannin content and the amino acid component content in the package green tea drink; and the ratio of the arginine content to teanin in the amino acid, each within a specific range. This invention is whereupon completed.

30 Thus, the present invention provides a package green tea drink which is characterized in that it comprises an amino acid component comprising at least teanin and arginine, and tannin, wherein

- (a) the amino acid component concentration is 20 – 200 mg/liter,
- 35 (b) the weight ratio of the amino acid component/tannin is 0.1 – 1.5,

and

(c) the weight ratio of the arginine/teanin is 0.05 – 0.60.

The present invention also provides a method for making a package green tea drink, which comprises adding to a green tea
5 extract an enzyme-treated green tea extract or concentrate thereof, and so adjusting the composition of the resultant green tea drink that

(a) its amino acid component concentration is 20 – 200 mg/liter,

(b) the weight ratio of the amino acid component/tannin is 0.1 – 1.5, and

10 (c) the weight ratio of the arginine/teanin is 0.05 – 0.60.

Hereinafter the invention is explained in further details.

The method for making the package green tea drink of the invention is subject to no particular limitation so long as the amino
15 acid component concentration in the formulated green tea drink, weight ratio of the amino acid component to tannin and weight ratio of arginine to teanin in the amino acid component fall within the above-specified ranges. Whereas, a generally preferred procedure is to blend an enzyme-treated green tea extract or its concentrate with a
20 green tea extract of drinking concentration.

As starting green tea materials useful for making enzyme-treated green tea extract, for example, steamed non-fermented tea such as green tea of middle grade, coarse tea, roasted tea, refined green tea, *Kabuse-cha*, *Ten-cha* and the like;
25 cauldron-boiled, non-fermented tea such as *Ureshino-cha*, *Aoyagi-cha* and various Chinese teas can be named.

As an enzymatic agent for the enzyme-treating these starting materials of green tea, protease is convenient. Protease per se is subject to no specific limitation, and one or more of animal-,
30 vegetable-, or microorganism-derived proteases can be used either singly or in combination. For example, Protease A, Protease M, Protease P, *Umamizyme*, Peptidase R, Newlase A and Newlase F (koji mould-derived proteases, Amanoenzyme Co.); Sumizyme AP, Sumizyme LP, Sumizyme MP, Sumizyme FP and Sumizyme LPL (koji
35 mould-derived proteases, Shin-nippon Chemical Industries, Co.);

Protin FN (a koji mould-derived protease, Daiwa Kasei Industries, Co.); Denapsin 2P, Denazyme AP and XP-415 (koji mould-derived proteases, Nagase Chemtechs); Orientase 20A, Orientase ONS and Tetrase S (koji mould-derived proteases, Hankyu Bioindustries);
 5 Molsin F, PD Enzyme, IP Enzyme and AO Protease (koji mould-derived proteases, Kikkoman Co.); Sakanase, (a koji-mould-derived protease, Kaken Pharmaceuticals); Punchdase YP-SS, Punchdase NP-2 and Punchdase P (koji mould-derived proteases, Yakult Co.); Flavorzyme (a koji mould-derived protease, Novozyme
 10 A/S); Kokulase SS, Kokulase P (koji mould-derived proteases, Sankyo Co.); Veron PS, Corolase PN-L (koji mould-derived proteases, Röhm Enzyme Co.); Protease N, Protease NL, Protease S, Prolazer FG-F (bacteria-derived proteases, Amanoenzyme Co.); Protin P, Deskin, Depirace, Protin A, Thermoase (bacteria-derived proteases, Daiwa
 15 Kasei); Biopraser XL-416F, Biopraser SP-4FG, Biopraser SP-15FG (bacteria-derived proteases, Nagase Chemtechs); Orientase 90N, Nucleisin, Orientase 10NL; Orientase 22 BF (bacteria-derived proteases, Hankyu Bioindustries); Aloase AP-10 (bacteria-derived protease, Yakult Co.); Protamex, Neutraser, Alkalase (bacteria-derived
 20 proteases, Novozyme A/S); Corolase N, Corolase 7089, Veron W, Veron P (bacteria-derived proteases, Röhm Enzyme Co.); Enzyron NBS (bacteria-derived protease, Rakuto Kasei Industries); Alkali Protease GL 440, Purafect 4000L, Protease 899, Protex 6L (bacteria-derived proteases; Kyowa Enzyme Co.); Actinase AS, Actinase AF
 25 (actinomyces-derived proteases, Kaken Pharmaceuticals, Co.); Tasinase (actinomyces-derived protease, Kyowa Enzyme Co.); Papain W-40 (a vegetable-derived protease, Amanoenzyme Co.); Purified Papain for food (a vegetable-derived protease, Nagasechemtechs); other animal-derived pepsins, trypsins and the like can be named.
 30 Use rate of protease differs depending on, e.g., titer of individual proteases and cannot be uniformly specified, but in general terms, for example, a range of 0.01 – 100 U/g, in particular, 0.1 – 100 U/g, based on the weight of starting green tea material may be applied.

Treatment of green tea extract with concurrent use of a
 35 protease as named in the above with at least one enzyme selected

from tannase, pectinase, cellulase and hemicellulase is preferred, because it can efficiently decompose proteins contained in green tea to amino acid. Concurrent use of protease and tannase is particularly preferred.

5 As the tannase, any optional one can be used so long as it has tannin-decomposing activity. More specifically, cultures or processed products thereof obtained through solid culture or liquid culture of bacteria belonging to *Aspergillus*, *Penicillium*, *Rhizopus*, *Mucor* or the like in a medium which is conventionally used for cultivation of these
10 moulds, by an accepted cultivation method, can be used, after purification by conventional method. Commercialized tannase may also be used, such as TANNASE (Kikkoman Co.), TANNASE (Sankyo Co.) and the like. The use rate of tannase differs for individual tannase-producing bacterium depending on its titer, for example, and
15 cannot be uniformly specified, while in general terms, for example, a range of 0.1 – 50 U/g, in particular, 0.2 – 25 U/g, based on the weight of starting green tea material can be applied.

 According to one embodiment of making an enzyme-treated green tea extract which is useful in this invention, to 1 weight part of
20 starting green tea material, 8 – 50 weight parts of water are added, sterilized at about 60 – about 121°C for about 2 seconds – about 20 minutes, cooled, to which aforesaid protease and tannase are added, followed by an enzymatic treatment at about 20 – about 60°C for about 30 minutes – about 24 hours. After the enzymatic treatment,
25 the system is heated to about 60 – about 121°C for about 2 seconds – about 20 minutes to deactivate the enzymes, cooled and separated by a suitable separation means such as centrifugation, filtration through filter paper, or the like, to provide a clear enzyme-treated green tea extract.

30 Thus an enzyme-treated green tea extract which is rich in teanin and arginine contents of the amino acid as taste-imparting component and tannin as the astringent component is obtained.

 The ratio of the amino acid component to tannin in the so obtained enzyme-treated green tea extract can be raised by, for
35 example, contacting the extract with polyvinylpolypyrrolidone (PVPP).

The use rate of PVPP in such an occasion is variable according to the desired amino acid component/tannin weight ratio, while generally it can be used in an amount of 5 – 100 wt%, in particular, 7.5 – 75 wt%, inter alia, 10 – 50 wt%, to the solid content of the enzyme-treated green tea extract. The contacting treatment with PVPP can be conducted by stirring an enzyme-treated green tea extract to which PVPP has been added, at temperatures ranging, for example, about 10°C – about 50°C, for about 10 minutes – about 2 hours. Then a clear extract can be separated from the system using a suitable separation means such as centrifuge, filtration and the like. Whereby an enzyme-treated green tea extract with the amino acid component/tannin weight ratio therein suitably adjusted can be obtained.

The optionally PVPP-treated, enzyme-treated green tea extract can be concentrated by a suitable condensing means, such as, for example, reduced pressure concentration, reverse osmotic membrane (RO membrane) concentration, freeze concentration and the like, to provide a concentrate of an enzyme-treated green tea extract. While the degree of concentration is not critical, in consideration of workability in blending it with package green tea drinks, generally convenient range is Bx 3° – 50°, in particular, Bx 6° – 30°.

On the other hand, as an enzyme-treated green tea extract or concentrate thereof, for example, a stock solution for green tea drink which is obtained through the steps of adding 10 – 100 wt parts of hot water of 50 – 100°C per wt part of earlier described starting green tea material, conducting an extraction treatment for about 1 – about 20 minutes and separating and removing the tea leaves; or an enzyme-treated green tea extract having at least one of the parameters, i.e., amino acid component concentration, amino acid component/tannin weight ratio and arginine/teanin weight ratio in amino acid component, deviated from the respective ranges specified by the present invention, which is obtained from enzyme-treating a starting green tea material; and the like can be used.

A package green tea drink of the present invention can be

provided by adding to a green tea extract, an enzyme-treated green tea extract or a concentrate thereof, such that, in the resulting green tea drink,

- (a) the amino acid component concentration ranges 20 – 200 mg/liter, preferably 40 – 180 mg/liter, inter alia, 60 – 160 mg/liter,
- (b) the weight ratio of the amino acid component/tannin ranges 0.1 – 1.5, preferably 0.12 – 1.0, inter alia, 0.15 – 0.6, and
- (c) the weight ratio of arginine/teanin in the amino acid component ranges 0.05 – 0.60, preferably 0.1 – 0.50, inter alia, 0.16 – 0.40.

Such adjustment of amino acid component concentration and the amino acid component/tannin weight ratio in the finished product of green tea drink, and arginine/teanin weight ratio in the amino acid component, can be conducted by analyzing in advance the respective amino acid concentration levels and the amino acid component/tannin weight ratios, and arginine/teanin weight ratios in the amino acid component, of the starting green tea extract and the enzyme-treated green tea extract or concentrate thereof, and blending the enzyme-treated green tea extract or concentrate thereof with the green tea extract such that the above requirements (a), (b) and (c) are satisfied. More specifically, for example, a package green tea drink of the present invention can be formulated by blending 0.05 – 10 parts by weight, preferably 0.75 – 5 parts by weight, inter alia 0.1 – 2 parts by weight, of the enzyme-treated green tea extract or concentrate thereof with 100 parts by weight of a green tea extract at a drinking concentration (Bx 0.2° – 0.4°).

Thus, according to the present invention, by adjusting the contents of amino acid component which is a taste-imparting component to green tea, in particular, arginine and teanin, and of tannin which is an astringency-imparting component, to fall within the ranges as specified under (a), (b) and (c) as above, a package green tea drink which is rich in good taste and flavor with suitably controlled astringency well balanced with the taste and gives an excellent high-quality impression, can be provided.

Such package green tea drink of the present invention can be offered as packed in ordinary containers such as metallic cans, paper

containers, bottles or the like. Their sterilization can be carried out, for example, by retort sterilization, high-temperature-short-time sterilization with plate type heat exchanger, or the like. Here “a package green tea” drink signifies a green tea drink which can be drunk as it is, without further dilution.

Hereinafter the present invention is explained in still further details, referring to working Examples and Controls.

Examples

10 Referential Example 1: Preparation of enzyme-treated green tea extract

To 1 kg of tea leaves of Shizuoka Prefecture growth, 12.5 kg of water (60°C), 3.0 g of sodium ascorbate was added, followed by heating to 80°C for sterilization and cooling to 40°C. Then 1.3 g of Tannase (Sankyo Co.) and 3.0 g of Protease P (Amano Enzyme) were added, allowed to react while standing at 40°C for 4 hours. After heating the reaction system at 90°C for 10 minutes to deactivate the enzymes, the tea leaves and the extract were separated with filter press, to provide 11.3 kg of a green tea extract (Referential Product 1).

20 (Analysis values of Referential Product 1)

Bx : 3.05°

pH : 5.8

tannin content (iron tartarate method): 0.68%

amino acid content: 0.247%.

25 The amino acid was quantified with Hitachi High Performance Amino Acid Analyzer L-8800A.

Referential Example 2: Preparation of an enzyme-treated green tea extract

30 To 11.3 kg of the Referential Product 1, 131 g of Divergan F (PVPP made by BASF AG) (37% to the solid content of the extract) was added and stirred at 30°C ±5°C for 1.5 hours, followed by a centrifugation and filtration through diatomaceous earth, to provide 10.95 kg of a clear green tea extract (Referential Product 2).

(Analysis values of Referentia Product 2)

Bx : 2.60°

pH : 5.8

tannin: 0.36%

5 amino acid: 0.243%

Referential Example 3: Preparation of a green tea extract without enzyme treatment

Referential Example 1 was repeated except that no enzyme
10 was used, to provide 10.5 kg of a green tea extract (Referentia Product 3).

(Analysis values of Referentia Product 3)

Bx : 2.86°

pH : 6.0

15 tannin content (iron tartarate method): 0.73%

amino acid content: 0.115%

Thus obtained Referentia Products 1, 2 and 3 were each concentrated with RO membrane to provide Bx 15° green tea extracts: [Referentia Product 4 (RO membrane-concentrated Referentia
20 Product 1), 2.29 kg; Referentia Product 5 (RO membrane-concentrated Referentia Product 2), 1.89 kg; and Referentia Product 6 (RO membrane-concentrated Referentia Product 3), 2.00 kg]. Analyses values of each of the green tea extracts were as shown in Tables 1 and 2.

TABLE 1
Results of Analyzing Referentia Products 4, 5 and 6

Analysis Item	Referentia Product 4	Referentia Product 5	Referentia Product 6
Bx	15	15	15
pH	6.2	6.2	6.2
Tannin content (%)	3.32	1.96	3.83
Amino acid content (%)	1.24	1.38	0.60
Amino acid/ Tannin	0.37	0.70	0.16
Arginine/Teainin	1.77	1.79	0.04

TABLE 2
Results of Analyzing Amino Acid of
Referentia Products 4, 5 and 6

Amino Acid (unit: mg/100 ml)	Referentia Product 4	Referentia Product 5	Referentia Product 6
Aspartic acid	80.0	88.9	72.2
Threonine	39.5	43.0	7.9
Serine	44.3	49.2	19.5
Asparagine	36.4	39.5	7.9
Glutamic acid	120.3	133.6	115.3
Glutamine	40.1	44.2	32.8
Teanin	64.8	71.5	283.0
Proline	39.3	43.9	2.1
Glycin	30.2	33.6	0.8
Alanine	57.1	62.9	12.4
Valine	48.9	54.5	3.3
Methionine	29.0	35.1	0.0
Isoleucine	43.3	48.3	3.3
Leucine	124.6	138.7	3.3
Tyrosine	60.8	67.2	5.8
Phenylalanine	68.8	76.0	7.0
Lysine	121.9	133.8	4.9
Histidine	24.8	27.6	1.6
Arginine	115.0	128.0	12.0
Others	54.9	61.2	6.9
Total	1244.0	1380.7	602.0

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Referential Example 4: Preparation of a stock solution for green tea drink

To 1 kg of green tea leaves of Shizuoka Prefecture growth, 20 kg of 80°C ion-exchange water was added and mildly stirred for 5 minutes. Thereafter the tea leaves were separated with a 40 – mesh wire net, and the separated liquid was cooled to 20°C to provide 14 kg

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of the extract. To the extract 7.0 g (500 ppm) of sodium ascorbate was added. Filtering the liquid with No. 2 filter paper (Advantec, retained particle size, 5 μ), a stock solution for green tea drink was obtained.

5 (Analysis values of the stock solution for green tea drink)

Bx: 2.22°

pH: 6.4

Tannin content (iron tartarate method): 0.44%

Amino acid content: 0.071%

TABLE 3

Amino Acid Composition of the Stock Solution
of Green Tea Drink (mg/100 ml)

Amino Acid	Content (mg/100 ml)
Aspartic acid	8.5
Threonine	0.4
Serine	2.3
Asparagine	1.8
Glutamic acid	13.6
Glutamine	3.9
Teanin	31.9
Proline	0.3
Glycin	0.0
Alanine	0.9
Valine	0.3
Methionine	0.0
Isoleucine	0.2
Leucine	0.2
Tyrosine	0.1
Phenylalanine	0.4
Lysine	3.2
Histidine	1.2
Arginine	1.4
Others	0.4
Total	71.0

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Examples 1-3 and Controls 1-5

Using the above stock solution for green tea drink and Referentia Products 4, 5 and 6, green tea drinks were prepared following the formulas shown in the following Table 4.

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Table 4
Formulas for Products 1-3 of PresentInvention and Control Products 1-5

[illegible]

Each of the diluted liquid was 5 micron-filtered with filter paper, UHT-sterilized at 136°C for 30 seconds, cooled to 89°C and filled in 500-ml PET bottle. The filled bottles were allowed to stand
5 for 2 minutes and cooled with water to 30°C. Analyses values and amino acid composition of each of the drinks were as shown in Tables 5 and 6.

Table 5
Analyses Results of Products 1-3 of the Invention and Control Products 1-5

	Control Product 1	Product 1 of this invention	Product 2 of this invention	Control Product 2	Control Product 3	Product 3 of this invention	Control Product 4	Control Product 5
Bx	0.34°	0.34°	0.34°	0.34°	0.34°	0.34°	0.34°	0.34°
pH	6.20	6.20	6.20	6.20	6.20	6.20	6.20	6.20
Tannin content (mg/100 ml)	59.84	60.32	57.60	61.34	58.89	62.20	47.28	66.40
Amino acid mg/liter	96.6	111.5	114.2	98.7	98.1	157.0	204.0	248.8
Amino acid/ Tannin	0.16	0.18	0.20	0.16	0.16	0.25	0.43	0.37
Arginine/ Teanin	0.044	0.100	0.106	0.044	0.049	0.333	0.625	1.775

Table 6
Amino Acid Composition of Products 1-3
of the Invention and Control Products 1-5

Amino Acid (unit: mg/100 ml)	Control Product 1	Product 1 of this invention	Product 2 of this invention	Control Product 2	Control Product 3	Product 3 of this invention	Control Product 4	Control Product 5
Aspartic acid	1.16	1.20	1.21	1.18	1.16	1.33	1.53	1.60
Threonine	0.05	0.13	0.13	0.06	0.06	0.35	0.54	0.79
Serine	0.31	0.37	0.38	0.32	0.32	0.54	0.71	0.89
Asparagine	0.24	0.29	0.30	0.24	0.25	0.44	0.57	0.73
Glutamic acid	1.85	1.90	1.93	1.89	1.85	2.06	2.34	2.41
Glutamine	0.53	0.56	0.56	0.54	0.53	0.64	0.74	0.80
Teanin	4.34	4.02	4.03	4.46	4.31	3.10	2.58	1.30
Proline	0.04	0.12	0.12	0.04	0.05	0.34	0.54	0.79
Glycin	0.00	0.06	0.07	0.00	0.01	0.24	0.40	0.60
Alanine	0.12	0.22	0.24	0.13	0.13	0.53	0.80	1.14
Valine	0.04	0.13	0.15	0.04	0.05	0.42	0.67	0.98
Methionine	0.00	0.06	0.07	0.00	0.01	0.23	0.42	0.58
Isoleucine	0.03	0.11	0.12	0.03	0.04	0.36	0.59	0.87
Leucine	0.03	0.27	0.30	0.03	0.05	1.01	1.68	2.49
Tyrosine	0.01	0.13	0.15	0.02	0.03	0.49	0.81	1.22
Phenylalanine	0.05	0.19	0.20	0.06	0.07	0.58	0.93	1.38
Lysine	0.44	0.63	0.66	0.40	0.46	1.23	1.78	2.44
Histidine	0.16	0.20	0.20	0.15	0.17	0.30	0.40	0.50
Arginine	0.19	0.40	0.43	0.19	0.21	1.03	1.61	2.30
Others	0.05	0.16	0.17	0.06	0.06	0.47	0.76	1.10
Total	9.66	11.15	11.42	9.87	9.81	15.70	20.40	24.88

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Each of the drinks was given functional evaluation by ten well trained panellers.

Deliciousness evaluation in respect of astringency and taste of each sample was given by each paneller by number of points, 10 being the full mark, and the total points given to each sample were

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averaged. Also flavor evaluation was expressed by words. The results were as shown in Table 7.

The grading standard was as follows:

- | | | |
|----|-----|---|
| | 0: | quality as green tea is very low, due to very strong |
| 5 | | astringency or too strong taste giving a broth-like flavor |
| | 2: | little deliciousness as green tea, due to ill balance between |
| | | astringency and taste |
| | 4: | giving a sense of incongruity as green tea, due to mismatch |
| | | between astringency and taste |
| 10 | 6: | clearly sensible as green tea, the astringency-taste balance |
| | | being acceptable |
| | 8: | delicious as green tea, the astringency-taste balance being |
| | | natural |
| 15 | 10: | giving an image of high grade green tea and very high |
| | | relish, with exquisite astringency-taste balance, good |
| | | flavor and pleasant feeling in the mouth. |

TABELE 7
Functional Evaluation of Products 1-3 of
the Invention and Control Products 1-5

	Formulation	Functional Evaluation	
		Point	flavor
Control Product 1	Green tea stock solution diluted to a drinking concentration (Bx 0.3°)	2.1	Strongly astringent, little taste, unsavory
Product 1 of the invention	Green tea stock solution added with Referentia Product 4 to meet the requirements of this invention	6.3	Good Astringency-taste balance, delicious
Product 2 of the invention	Green tea stock solution added with Referentia Product 5 to meet the requirements of this invention	6.9	Milder taste than above Product 1, good flavor and more delicious
Control Product 2	Green tea stock solution added with Referentia Product 3 (at the same ratio as that in Product 1 and 2 of the invention)	2.5	Not much different from non-addition
Control Product 3	Green tea stock solution added with Referentia Product 4 in an amount short of exhibiting its full effect (1/10 the amount that was used in Product 1 of the invention)	3.2	Slightly more tasty than non-added, diluted stock solution, astringency still too strong to reveal the taste
Product 3 of the invention	Green tea stock solution added with Referentia Product 4 in an amount close to the upper limit provided in this invention	7.4	Strong taste, good flavor and delicious, giving images of refined tea or high-grade green tea
Control Product 4	Green tea stock solution added with Referentia Product 5 in an amount to give the (b) and (c) values deviating from the upper limit values specified in this invention	4.3	Taste slightly too strong for green tea of middle grade, giving a sense of incongruity
Control Product 5	Product 2 of the invention diluted to a drinking concentration (Bx 0.3°)	3.5	Flavored like broth and far from the image of green tea

As is clear from the above table, the products of the invention gave good astringency-taste balance and received high functional evaluation.

Claims

1. A package green tea drink which is characterized in that it comprises an amino acid component comprising at least teanin and arginine, and tannin, wherein
 - (a) the amino acid component concentration is 20 – 200 mg/liter,
 - (b) the weight ratio of the amino acid component/tannin is 0.1 – 1.5, and
 - (c) the weight ratio of the arginine/teanin is 0.05 – 0.60.
2. A package green tea drink according to Claim 1, in which
 - (a) the amino acid component concentration is 40 – 180 mg/liter,
 - (b) the weight ratio of the amino acid component/tannin is 0.12 – 1.0, and
 - (c) the weight ratio of the arginine/teanin is 0.1 – 0.50.
3. A package green tea drink according to Claim 1, in which at least a part of its amino acid component and tannin are derived from an enzyme-treated green tea extract or concentrate thereof.
4. A package green tea drink according to Claim 3, in which the enzyme-treated green tea extract is one obtained by treating green tea with protease.
5. A package green tea drink according to Claim 3, in which the enzyme-treated green tea extract is one obtained by treating green tea with concurrent use of a protease with at least one enzyme selected from tannase, pectinase, cellulase and hemicellulase.
6. A package green tea drink according to Claim 3, which is a blend of, per 100 parts by weight of a green tea extract of drinking concentration (Bx 0.2° – 0.4°), 0.05 – 10 parts by weight of an enzyme-treated green tea extract or a concentrate thereof.
7. A method for making a package green tea drink, which

comprises adding to a green tea extract an enzyme-treated green tea extract or concentrate thereof, and so adjusting the composition of the resultant green tea drink that

- (a) its amino acid component concentration is 20 – 200 mg/liter,
- (b) the weight ratio of the amino acid component/tannin is 0.1 – 1.5,
- and
- (c) the weight ratio of the arginine/teanin is 0.05 – 0.60.

8. A method for making a package green tea drink according to Claim 7, in which the green tea drink has such composition as

- (a) the amino acid component concentration is 40 – 180 mg/liter,
- (b) the weight ratio of the amino acid component/tannin is 0.12 – 1.0,
- and
- (c) the weight ratio of the arginine/treanin is 0.1 – 0.50.