material to be extracted uniformly due to the uniform water contact with the material to be extracted.

As an apparatus for extraction, any one with a deionized water inlet and an extract liquid outlet can be used, for example, it may be a tank, basket or a drip extraction apparatus, for example, an extraction kettle such as a cylindrical drip extraction kettle.

The nozzle angle and height of the drip extraction apparatus can be adjusted such that the water can be uniformly sprayed onto the upper surface of the material to be extracted. Water can be sprayed onto the upper surface of the material to be extracted in the form of droplets or mist. For example, coffee extractors SK-EXTl0 and SK-EXT-15 manufactured by Sanyou Machine Co., Ltd. with a sprayer on the upper part, and multifunctional extraction devices TEXl512 and TEX2015 manufactured by Izumi food MACHINERY CO., LTD., can be used.

In an embodiment of the present application, the apparatus used in the extraction can be closed or open, optionally closed, which can avoid the deterioration of the working environment caused by the escape of steam during the extraction operation, and can also avoid the problems such as quality degradation due to the volatilization and oxidation of aroma components. For example, the extractor may be a closed cylindrical extractor.

In an embodiment of the present application, the apparatus used for extraction may have meshes, grid plates or other nets for separating the material to be extracted and the extract liquid.

An embodiment of the present application also provides an extract liquid prepared by the method for producing an extract liquid as described above.

An embodiment of the present application also provides a container-packed beverage obtained directly or by dilution of the extract liquid prepared by the method for producing an extract liquid as described above.

An embodiment of the present application also provides a method for producing a tea extract liquid, comprising:

S100: extracting tea leaves with deionized water, and removing a tea solution after the extraction is completed;

S200: adding deionized water again to extract the remaining tea leaves obtained by removing the tea solution, and removing the tea solution after the extraction is completed;

production process; and the oolong tea may include tea leaves of semi-fermented teas such as Tieguanyin, composite oolong, sezhong, huangjin gui, and Wuyi rock tea, which are collectively referred to as oolong tea.

The tea leaves used may be in the form of uncut leaves or small cut leaves, or in a mixed form thereof, depending on the type and the shape of tea leaves. The particle size of tea leaves has an impact on the speed of extraction, and tea leaves of small particles are easier to achieve extraction balance.

In an embodiment of the present application, the deionized water can be supplied by injection or spraying. The spraying method facilitates to extract the active ingredients of tea leaves uniformly due to the uniform water contact with the tea leaves.

As an apparatus for extraction, any one with a deionized water inlet and an extract liquid outlet can be used, for example, it may be a tank, basket or drip extraction apparatus, for example, a tea extraction kettle such as a cylindrical drip-type tea extraction kettle.

The nozzle angle and height of the drip extraction apparatus can be adjusted such that the water can be uniformly sprayed onto the upper surface of the tea leaves. Water can be sprayed onto the upper surface of the tea leaves in the form of droplets or mist. For example, coffee extractors SK-EXTl0 and SK-EXT-15 manufactured by Sanyou Machine Co., Ltd. with a sprayer on the upper part, and multifunctional extraction devices TEXl512 and TEX2015 manufactured by Izumi food MACHINERY CO., LTD., can be used.

In an embodiment of the present application, the apparatus used in the extraction can be closed or open, optionally closed, which can avoid the deterioration of the working environment caused by the escape of steam during the extraction operation, and can also avoid the problems such as quality degradation due to the volatilization and oxidation of aroma tea components. For example, the extractor may be a closed cylindrical extractor.

In an embodiment of the present application, the apparatus used for extraction may have meshes, grid plates or other nets for separating the tea leaves and the tea extract liquid.

An embodiment of the present application also provides a tea extract liquid prepared by the method for producing a tea extract liquid as described above.

An embodiment of the present application also provides a container-packed tea beverage obtained directly or by dilution of the tea extract liquid prepared by the method for producing a tea extract liquid as described above.

tea beverage.

Comparative example 1

S100': adding 44 g of Longjing green tea leaves produced in Hangzhou, Zhejiang and of the same type and batch as those in example 1 and 1320 g of RO water at room temperature (25°C) into a house-made 5 L extraction apparatus, such that the green tea leaves are soaked in the RO water for 30 minutes by leaving to stand without stirring for extraction, and after the extraction is completed, leaching a tea solution (an extract liquid 1') for later use;

S200': cooling the extract liquid 1' obtained in step S100', and purifying same in a centrifuge (5000 RPM, 10 minutes) to obtain a clearer tea extract liquid;

S300': formulating the tea extract liquid obtained in step S200' into a beverage with a solid content concentration of 2.3 g/L, sterilizing and then bottling same to obtain a bottled tea beverage.

Test example 1

1. The solid content and extraction yield of the tea extract liquids prepared in Example 1 and Comparative Example 1 above are calculated. The test results are as shown in Table 1.1.

2. Referring to the document Sensory Evaluation Techniques, 2nd Edition, Meilgaard Civille Carr. Scaling introduction, the taste sensory evaluations of aroma, flavor intensity, sweet aftertaste, bitterness and astringency of the bottled tea drinks prepared in the above Example 1 and Comparative Example 1 are carried out using a 5-scale evaluation method (-2 score to +2 score). The test results are as shown in Table 1.2 and Figure 1.

Table 1.1

	Unit	Example 1	Comparative example 1
Green tea	g	44	44
RO water		440 g/extraction × 3 extractions = 1320 g	1320 g
Extraction conditions		Room temperature RO water (25°C) for 10 minutes each extraction, 3 extractions in total	Room temperature RO water (25°C) for 30 minutes of extraction, 1 extraction in total
Weight of extract liquid	g	1086.6	1096
Concentration of	°Bx	1.05	0.93

extract liquid (Brix)			
Extraction yield		25.9 %	23.2 %
Tea polyphenols	mg/L	859	757
Caffeine	mg/L	111	88.6
Amino acids	mg/L	129	119.6

Compared with Comparative Example 1, the extraction yield of the production method of Example 1 is increased by 11.7%.

Table 1.2

Cold Extracted Green Tea Beverage	Example 1	Comparative example 1 (0 score as benchmark)
Aroma intensity	+1	0
Flavor Intensity	0	0
Sweet aftertaste	0	0
Bitterness	-1	0
Astringency	-1	0
Off-flavor	0	0

It can be seen that the bottled tea drink of Example 1 has improved aroma and reduced bitterness.

Example 2

Production of cold extracted oolong tea beverage, including:

S100: adding 43.5 g of oolong tea leaves of tieguanyin produced in Anxi, Fujian, and 435 g of RO water at room temperature (25.7°C) into a house-made 5 L extraction apparatus, such that the oolong tea leaves are soaked in the RO water for 10 minutes by leaving to stand without stirring for extraction, and after the extraction is completed, leaching a tea solution (an extract liquid 1) for later use;

S200: adding 435 g of RO water at room temperature (25.7°C) to the extraction apparatus again to extract the remaining tea leaves in step S100 for 10 minutes, and after the extraction is completed, leaching the tea solution (an extract liquid 2) for later use;

S210: repeating step S200 twice to obtain an extract liquid 3 and an extract liquid 4;

S300: combining the extract liquids 1 to 4 obtained in steps S100 to S210, and then cooling same and purifying same in a centrifuge (5000 RPM, 10 minutes) to obtain a clearer tea extract liquid; and

liquid			
Concentration of extract liquid (Brix)	°Bx	0.76	0.66
Extraction yield		28.2 %	24.2%
Tea polyphenols	mg/L	620	524
Caffeine	mg/L	71.3	60.4
Amino acids	mg/L	67.7	59

Compared with Comparative Example 2, the extraction yield of the production method of Example 2 is increased by 16.5%.

Table 2.2

Cold Extracted Oolong Tea Beverage	Example 2 (0 score as benchmark)	Comparative example 2
Aroma intensity	0	0
Flavor Intensity	0	-1
Sweet aftertaste	0	0
Bitterness	0	-1
Astringency	0	+1
Off-flavor	0	0

It can be seen that the overall flavor of Comparative Example 2 is lighter and more astringent than that of Example 2.

Example 3

Production of cold extracted black tea beverage, including:

S100: adding 70 g of CTC (Crush Tear Curl) black tea leaves produced in Sri Lanka and 700 g of RO water at room temperature (24.1°C) into a house-made 5 L extraction apparatus, such that the black tea leaves are soaked in the RO water for 7 minutes by leaving to stand without stirring for extraction, and after the extraction is completed, leaching a tea solution (an extract liquid 1) for later use;

S200: adding 700 g of RO water at room temperature (24.1°C) to the extraction apparatus again to extract the remaining tea leaves in step S100 for 7 minutes, and after the extraction is completed, leaching the tea solution (an extract liquid 2) for later use;

S210: repeating step S200 twice to obtain an extract liquid 3 and an extract liquid 4;

S300: combining the extract liquids 1 to 4 obtained in steps S100 to S210, and then cooling same and purifying same in a centrifuge (5000 RPM, 10 minutes) to obtain a clearer tea extract liquid; and

S400: formulating the tea extract liquid obtained in step S4 into a beverage of 8.0 g/L (on the basis of dried tea leaves), sterilizing and then bottling same to obtain a bottled tea beverage.

Comparative example 3

S100': adding 70 g of CTC black tea leaves produced in Sri Lanka and of the same type and batch as those in example 3 and 2800 g of RO water at room temperature (24.1°C) into a house-made 5 L extraction apparatus, such that the black tea leaves are soaked in the RO water for 28 minutes by leaving to stand without stirring for extraction, and after the extraction is completed, leaching a tea solution (an extract liquid 1') for later use;

S200': cooling the extract liquid 1' obtained in step S100', and purifying same in a centrifuge (5000 RPM, 10 minutes) to obtain a clearer tea extract liquid;

S300': formulating the tea extract liquid obtained in step S200' into a beverage of 8.0 g/L (on the basis of dried tea leaves), sterilizing and then bottling same to obtain a bottled tea beverage.

Test example 3

1. The solid content and extraction yield of the tea extract liquids prepared in Example 3 and Comparative Example 3 above are calculated. The test results are as shown in Table 3.1.

2. The taste sensory evaluations of aroma, flavor intensity, sweet aftertaste, bitterness and astringency of the bottled tea drinks prepared in the above Example 3 and Comparative Example 3 are carried out using a 5-scale evaluation method (-2 score to +2 score). The test results are as shown in Table 3.2 and Figure 3.

Table 3.1

	Unit	Example 3	Comparative example 3
Red tea	g	70	70
RO water		700 g/extraction × 4 extractions = 2800 g	2800 g
Extraction conditions		Room temperature RO water (24.1°C) for 7 minutes each extraction, 4 extractions in total	Room temperature RO water (24.1°C) for 28 minutes of extraction, 1 extraction in total
Weight of extract liquid	g	2579.7	2680
Concentration of	°Bx	0.71	0.64

extract liquid (Brix)			
Extraction yield		26.2%	24.5%
Tea polyphenols	mg/L	311	288
Caffeine	mg/L	64.7	65.6
Amino acids	mg/L	207	190

Compared with Comparative Example 3, the extraction yield of the production method of Example 3 is increased by 6.9%.

Table 3.2

Cold Extracted Black Tea Beverage	Example 3 (0 score as benchmark)	Comparative example 3
Aroma intensity	0	-1
Flavor Intensity	0	0
Sweet aftertaste	0	0
Bitterness	0	0
Astringency	0	0
Off-flavor	0	0

It can be seen that the aroma of Comparative Example 3 is lighter than that of Example 3.

Example 4

Production of cold extracted green tea beverage, including:

S100: adding 6.325 kg of Longjing green tea leaves produced in Hangzhou, Zhejiang into a SH/3-191109 Model cylindrical tea extraction kettle from the HI-TEC Company, and spraying RO water at room temperature (26.5°C) at 400 L/H from the cylindrical tea extraction kettle to the green tea leaves uniformly for 7 minutes, such that the green tea leaves are soaked in the RO water for 5 minutes by leaving to stand without stirring for extraction, and after the extraction is completed, leaching a tea solution (an extract liquid 1) for later use;

S200: uniformly spraying RO water at room temperature (26.5°C) again at 400 L/H from the cylindrical tea extraction kettle to the remaining tea leaves in step S100 for 7 minutes, and extracting same for 5 minutes, and after the extraction is completed, leaching the tea solution (an extract liquid 2) for later use;

S210: repeating step S200 twice to obtain an extract liquid 3 and an extract liquid 4;

S300: combining the extract liquids 1 to 4 obtained in steps S100 to S210, and then

conditions		(7 minutes of water spraying; 5 minutes of extraction), in total of 4 and a total time of 48 minutes	extraction; 36 minutes of dynamic extraction; total time of 48 minutes
Weight of extract liquid	kg	171.18	168.58
Concentration of extract liquid (Brix)	°Bx	0.96	0.975
Extraction yield		26.0%	26.0%
Tea polyphenols	mg/L	718	728
Caffeine	mg/L	96.9	99.1
Amino acids	mg/L	215.3	209.2

Table 4.2

Cold Extracted Green Tea Beverage	Example 4	Comparative example 4 (0 score as benchmark)
Aroma intensity	+1	0
Flavor Intensity	+1	0
Sweet aftertaste	0	0
Bitterness	0	0
Astringency	0	0
Off-flavor	0	0

It can be seen that under the same extraction yield using different extraction processes, the aroma and overall flavor of Example 4 are stronger. Also, the tea polyphenol and caffeine that affect the flavor is lower than those of the comparative example, and the amino acid is higher than that of the comparative example.

Example 5

Production of cold extracted oolong tea beverage, including:

S100: adding 43.5 g of oolong tea leaves of tieguanyin produced in Anxi, Fujian, and 435 g of iced RO water (5°C) into a house-made 5 L extraction apparatus, such that the oolong tea leaves are soaked in the RO water for 10 minutes by leaving to stand without stirring for extraction, and after the extraction is completed, leaching a tea solution (an extract liquid 1) for later use;

S200: adding 435 g of iced RO water (5°C) to the extraction apparatus again to extract the remaining tea leaves in step S100 for 10 minutes, and after the extraction is completed,

		extractions = 2610 g	
Extraction conditions	/	Iced RO water (5°C) for 10 minutes each extraction, 6 extractions in total	Extraction with iced RO water (5°C) for 60 minutes, 1 extraction in total
Weight of extract liquid	g	2511.8	2514
Concentration of extract liquid (Brix)	°Bx	0.39	0.25
Extraction yield		22.5%	14.4%
Tea polyphenols	mg/L	468	288
Caffeine	mg/L	49.4	27.7
Amino acids	mg/L	82.7	40.6

Compared with Comparative Example 5, the extraction yield of the production method of Example 5 is increased by 56.3%.

Table 5.2

Cold Extracted Oolong Tea Beverage	Example 5 (0 score as benchmark)	Comparative example 5
Aroma intensity	0	-1
Flavor Intensity	0	-1
Sweet aftertaste	0	0
Bitterness	0	0
Astringency	0	-1
Off-flavor	0	0

It can be seen that the overall flavor of Comparative Example 5 is lighter than that of Example 5.

Example 6

Production of hot extracted green tea beverage, including:

S100: adding 44 g of Longjing green tea leaves produced in Hangzhou, Zhejiang and 440 g of RO water (70°C) into a house-made 5 L extraction apparatus, such that the green tea leaves are soaked in the RO water for 2.67 minutes by leaving to stand without stirring for extraction, and after the extraction is completed, leaching a tea solution (an extract liquid 1) for later use;

S200: adding 440 g of RO water (70°C) to the extraction apparatus again to extract the remaining tea leaves in step S100 for 2.67 minutes, and after the extraction is completed, leaching the tea solution (an extract liquid 2) for later use;

		extraction, 3 extractions in total	minutes, 1 extraction in total
Weight of extract liquid	g	1111.45	1100
Concentration of extract liquid (Brix)	°Bx	1.39	1.25
Extraction yield		35.1%	31.3%
Tea polyphenols	mg/L	1084	1006
Caffeine	mg/L	122	108.8
Amino acids	mg/L	113	106

Compared with Comparative Example 6, the extraction yield of the production method of Example 6 is increased by 12.1%.

Table 6.2

Hot Extracted Green Tea Beverage	Example 6	Comparative example 6 (0 score as benchmark)
Aroma intensity	-1	0
Flavor Intensity	+1	0
Sweet aftertaste	0	0
Bitterness	-1	0
Astringency	-1	0
Off-flavor	0	0

It can be seen that the bottled tea beverage of Example 6 has a higher flavor intensity and lower bitterness.

Example 7

Production of hot extracted oolong tea beverage, including:

S100: adding 43.5 g of oolong tea leaves of tieguanyin produced in Anxi, Fujian, and 435 g of RO water (90°C) into a house-made 5 L extraction apparatus, such that the oolong tea leaves are soaked in the RO water for 2.67 minutes by leaving to stand without stirring for extraction, and after the extraction is completed, leaching a tea solution (an extract liquid 1) for later use;

S200: adding 435 g of RO water (90°C) to the extraction apparatus again to extract the remaining tea leaves in step S100 for 2.67 minutes, and after the extraction is completed, leaching the tea solution (an extract liquid 2) for later use;

S210: repeating step S200 once to obtain an extract liquid 3;

		extractions in total	total
Weight of extract liquid	g	1138.9	1153.6
Concentration of extract liquid (Brix)	°Bx	1.26	1.06
Extraction yield		33.0%	28.1%
Tea polyphenols	mg/L	883	757
Caffeine	mg/L	109.5	91.1
Amino acids	mg/L	64.8	54.9

Compared with Comparative Example 7, the extraction yield of the production method of Example 7 is increased by 17.4%.

Table 7.2

Hot Extracted Oolong Tea Beverage	Example 7 (0 score as benchmark)	Comparative example 7
Aroma intensity	0	0
Flavor Intensity	0	-1
Sweet aftertaste	0	0
Bitterness	0	-1
Astringency	0	+1
Off-flavor	0	0

It can be seen that Comparative Example 7 has an overall flavor lighter than that of Example 7 but a stronger astringency.

Example 8

Production of hot extracted black tea beverage, including:

S100: adding 40 g of CTC black tea leaves produced in Sri Lanka and 400 g of RO water (70°C) into a house-made 5 L extraction apparatus, such that the black tea leaves are soaked in the RO water for 2 minutes by leaving to stand without stirring for extraction, and after the extraction is completed, leaching a tea solution (an extract liquid 1) for later use;

S200: adding 400 g of RO water (70°C) to the extraction apparatus again to extract the remaining tea leaves in step S100 for 2 minutes, and after the extraction is completed, leaching the tea solution (an extract liquid 2) for later use;

S210: repeating step S200 once to obtain an extract liquid 3;

S300: combining the extract liquids 1 to 3 obtained in steps S100 to S210, and then cooling same and purifying same in a centrifuge (5000 RPM, 10 minutes) to obtain a clearer

Concentration of extract liquid (Brix)	°Bx	1.33	1.21
Extraction yield		33.5%	31.1%
Tea polyphenols	mg/L	558	515
Caffeine	mg/L	124.9	116.9
Amino acids	mg/L	171.3	161.9

Compared with Comparative Example 8, the extraction yield of the production method of Example 8 is increased by 7.7%.

Table 8.2

Hot Extracted Black Tea Beverage	Example 8 (0 score as benchmark)	Comparative example 8
Aroma intensity	0	0
Flavor Intensity	0	-1
Sweet aftertaste	0	0
Bitterness	0	+1
Astringency	0	+1
Off-flavor	0	0

It can be seen that Comparative Example 8 has an overall flavor lighter than that of Example 8 but stronger bitterness and astringency.

Example 9

Production of hot extracted oolong tea beverage, including:

S100: adding 30 g of oolong tea leaves of tieguanyin produced in Anxi, Fujian, and 90 g of RO water (100°C) into a house-made 1 L extraction apparatus, such that the oolong tea leaves are soaked in the RO water for 5 minutes by leaving to stand without stirring for extraction, and after the extraction is completed, leaching a tea solution (an extract liquid 1) for later use;

S200: adding 90 g of RO water (100°C) to the extraction apparatus again to extract the remaining tea leaves in step S100 for 5 minutes, and after the extraction is completed, leaching the tea solution (an extract liquid 2) for later use;

S210: repeating step S200 5 times to obtain an extract liquids 3 to 7;

S300: combining the extract liquids 1 to 7 obtained in steps S100 to S210, and then cooling same and purifying same in a centrifuge (5000 RPM, 10 minutes) to obtain a clearer tea extract liquid; and

S400: formulating the tea extract liquid obtained in step S300 into a beverage of 14.5 g/L (on the basis of dried tea leaves), sterilizing and then bottling same to obtain a bottled tea beverage.

Comparative example 9

S100': adding 30 g of oolong tea leaves of tieguanyin produced in Anxi, Fujian, and of the same type and batch as those in example 9 and 630 g of RO water (100°C) into a house-made 1 L extraction apparatus, such that the oolong tea leaves are soaked in the RO water for 35 minutes by leaving to stand without stirring for extraction, and after the extraction is completed, leaching a tea solution (an extract liquid 1') for later use;

S200': cooling the extract liquid 1' obtained in step S100', and purifying same in a centrifuge (5000 RPM, 10 minutes) to obtain a clearer tea extract liquid;

S300': formulating the tea extract liquid obtained in step S200' into a beverage of 14.5 g/L (on the basis of dried tea leaves), sterilizing and then bottling same to obtain a bottled tea beverage.

Test example 9

1. The solid content and extraction yield of the tea extract liquids prepared in Example 9 and Comparative Example 9 above are calculated. The test results are as shown in Table 9.1.

2. The taste sensory evaluations of aroma, flavor intensity, sweet aftertaste, bitterness and astringency of the bottled tea drinks prepared in the above Example 9 and Comparative Example 9 are carried out using a 5-scale evaluation method (-2 score to +2 score). The test results are as shown in Table 9.2 and Figure 9.

Table 9.1

	Unit	Example 9	Comparative example 9
Oolong tea	g	30	30
RO water		90 g/extraction × 7 extractions = 630 g	630 g
Extraction conditions	/	RO water (100°C) for 5 minutes each extraction, 7 extractions in total	Extraction with RO water (100°C) for 35 minutes, 1 extraction in total
Weight of extract liquid	g	555.8	490
Concentration of extract liquid	°Bx	1.15	0.89

(Brix)			
Extraction yield		21.3%	14.5%
Tea polyphenols	mg/L	474	339
Caffeine	mg/L	69.6	53.6
Amino acids	mg/L	93.7	72.3

Compared with Comparative Example 9, the extraction yield of the production method of Example 9 is increased by 46.9%.

Table 9.2

Hot Extracted Oolong Tea Beverage	Example 9 (0 score as benchmark)	Comparative example 9
Aroma intensity	0	-1
Flavor Intensity	0	-2
Sweet aftertaste	0	0
Bitterness	0	-1
Astringency	0	-1
Off-flavor	0	0

It can be seen that the overall flavor of the bottled tea beverage of Comparative Example 9 is lighter than that of Example 9.

Example 10

Production of hot extracted oolong tea beverage, including:

S100: adding 62.5 g of oolong tea leaves of tieguanyin produced in Anxi, Fujian, and 1250 g of RO water (90°C) into a house-made 5 L extraction apparatus, such that the oolong tea leaves are soaked in the RO water for 8 minutes by leaving to stand without stirring for extraction, and after the extraction is completed, leaching a tea solution (an extract liquid 1) for later use;

S200: adding 1250 g of RO water (90°C) to the extraction apparatus again to extract the remaining tea leaves in step S100 for 8 minutes, and after the extraction is completed, leaching the tea solution (an extract liquid 2) for later use;

S300: combining the extract liquids 1 and 2 obtained in steps S100 and S200, and then cooling same and purifying same in a centrifuge (5000 RPM, 10 minutes) to obtain a clearer tea extract liquid; and

S400: formulating the tea extract liquid obtained in step S300 into a beverage of 12.5 g/L (on the basis of dried tea leaves), sterilizing and then bottling same to obtain a bottled tea beverage.

Comparative example 10

S100': adding 62.5 g of oolong tea leaves produced in Anxi, Fujian, and of the same type and batch as those in example 10 and 2500 g of RO water (90°C) into a house-made 5 L extraction apparatus, such that the oolong tea leaves are soaked in the RO water for 16 minutes by leaving to stand without stirring for extraction, and after the extraction is completed, leaching a tea solution (an extract liquid 1') for later use;

S200': cooling the extract liquid 1' obtained in step S100', and purifying same in a centrifuge (5000 RPM, 10 minutes) to obtain a clearer tea extract liquid; and

S300': formulating the tea extract liquid obtained in step S200' into a beverage of 12.5 g/L (on the basis of dried tea leaves), sterilizing and then bottling same to obtain a bottled tea beverage.

Test example 10

1. The solid content and extraction yield of the tea extract liquids prepared in Example 10 and Comparative Example 10 above are calculated. The test results are as shown in Table 10.1.

2. The taste sensory evaluations of aroma, flavor intensity, sweet aftertaste, bitterness and astringency of the bottled tea drinks prepared in the above Example 10 and Comparative Example 10 are carried out using a 5-scale evaluation method (-2 score to +2 score). The test results are as shown in Table 10.2 and Figure 10.

Table 10.1

	Unit	Example 10	Comparative example 10
Oolong tea	g	62.5	62.5
RO water		1250 g/extraction × 2 extractions = 2500 g	2500 g
Extraction conditions	/	RO water (90°C) for 8 minutes each extraction, 2 extractions in total	Extraction with RO water (90°C) for 16 minutes, 1 extraction in total
Weight of extract liquid	g	2199	2219
Concentration of extract liquid (Brix)	°Bx	0.84	0.78
Extraction yield		29.6%	27.7%
Tea polyphenols	mg/L	705	650

Caffeine	mg/L	96.2	90.4
Amino acids	mg/L	87.3	82

Compared with Comparative Example 10, the extraction yield of the production method of Example 10 is increased by 6.9%.

Table 10.2

Hot Extracted Oolong Tea Beverage	Example 10	Comparative example 10 (0 score as benchmark)
Aroma intensity	+1	0
Flavor Intensity	+1	0
Sweet aftertaste	0	0
Bitterness	0	0
Astringency	-1	0
Off-flavor	0	0

It can be seen that Comparative Example 10 has an overall flavor lighter than that of Example 10 but a stronger astringency.

Herebelow, the influence of tea leaf-to-water ratio (that is, the mass ratio of tea leaves to deionized water used in a single extraction) and extraction time on the extraction yield is illustrated by way of examples. All experiments are carried out by water at room temperature, and the types and batches of tea leaves are the same in the same example, in order to reduce the influence of temperature fluctuations in extraction and tea leaf source on the experimental results. According to the dissolution dynamic model, other temperatures are also in line with the predicted results of this experiment.

Example 11-1 (Influence of tea leaf-to-water ratio on extraction yield, tea leaf-to-water ratio in single extraction: 1 : 10)

Production of cold extracted oolong tea beverage, including:

S100: adding 43.5 g of oolong tea leaves of tieguanyin A produced in Anxi, Fujian, and 435 g of RO water (24.5°C) into a house-made 1 L extraction apparatus, such that the oolong tea leaves are soaked in the RO water for 10 minutes by leaving to stand without stirring for extraction, and after the extraction is completed, leaching a tea solution (an extract liquid 1) for later use;

S200: adding 435 g of RO water (24.5°C) to the extraction apparatus again to extract the remaining tea leaves in step S100 for 10 minutes, and after the extraction is completed,

leaching the tea solution (an extract liquid 2) for later use;

S210: repeating step S200 twice to obtain an extract liquid 3 and an extract liquid 4;

S300: combining the extract liquids 1 to 4 obtained in steps S100 to S210, and then cooling same and purifying same in a centrifuge (5000 RPM, 10 minutes) to obtain a clearer tea extract liquid; and

S400: weighing the tea extract liquids prepared in steps S100 and S300 respectively, measuring the Brix, and calculating the extraction yield. The calculation results are as shown in Table 11.

Example 11-2 (Influence of tea leaf-to-water ratio on extraction yield, tea leaf-to-water ratio in single extraction: 1: 12.5)

Production of cold extracted oolong tea beverage, including:

S100: adding 43.5 g of oolong tea leaves of tieguanyin A produced in Anxi, Fujian, and of the same batch as in Example 11-1 and 543.75 g of RO water (24.5°C) into a house-made 1 L extraction apparatus, such that the oolong tea leaves are soaked in the RO water for 10 minutes by leaving to stand without stirring for extraction, and after the extraction is completed, leaching a tea solution (an extract liquid 1) for later use;

S200: adding 543.75 g of RO water (24.5°C) to the extraction apparatus again to extract the remaining tea leaves in step S100 for 10 minutes, and after the extraction is completed, leaching the tea solution (an extract liquid 2) for later use;

S210: repeating step S200 twice to obtain an extract liquid 3 and an extract liquid 4;

S300: combining the extract liquids 1 to 4 obtained in steps S100 to S210, and then cooling same and purifying same in a centrifuge (5000 RPM, 10 minutes) to obtain a clearer tea extract liquid; and

S400: weighing the tea extract liquids prepared in steps S100 and S300 respectively, measuring the Brix, and calculating the extraction yield. The calculation results are as shown in Table 11.

Examples 11-3 (Influence of tea leaf-to-water ratio on extraction yield, tea leaf-to-water ratio in single extraction: 1 : 15)

Production of cold extracted oolong tea beverage, including:

S100: adding 43.5 g of oolong tea leaves of tieguanyin A produced in Anxi, Fujian, and of the same batch as in Example 11-1 and 652.5 g of RO water (24.5°C) into a house-made

1 L extraction apparatus, such that the oolong tea leaves are soaked in the RO water for 10 minutes by leaving to stand without stirring for extraction, and after the extraction is completed, leaching a tea solution (an extract liquid 1) for later use;

S200: adding 652.5 g of RO water (24.5°C) to the extraction apparatus again to extract the remaining tea leaves in step S100 for 10 minutes, and after the extraction is completed, leaching the tea solution (an extract liquid 2) for later use;

S210: repeating step S200 twice to obtain an extract liquid 3 and an extract liquid 4;

S300: combining the extract liquids 1 to 4 obtained in steps S100 to S210, and then cooling same and purifying same in a centrifuge (5000 RPM, 10 minutes) to obtain a clearer tea extract liquid; and

S400: weighing the tea extract liquids prepared in steps S100 and S300 respectively, measuring the Brix, and calculating the extraction yield. The calculation results are as shown in Table 11.

Table 11

tea leaf-to-water ratio (1 : X)	Extraction yield (1 time)	Extraction yield (4 times)
1: 10.0	11.45%	26.36%
1: 12.5	11.20%	26.11%
1: 15.0	10.36%	25.98%

It can be seen that when the tea leaf-to-water ratio in a single extraction is in a range of 1 : 10.0 to 1 : 15.0, the tea leaf-to-water ratio has little influence on the extraction yield. In addition, the extraction results from different tea leaf-to-water ratios show that a higher the tea leaf-to-water ratio required for a single extraction is not always better.

Example 12 (Influence of extraction time on extraction yield in a single extraction, using a single extraction and a tea leaf-to-water ratio of 1 : 30, and turning on magnetic stirring during extraction)

Production of cold extracted oolong tea beverage, including:

S1: adding 22.8 g of crushed frozen top oolong tea leaves produced in Taiwan and 684 g of RO water (25°C) into a house-made 1 L extraction apparatus, such that the oolong tea leaves are soaked for 10 minutes in the RO water under magnetic stirring at a rotation speed of 100 RPM for extraction; after extraction is completed, leaching a tea solution (an extract liquid 1) for later use;

S2: adding 22.8 g of crushed frozen top oolong tea leaves produced in Taiwan and of the same batch as that in step S1 and 684 g of RO water (25°C) into a house-made 1 L extraction apparatus, such that the oolong tea leaves are soaked for 20 minutes in the RO water under magnetic stirring at a rotation speed of 100 RPM for extraction; after extraction is completed, leaching a tea solution (an extract liquid 2) for later use;

S3: adding 22.8 g of crushed frozen top oolong tea leaves produced in Taiwan and of the same batch as that in step S1 and 684 g of RO water (25°C) into a house-made 1 L extraction apparatus, such that the oolong tea leaves are soaked for 30 minutes in the RO water under magnetic stirring at a rotation speed of 100RPM for extraction; after extraction is completed, leaching a tea solution (an extract liquid 3) for later use; and

S4: weighing the tea extract solutions prepared in steps S1 to S3 respectively, measuring the Brix, and calculating the extraction yield. The calculation results are shown in Table 12.

Table 12

Sample	Tea leaves (gram)	Tea extraction time (minute)	Extract liquid (g)	Brix(°Bx)	Extraction yield (%)
S1	22.8	10	621.7	1.14	31.09
S2	22.8	20	591.8	1.22	31.67
S3	22.8	30	587.3	1.22	31.43

It can be seen that a longer single extraction time is not always better. After a certain level of extraction is reached, a further extended time will not help the increase of the extraction yield much.

Example 13-1 (Influence of extraction time on the extraction yield, using multiple extractions; the tea leaf-to-water ratio in a single extraction of 1 : 10)

Production of cold extracted oolong tea beverage, including:

S100: adding 43.5 g of oolong tea leaves of tieguanyin B produced in Anxi, Fujian, and 435 g of RO water (24.3°C) into a house-made 1 L extraction apparatus, such that the oolong tea leaves are soaked in the RO water for 8 minutes by leaving to stand without stirring for extraction, and after the extraction is completed, leaching a tea solution (an extract liquid 1) for later use;

S200: adding 435 g of RO water (24.3°C) to the extraction apparatus again to extract

the remaining tea leaves in step S100 for 8 minutes, and after the extraction is completed, leaching the tea solution (an extract liquid 2) for later use;

S210: repeating step S200 twice to obtain an extract liquid 3 and an extract liquid 4;

S300: combining the extract liquids 1 to 4 obtained in steps S100 to S210, and then cooling same and purifying same in a centrifuge (5000 RPM, 10 minutes) to obtain a clearer tea extract liquid; and

S400: weighing the extract liquids prepared in steps S100 to S300 respectively, measuring the Brix, and calculating the extraction yield. The calculation results are as shown in Table 13.

Example 13-2 (Influence of extraction time on the extraction yield, using multiple extractions; the tea leaf-to-water ratio in a single extraction of 1 : 10)

Production of cold extracted oolong tea beverage, including:

S100: adding 43.5 g of oolong tea leaves of tieguanyin B produced in Anxi, Fujian, and 435 g of RO water (24.3°C) into a house-made 1 L extraction apparatus, such that the oolong tea leaves are soaked in the RO water for 10 minutes by leaving to stand without stirring for extraction, and after the extraction is completed, leaching a tea solution (an extract liquid 1) for later use;

S200: adding 435 g of RO water (24.3°C) to the extraction apparatus again to extract the remaining tea leaves in step S100 for 10 minutes, and after the extraction is completed, leaching the tea solution (an extract liquid 2) for later use;

S210: repeating step S200 twice to obtain an extract liquid 3 and an extract liquid 4;

S300: combining the extract liquids 1 to 4 obtained in steps S100 to S210, and then cooling same and purifying same in a centrifuge (5000 RPM, 10 minutes) to obtain a clearer tea extract liquid; and

S400: weighing the tea extract solutions prepared in steps S100 to S300 respectively, measuring the Brix, and calculating the extraction yield. The calculation results are as shown in Table 13.

Table 13

Sample	Extraction yield (%), relative to dry tea leaves	
	Single extraction time of 8 minutes	Single extraction time of 10 minutes
Extraction yield of	10.08	10.44

S3: weighing the 11 samples collected in S1 and S2 respectively, measuring the Brix and calculating the extraction yield. The calculation results are as shown in Table 15 and Figure 12.

Table 15

Tea solution samples/number of extractions	Extraction yield (cumulative)	
	0.5 minutes/extraction (extraction time)	1 minute/extraction (extraction time)
ext1	1.6%	2.5%
ext2	3.7%	5.8%
ext3	6.1%	8.9%
ext4	8.4%	11.9%
ext5	10.4%	14.3%
ext6	12.4%	16.5%
ext7	14.3%	18.4%
ext8	15.9%	19.9%
ext9	18.0%	21.2%
ext10	19.3%	22.5%
ext11	20.7%	23.8%

The experimental results show that multiple short-term extractions can significantly increase the extraction yield. For the comparison of a single extraction of 0.5 minute and 1 minute, when the total extractions is repeated 11, the difference in extraction yield is 3.1%, but the total extraction time is doubled. In comparison, the difference in total extraction time is more obvious.

The disclosure is an example of the principles of the embodiments in the present application, and does not limit the present application in any form or in substance, or limit the present application to specific embodiments. For those skilled in the art, it is obvious that the elements, methods, systems, etc. of the technical solutions in the embodiments of the present application can be altered, changed, modified, and evolved without departing from the principles, spirit and scope as defined in the claims, as described in the above embodiments and technical solutions of the present application. The embodiments of these alterations, changes, modifications, and evolutions are all included in the equivalent embodiments of the present application, and these equivalent embodiments are all included in the scope of the present application as defined by the claims. While the embodiments of the present application can be embodied in many different forms, described in detail herein