

Study on Development Technology of Compound Health Beverage of Passion Fruit and Green Tea

He Jinwu

Sanya Aviation and Tourism College, Sanya, 572000, Hainan, China

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Abstract: With the continuous improvement of people's living standard, the quality of life is gradually improved, and the requirements for beverages are also constantly improved. Passion fruit is a rare tropical and subtropical fruit with rich aroma and rich nutrition. It is rich in bioactive components and has high nutritional and medicinal value. At present, the liquefaction of tea has become the dominant development direction of tea beverages. Passion fruit green tea compound health beverage is a unique health green beverage with broad market prospects. Based on this, this paper studied the development technology of passion fruit and green tea compound health beverage with passion fruit and green tea as main materials. In this paper, the production technology and blending method of passion fruit green tea beverage were summarized, and the optimum formula of passion fruit green tea compound health beverage was determined by orthogonal experiment. The research shows that the product with more than 0.2% passion fruit juice has outstanding flavor, refreshing and delicious taste. The compound health beverage of passion fruit and green tea produced by the preparation technology in this paper has uniform color, good clarity, good stability, moderate sweetness and sweetness, and strong natural fragrance of passion fruit and green tea. In order to provide reference for the development of healthy and nutritious passion fruit products.

1. Introduction

In recent years, with the continuous development of China's economy and the continuous improvement of people's living standards, the demand for fruits has gradually increased, and people's requirements have changed from simple palatability to health [1]. Some fruits with health care effects have been recognized by more and more people. Passion fruit is rich in flavor, with the compound flavor of guava, mango, banana, pineapple, strawberry and other fruits. Passion fruit juice has the functions of promoting salivation, quenching thirst, refreshing mind, helping digestion, eliminating phlegm and relieving cough, and nourishing and strengthening the body [2]. Passion fruit not only has the properties of general fruits, but also contains rich bioactive components, mainly including flavonoids, alkaloids, etc., which have high nutritional value and medicinal value [3]. There are 19 kinds of passion fruit in China, of which 13 are native to China and 6 are imported. It is an important flavoring agent for various products such as fruit juice drinks, ice cream, snacks, jelly, etc. and an indispensable raw material for fruit juice drinks [4]. In recent years, with people's increasing concern about food nutrition and health, compound fruit juice drinks have risen all over the world and become a popular beverage product.

On the one hand, the market of passion fruit has been greatly increased in recent years, and at the same time, the processed products of passion fruit have also ushered in opportunities for development [5]. On the other hand, with the increase of the planting area of passion fruit, the yield of passion fruit also increases, and the fresh fruit value of passion fruit is low and the preservation period is short, so it is urgent to study the processing technology of passion fruit [6]. With the deepening of the research on the active ingredients and health functions of passion fruit, the application range of passion fruit in fruit processing is also expanding [7]. Therefore, the research on the development technology of passion fruit and green tea compound health beverage will be more conducive to promoting the consumption market of passion fruit, and the huge development value of passion fruit has also stimulated the enthusiasm of researchers for in-depth research [8]. At present, the research on passion fruit products mainly focuses on passion fruit juice, passion fruit

wine, passion fruit vinegar, passion fruit tea, passion fruit paste, passion fruit preserved and so on, and the processing technology is relatively simple [9]. However, the liquid tea has become the dominant development direction of tea beverages. Passion fruit green tea beverage is a unique health green beverage with broad market prospects. In this paper, the development technology of passion fruit green tea compound health beverage was explored.

2. Functions of passion fruit

As a kind of fruit growing in the tropics and subtropics, passion fruit has high nutritional and active ingredients. Passion fruit is juicy and unique in flavor, which not only has the properties of general fruits, but also has high nutritional value and medicinal value [10]. With the deepening of the research on the functional active ingredients and health care function of passion fruit, the application range of passion fruit in fruit processing is also expanding. Therefore, the research of passion fruit and green tea compound health beverage will be more conducive to promoting the consumption market of passion fruit, and the huge development value of passion fruit has also stimulated the enthusiasm of researchers for in-depth research. Passion fruit contains as many as 165 kinds of compounds, 17 kinds of amino acids and anti-cancer active ingredients, which can prevent and treat cell aging and cancer, and has the effects of anti-aging and caring skin. Fruit contains a variety of vitamins, which can reduce blood lipid, prevent arteriosclerosis and lower blood pressure. It has anti-anxiety, sedative, anti-inflammatory and anti-addiction effects. In addition, passion fruit also has complex effects on the central nervous system, which can calm nerves and relieve anxiety, depression and nervousness-induced headaches.

3. Material and process flow

3.1. Materials and instruments

Materials: Green tea, white sugar, passion fruit: commercially available; β -CD, citric acid, CMC: food grade.

Instruments: soft water treatment device, multifunctional cooking machine, electronic balance, centrifuge, filter, cooling device, centrifuge, sterilization equipment, filling and sealing machine, packaging machine.

3.2. Process flow

(1) Passion fruit \rightarrow selection \rightarrow cutting in half \rightarrow digging pulp \rightarrow juicing \rightarrow enzymolysis \rightarrow filtration \rightarrow original juice.

(2) Green tea leaves \rightarrow soaking \rightarrow filtering \rightarrow cooling \rightarrow tea juice.

(3) β -CD \rightarrow tea juice \rightarrow blending \rightarrow homogenization \rightarrow sterilization \rightarrow canning \rightarrow cooling \rightarrow color fixative and stabilizer \rightarrow packaging and inspection \rightarrow finished product.

Note:

Tea extraction: The tea extraction time is strictly controlled for 15min, and the solute in the tea easily diffuses into the solution, so the tea extraction rate is high.

Passion Fruit Juice: Cut passion fruit in half, scoop out the pulp with a spoon, squeeze juice, and naturally separate seeds from juice. After cooling, centrifuge in a centrifuge at a speed of 2000 r/min \sim 3000 r/min for 10 min, and take the supernatant as the original juice.

Sterilization: thermally sterilizing the filled compound beverage at 85°C for 15min to obtain the finished product.

Packaging: Pass the lamp inspection, reject the unqualified products, and package the qualified products.

4. Evaluation of compound health beverage of passion fruit and green tea

After a period of storage, especially at low temperature, the stability of tea drinks often decreases, and precipitation and turbidity appear, that is, "tea curd". This will affect the sensory quality of the

product. According to Stokes' law of fluid mechanics, the homogenization process can make the pulp particles finer. Adding a proper amount of stabilizer in the system can adjust the density of the dispersion medium and keep the stability of the juice. As the addition of green tea, passion fruit, white sugar and citric acid will directly affect the sensory quality of passion fruit green tea beverage, so these four factors were selected for the orthogonal experiment of 4 factors and 3 levels. See Table 1 for experimental factors.

Table 1 Orthogonal experimental factors level table of passion fruit green tea beverage

Level	Factor			
	A Green tea addition	B Passion fruit addition	C Added amount of white granulated sugar	D Citric acid addition
1	2	5	11	0.03
2	3	9	13	0.05
3	4	13	15	0.07

In this paper, different sterilization processes were used to sterilize the blended compound juice to determine the best sterilization conditions. According to the optimized formula, passion fruit green tea compound health beverage was prepared, and the quality of the obtained product was tested. The results were as follows: (1) Color: bright yellow, shiny, uniform color, no visible impurities. (2) Taste: It has the unique taste and aroma of passion fruit and green tea, with sweet and sour taste, harmonious flavor and no peculiar smell. (3) Microstructure: stable and uniform clear solution without precipitation. (4) Microbiological indicators: total bacteria ≤ 100 CFU/mL, coliform ≤ 3 MPN/mL, and no pathogenic bacteria were detected. In order to better evaluate the developed compound beverage, the traditional sensory evaluation, physical and chemical indicators and microbial indicators were used for evaluation. Table 2 shows the quality indexes of passion fruit green tea products.

Table 2 Quality indexes of passion fruit green tea products

Project	Demand
Sugar degree (20°C) / Birx	8.5+0.2
B. pH	3.5+0.2
Total acid	0.12+0.01
Tea polyphenol	≥ 220 mg/L
Turbidity	≤ 10
Character	Good aroma, no odor, odor and foreign matter

This paper uses Excel, SPSS statistical software to carry out statistical analysis on the experimental results, and the results are expressed as mean \pm SD.

5. Results and analysis

Because of its healthy and natural drinking advantages, tea drinks are more and more favored by consumers. The unique production technology and convenient drinking characteristics make tea drinks popular all over the world, and become the third largest drink after carbonated drinks and drinking water. In this paper, single factor experiment and orthogonal experiment were adopted to select the juice formula, and the color, aroma, taste and tissue state of passion fruit green tea compound health beverage were comprehensively scored, which was used as an evaluation index to select the formula with the best taste and flavor. In the passion fruit green tea compound health beverage, there are many factors influencing the preparation of tea soup, such as tea type, shape, size, tea-water ratio, extraction time, temperature, extraction times and water quality. Usually, the main factors affecting the preparation of tea soup are: extraction temperature, tea-water ratio, extraction time, etc.

5.1. Green tea

The addition of green tea will affect the taste, aroma and tissue state of passion fruit green tea

beverage. (1) The addition amount of green tea is too low, so the passion fruit green tea beverage can't reflect the unique taste of green tea, and it lacks the sweet taste of green tea, with weak aroma. (2) When the amount of green tea was 1% ~ 2%, the comprehensive score of sensory evaluation of passion fruit green tea beverage gradually increased. (3) When the amount of green tea is more than 2%, the taste of green tea becomes stronger and stronger, which affects and masks the fruit flavor of passion fruit in the beverage. In severe cases, it produces bitter tea taste and even peculiar smell, and the score gradually decreases.

5.2. Citric acid

The addition of citric acid has different effects on the quality of products. (1) When the amount of citric acid is less than 0.04%, the juice beverage is prone to browning. (2) When the addition of citric acid is more than 0.04%, although the color protection effect is obvious, the juice has pungent odor, uncoordinated flavor and unacceptable to the senses. (3) When the addition of citric acid is 0.04%, the color protection effect of citric acid is remarkable, and the fruit juice beverage is in a uniform state, and its color is white and uniform. Therefore, 0.04% citric acid is the best addition.

5.3. White granulated sugar

The added amount of white sugar has little effect on the color, texture and smell of passion fruit green tea compound health beverage, but mainly affects the taste of the compound beverage. The sweetness of the compound beverage is regulated by white sugar. (1) When the amount of white sugar is 8%, the taste of compound beverage is the best. (2) When the added amount of white sugar is too low or too high, the taste is too light or too sweet.

5.4. Passion fruit

The addition of passion fruit will also affect the taste, aroma and tissue state of passion fruit green tea beverage. (1) The added amount of passion fruit is too small, and the flavor of passion fruit in the beverage is weak, which can't reflect the fruit fragrance of passion fruit. (2) When the amount of passion fruit was 6% ~ 10%, the comprehensive score of sensory evaluation gradually increased. (3) When the amount of passion fruit is more than 10%, the flavor of passion fruit in tea drinks is too strong, which masks the taste of green tea. The overall taste is too sour, and the score gradually decreases.

6. Conclusions

With the increase of the planting area of passion fruit, the yield of passion fruit also increases. The fresh fruit value of passion fruit is low and the preservation period is short, so it is urgent to study the processing technology of passion fruit. With the increasing quality of life, people's demand for drinks is no longer a single juice drink, but a juice drink with diversified needs, excellent taste and rich nutrition. At present, compound fruit juice drinks are rising all over the world, and become a kind of popular beverage products. However, most fruits can produce fruit juice with good export flavor after proper processing, but the flavor is often single and the nutrition is lacking. Based on this, this paper explores the development technology of passion fruit green tea compound health beverage. The compound health beverage of passion fruit and green tea developed in this paper is a healthy juice beverage which integrates the nutrition and flavor of passion fruit and green tea. Adding more than 0.2% passion fruit juice into the production of passion fruit green tea beverage has outstanding flavor, soft taste, refreshing and delicious taste. The compound health beverage of passion fruit and green tea has the aroma of passion fruit and green tea, with harmonious and soft aroma, strong stability and good quality. In the future, the processing conditions of high preservation of nutritional components and aroma components during processing need further exploration.

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