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# Study on the Development and Stability of Passion Fruit-Pitaya Compound Beverage

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**Mei-ling Tang [1,2], Wei-wen Duan[1], Zhen-hua Duan[1,2*], Yan Chen[1,2], Qiu-xia Duan[1,2], Yu-yan Pan[1]**

*[1]School of Food and Bioengineering, Hezhou University, China*
*[2]School of Food Science and Technology, Dalian Polytechnic University, China*

***Address for Correspondence**
Zhen-hua Duan, School of Food and Bioengineering, Hezhou University, Hezhou 542899, China, Email: dzh65@126.com

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**Keywords:** Passion fruit; Pitaya; Compound beverage; Stability

## Abstract

In the test, the main raw materials were whole passion fruit and pitaya, and sugar, black fungus and stabilizers were used as the supplementary material. The basic formulation of passion fruit-pitaya compound beverage was studied by single factor and orthogonal test, and its stability was discussed on this basis. The results showed that the compound ratio of passion fruit and pitaya was 1:1(g/g), the ratio of material to liquid was 1:3(g/g), the additive amount of sugar was 9%, the additive amount of black fungus powder was 0.35%, and the compound beverage had the optimal sensory effect. When 0.06% pectin and 0.04% xanthan gum were added, the stability of compound beverage was the optimal. The prepared compound beverage from the formulation was suitable for acidity and sweetness, rich nutrition and good stability.

## Introduction

With the increasing demand of people for nutrition and health, beverage has gradually developed from single to diversified and nutritious. Therefore, the fruit and vegetable juice compound beverage is favored by more and more consumers. It can achieve functional complementarily by mixing and blending the raw materials of different nutrients and functional components [1,2]. Passion fruit (*Passiflora edulis* Sims) contains carotenoids, free amino acids and rich calcium, phosphorus, iron and other substances [3]. At the same time, passion fruit also has a unique fruit flavor, which is very suitable for processing fruit juices and beverages with other fruit and vegetable juices to effectively improve the flavor [4]. Pitaya (*Hylocereus undatus*) is rich in vitamins, dietary fiber, carbohydrates and minerals [5], and it is a tropical fruit with high dietary fiber, low-fat, low-sugar, high moisture and rich in micronutrients [6]. Black fungus (*Auricularia auricular*), as a medicinal and edible health food [7], has health and pharmacological effects such as lowering blood sugar, lowering blood lipids, antithrombotic and improving body immunity [8]. It is mainly based on direct sales after drying, and its product development is still in an exploratory stage.

As the dominant agricultural product resources in Guangxi, passion fruit and pitaya have the characteristics of high yield but not easy storage. They are mainly fresh fruit sales, and the processing and utilization degree is low. Therefore, it is extremely important to develop new types of processed products with market prospects. At present, there are some studies on the development of single fruit juice beverage and compound beverage from passion fruit and pitaya. For example, passion fruit and pomelo, pineapple, cucumber, etc. are respectively made into compound beverages [9-11]; pitaya and green tea, cherry tomatoes, apples, etc. are respectively developed into compound beverages [12-14]. However, it has not been reported in the current study that using the whole passion fruit and pitaya as the main raw materials to develop the compound beverage. At the same time, the phenomenon of stratification and precipitation is common in the compound beverage, and the stability of compound beverage can be effectively solved by selecting appropriate stabilizer.

The study has developed a kind of passion fruit-pitaya compound beverage, which is rich in nutritional ingredients, good taste and strong aromas of passion fruit and pitaya. It is based on whole passion fruit and pitaya as the main raw materials, and the black fungus, sugar and stabilizers as the supplementary material to study the production process and stability of compound beverage after reasonable blending in a certain proportion. It fully combines the nutrition elements of the three fruits and vegetables and the strong aroma of fruits, so that the advantages of each raw material are complementary. Therefore, the compound beverage can give full play to the strong aroma of passion fruit, the bright color of pitaya and the nutrition and health functions of black fungus. The development of passion fruit-pitaya compound beverage can not only enrich the products of fruit and vegetable juice compound beverage, but also increase the additive value of raw materials. It also explores a new way for the deep processing and utilization of passion fruit, pitaya and black fungus.

## Materials and Methods

### Materials

Passion fruit and pitaya were purchased from Taihe Fruit Store in Hezhou, Guangxi; Sugar and salt were purchased from Baijiafu Supermarket in Hezhou, Guangxi; Selenium-rich black fungus was produced by Zhaoping Tianrun Xianhui Edible Fungus Co., Ltd. in Hezhou, Guangxi; Pectinase was purchased from Nuo Weixin Co, Ltd.; Sodium hydroxide was purchased from analytical grade Xilong Science Co, Ltd.; Phenolphthalein and ethanol were purchased from Guangdong Guanghua Technology Co, Ltd.; Pectin, xanthan gum, carrageenan, and guar gum were all food grade, which was purchased from Zhejiang Duowei Chemical Food Co, Ltd.

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XP07-type wall-breaking cooking machine was purchase form Foshan Shunde Xilai Home Appliance Co, Ltd.; JJ1000 electronic balance was bought from Changshu Shuangjie Testing Instrument Factory; PTX-FA110S electronic balance was bought from Fuzhou Huazhi Scientific Instrument Co, Ltd.; HH-$S_2$ Digital thermostatic water bath was bought from Jiangsu Jinyi Instrument Technology Co, Ltd.; DH411C air supply constant temperature oven was purchase from Yamato Japan; Multi-function induction cooker was purchase from Guangdong Midea Life Electric Manufacturing Co, Ltd.; DFY-600 swing high-speed universal grinder was purchase from Wenling Linda Machinery Co, Ltd.; JM-L50A colloid mill was purchase from Hangzhou Huihe Machinery Equipment Co, Ltd.; AS-Z0L vacuum packaging machine was purchase from Quanzhou Ansen Electromechanical Co, Ltd.; 722 visible spectrophotometer was purchase from Youke Instrumentation Co, Ltd; FE28 pH meter was purchase from Mettler-Toledo Instruments (Shanghai) Co, Ltd.; LH-B55 digital display sugar meter was purchase from Lu Heng Biological Co, Ltd.; NDJ-8S digital display viscometer was purchase from Bangxi Instrument Technology (Shanghai) Co, Ltd.; L550 desktop low-speed large-capacity centrifuge was purchase from Hunan Xiangyi Laboratory Instrument Development Co., Ltd.

**Passion Fruit – Pitaya Compound Beverage Processing**

Passion fruit juice, pitaya juice, black fungus powder→Mixing and allocating(Adding white granulated sugar and stabilizer)→Colloid mill→Bagging→Exhausting→Sealing→Sterilizing→Cooling→End product→Determination of indexes.

**Operation point**

**Preparation of passion fruit juice:** Passion fruit was selected according to the criteria of freshness, no pests, equal maturity, intact pericarp and uniform size. The selected passion fruit was cleaned, and then cut into pieces after draining the water. The sliced passion fruit was processed in a beater for 3 to 5 minutes to obtain its serous fluid. 0.004% (V/V) pectinase (enzyme activity: 10000U/g) was added to the serous fluid for enzymolysis under the condition of 20 minutes in 40 constant temperature water bath. The serous fluid was filtered with eight layers of gauze after cooling.

**Preparation of pitaya juice:** The selection of pitaya is based on the standard of freshness, equal maturity and uniform size. After washing and peeling, the flesh was soaked in 0.1% brine for 3-5 minutes, and then placed in a beater for 3-5 minutes. The serous fluid was filtered through 8 layers of gauze.

**Preparation of black fungus powder:** The dried black fungus was soaked in water, and the impurities were removedafter absorbing water. The cleaned black fungus was soaked in water for 1 h, and then precooked in boiling water for 5 min. The precooked black fungus was dried in an oven, and the black fungus powder was obtained by using a grinder after drying.

**Preparation of passion fruit-pitaya compound beverage:** After mixing passion fruit juice and pitaya juice at a certain ratio, a certain amount of black fungus powder, sugar and stabilizer were added as supplementary material. Then the mixed fruit and vegetable juice was processed in a colloid mill for 7 minutes. After processing, it was filled into a PET / PE compound vacuum food packaging bag, and sealed by vacuum packaging machine. The packed compound beverage was sterilized in a water bath at 85±2 for 15min [15].

**Basic Formulation Test of Compound Beverage**

Based on the pre-experiment, the ratio of sugar to acid and sensory score were used as evaluation indexes, and the statistical analysis adopted a multi-index weighted comprehensive score method [16]. The single factor test was performed with the compound mass ratio of passion fruit and pitaya (3:1,2:1,1:1, 1:2, 1:3), the mass ratio of material to liquid (1:1, 1:2, 1:3, 1:4, 1:5), the additive amount of sugar (4%, 6%, 8%, 10%, 12%) and the additive amount of black fungus powder (0.05%, 0.65%, 1.25%, 1.85%, 2.45%). On the basis of the single factor test, three appropriate levels of each factor were selected for the $L_9$ ($3^4$) orthogonal optimization test. The levels of each factor were shown in (Table 1).

**Stability Test of Compound Beverage**

Selection of single stabilizer: Under the optimal basic formulation condition of passion fruit-pitaya compound beverage, the additive amount of each stabilizer was fixed at 0.1%. Pectin, xanthan gum, carrageen an and guar gum were selected as stabilizers, and stability factor and viscosity were used as indexes. The stability of compound beverage was studied with sensory effects.

Determination of compound stabilizer and total addition: It was difficult to achieve a good stabilization effect with a single stabilizer. Therefore, it was considered to apply different stabilizers to compound beverages. The use of compound stabilizers could not only enhance system stability, but also reduce costs and improve beverage taste and flavor. Fixed compound stabilizer with a mass ratio of 1:1, and then compound test of three single stabilizers was performed. The test used the stability factor and viscosity as indexes. The effects of compound stabilizers and total additions on the stability of compound beverage were investigated. By investigating the impact of the combination of compound stabilizer (pectin + xanthan gum, pectin + carrageean, xanthan gum + carrageean) and total additive amount (0.05%, 0.1%, 0.15%, 0.2%, 0.25%) on stable effect, the optimal combination of compound stabilizer and total additive amount were determined in combination with sensory effect.

Optimal ratio of compound stabilizer: The total addition of pectin and xanthan gum was fixed at 0.1%, and the ratio of compound stabilizer was 5:0, 4: 1, 3:2, 1:1, 2:3, 1:4, 0:5. The stability factor and viscosity were taken as indexes, and the optimal ratio of compound stabilizers were determined in combination with sensory effect.

**Determination of Indexes**

**The calculation of the ratio of sugar to acid:** The ratio of sugar to acid of compound beverage was expressed as the brix divided by the acidity [17]. The brix was measured with a digital sugar meter. The acidity was a value measured with reference to the acid-base titration method in the national standard GB / T 12456-2008.

**Multi-index weighted comprehensive scoring:** The contribution of each index to beverage quality was different [18], the weight factors of the ratio of sugar to acid ratio ($Y_1$) and sensory score ($Y_2$) were set to 0.4 and 0.6, respectively.

Comprehensive score = (the ratio of sugar to acid / (the highest

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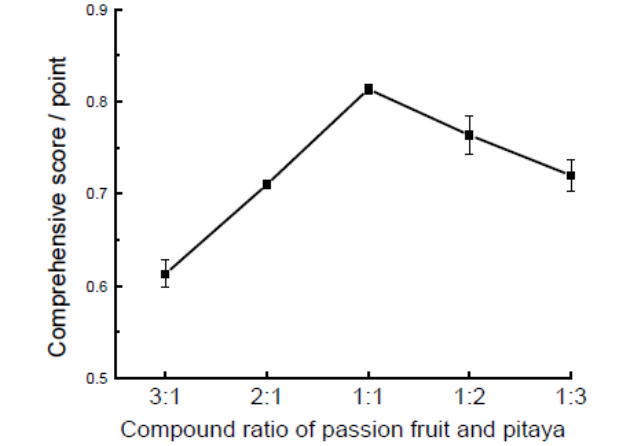


**Figure 1:** Effect of the compound ratio of passion fruit and pitaya on the quality of compound beverage.

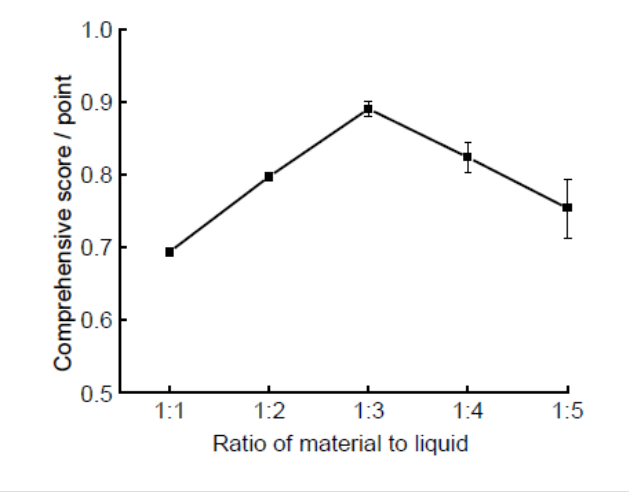


**Figure 2:** Effect of the ratio of material to liquid on the quality of compound beverage.

ratio of sugar to acid) × 0.4 + (sensory score / highest sensory score) × 0.6.

**Determination of the stability factor** 5 mL of the prepared compound beverage (shaking thoroughly) was placed in a 50 mL volumetric flask, and the volume was adjusted with distilled water. After shaking, the spectrophotometer was used to measure the absorbance $A_1$ at its maximum absorption wavelength of 530 nm. Then, 10 mL of the prepared compound beverage was put into the high-speed centrifugal machine, which was centrifuged at 2000 r/min for 10 min. After taking the centrifugal machine, 5 mL of the supernatant was diluted 10 times in the same way, and the absorbance $A_2$ was measured at the maximum absorption wavelength by shaking. The stability factor R of compound beverage was calculated [19]. The larger R indicated the more stable of compound beverage. The calculation formula was as follows:

$$R = A_2/A_1$$

In the formula:

R is the stability factor

$A_1$ is the absorbance of the compound beverage before centrifugation

$A_2$ is the absorbance of the supernatant of the compound beverage after centrifugation

**Determination of viscosity:** The viscosity of passion fruit-pitaya compound beverage system was measured at room temperature by the NDJ-8S digital display viscometer, and the viscosity unit was milliPascals • seconds (mPa • s).

**The method of sensory evaluation** According to the sensory requirements of compound beverage related standard NY/T 434-2016, some modifications were made by referring to methods such as De-zhi Wu [20]. The sensory evaluation group consists of 10 members of food profession, and the score is 100 points. The criteria for sensory evaluation were shown in (Table 2).

## Results and Analysis

### The Compound Ratio of Passion Fruit and Pitaya

In the color of compound beverage gradually changes from light purple to dark purple under different compounding ratios of passion fruit and pitaya, the flavor of raw materials changes from a single passion fruit flavor to a coordinated compound fruit flavor. When the compound ratio of passion fruit and pitaya was 1: 1 (g/g), the comprehensive score was the highest. The compound mass ratio of passion fruit and pitaya was 3: 1, 2: 1, 1: 2, 1: 3, the compound beverage had varying degrees of poor color and flavor. Therefore, 1: 1 (g/g) was selected as the compound ratio of passion fruit and pitaya for subsequent experiments (Figure 1).

### The Ratio of Material to Liquid

Showed that with the increase of the ratio of material to liquid, the color of compound beverage gradually changed from dark purple red to mauve red. The fruit flavor of raw materials changed from

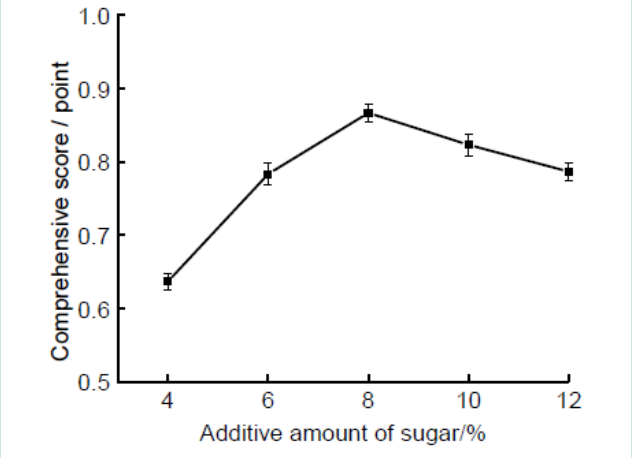


**Figure 3:** Effect of the additive amount of sugar on the quality of compound beverage.

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**Table 1:** Factor levels of orthogonal test.

| Factor | | | | |
|---|---|---|---|---|
| Level | Compound ratio of passion fruit and pitaya | Ratio of material to liquid | Additive amount of sugar(%) | Additive amount of black fungus powder(%) |
| 1 | 2:01 | 1:02 | 7 | 0.35 |
| 2 | 1:01 | 1:03 | 8 | 0.65 |
| 3 | 1:02 | 1:04 | 9 | 0.95 |

**Table 2:** Criteria for sensory evaluation of compound beverage.

| project | Evaluation criteria | sensory score / point |
|---|---|---|
| Color | Purple red | 16~20 |
| (20 points) | Light purple red | 9~15 |
| | Dark or Light purple red, Purple black or black | 0~8 |
| Smell | Scent and harmony of fresh passion fruit and pitaya | 21~30 |
| (30 points) | With a passion fruit or pitaya flavor, but the lack of coordination | 11~20 |
| | Unique flavor pale and smelly of passion fruit and pitaya | 0~10 |
| Taste | Good taste, acidity and sweetness are very suitable | 21~30 |
| (30 points) | Average taste, acidity and sweetness are suitable | 11~20 |
| | Poor taste, sour to sweet ratio has been out of balance | 0~10 |
| Organization status (20 points) | Beverages are turbid with a small amount of sediment and free of impurities | 16~20 |
| | Beverages are turbid with a large amount of sediment and free of impurities | 9~15 |
| | Beverages are cloudy with a lot of sediment and sticky | 0~8 |

**Note:** In the research on the basic formulation of passion fruit-pitaya compound beverage, the stability of compound beverage was not taken into consideration for the time being, and its tissue state was 20 points.

**Table 3:** Orthogonal test results of the basic formulation of compound beverage.

| Test number | Test factor | | | | | | |
|---|---|---|---|---|---|---|---|
| | A | B | C | D | $Y_1$ | $Y_2$ | Comprehensive score |
| 1 | 1(2:1) | 1(1:2) | 1(7) | 1(0.35) | 2.85 | 74.00(0.48) | 0.63 |
| | | | | | (0.15) | | |
| 2 | 1 | 2(1:3) | 2(8) | 2(0.65) | 3.87 | 85.88(0.56) | 0.76 |
| | | | | | (0.2) | | |
| 3 | 1 | 3(1:4) | 3(9) | 3(0.95) | 5 | 65.82(0.43) | 0.69 |
| | | | | | (0.26) | | |
| 4 | 2(1:1) | 1 | 2 | 3 | 4.01 | 80.00(0.52) | 0.73 |
| | | | | | (0.21) | | |
| 5 | 2 | 2 | 3 | 1 | 5.37 | 91.73 | 0.88 |
| | | | | | (0.28) | -0.6 | |
| 6 | 2 | 3 | 1 | 2 | 5.04 | 80.56 | 0.79 |
| | | | | | -0.26 | -0.53 | |
| 7 | 3(1:2) | 1 | 3 | 2 | 5.94 | 60.9 | 0.71 |
| | | | | | -0.31 | -0.4 | |
| 8 | 3 | 2 | 1 | 3 | 6 | 59.65 | 0.7 |
| | | | | | -0.31 | -0.39 | |
| 9 | 3 | 3 | 2 | 1 | 7.71 | 64.21 | 0.82 |
| | | | | | -0.4 | -0.42 | |
| $k_1$ | 0.69 | 0.69 | 0.71 | 0.78 | | | |
| $k_2$ | 0.8 | 0.78 | 0.77 | 0.75 | | | |
| $k_3$ | 0.74 | 0.77 | 0.76 | 0.71 | | | |
| R | 0.11 | 0.09 | 0.06 | 0.07 | | | |
| comprehensive score | Primary and secondary factors | | | A>B>D>C | | | |
| | Optimal combination | | | $A_2B_2C_2D_1$ | | | |

**Note:** In the Table 3, A was the compound ratio of passion fruit and pitaya; B was the ratio of material to liquid; C was the additive amount of sugar (%) **:** D was the additive amount of black fungus powder (%).

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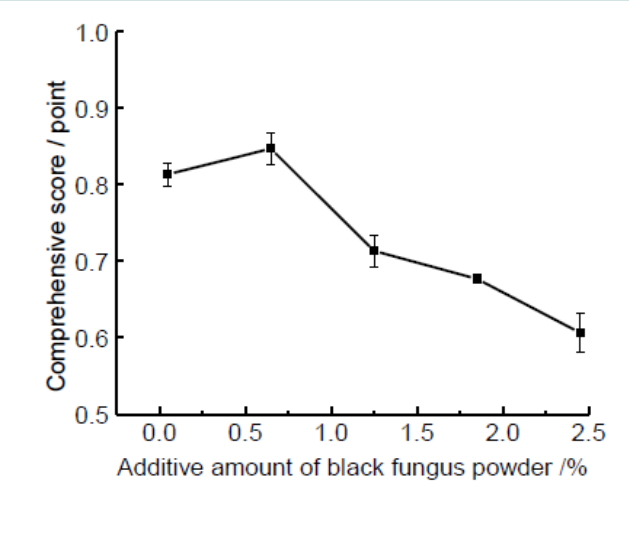


**Figure 4:** Effect of the additive amount of black fungus powder on the quality of compound beverage.

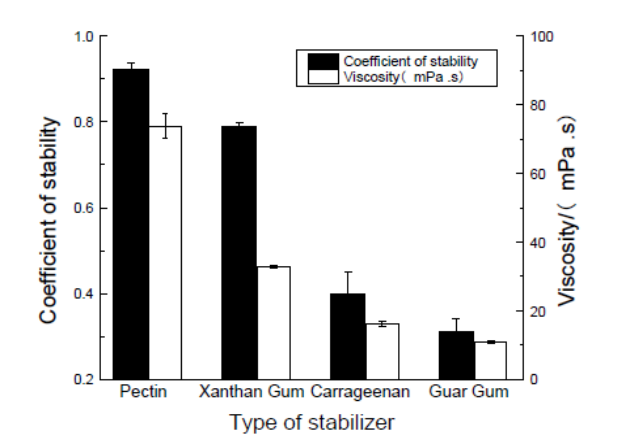


**Figure 5:** Effect of different stabilizers on the stability factor and viscosity of compound beverage.

strong to light. Because of the increase of the ratio of water in the compound beverage system, the ratio of raw materials in the system was decreased, which affected the comprehensive score of compound beverage. When the ratio of material to liquid was 1:3(g/g), the color of compound beverage was purple red and the comprehensive score was high. When the mass ratio of material to liquid was 1:4, 1:5, the color of compound beverage was light purple red, the fruit flavor was light, the taste was poor and the comprehensive score was low. Therefore, 1: 3 (g/g) was selected as the ratio of material to liquid for subsequent experiments (Figure 2).

### The Additive Amount of Sugar

The sugar content had a small effect on the color and flavor of compound beverage, and the effect of taste was greater [21]. It can be seen from (Figure 3) that with the increase of the additive amount of sugar, the taste of compound beverage changed from sour to sweet. When the sugar was 8%, the compound beverage had a higher comprehensive score; the additive amount of sugar was 4% and 12%, the comprehensive score was low, and the imbalance of the ratio of sugar to acid. Therefore, 8% was selected as the additive amount of sugar in subsequent tests (Figure 3).

### The Additive Amount of Black Fungus Powder

In The taste of compound beverage gradually had become worse with the increase of the additive amount of black fungus powder. When the additive amount of black fungus powder was 0.65%, the comprehensive score was the highest. The additive amount of black

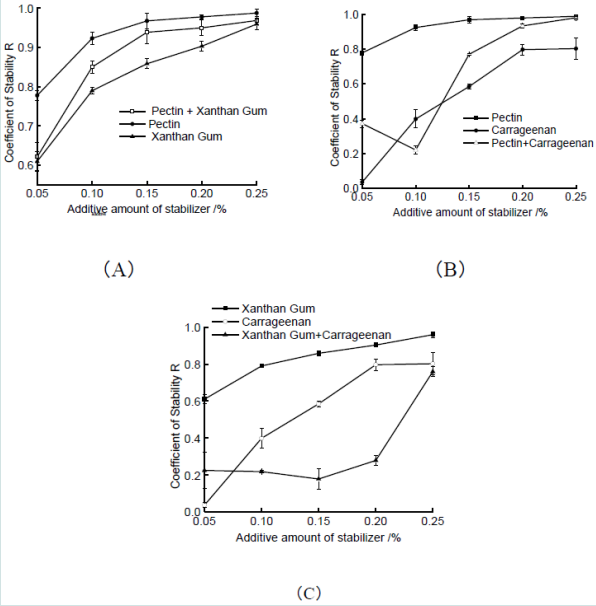


**Figure 6:** Effect of different stabilizers on the stability factor and viscosity of compound beverage.

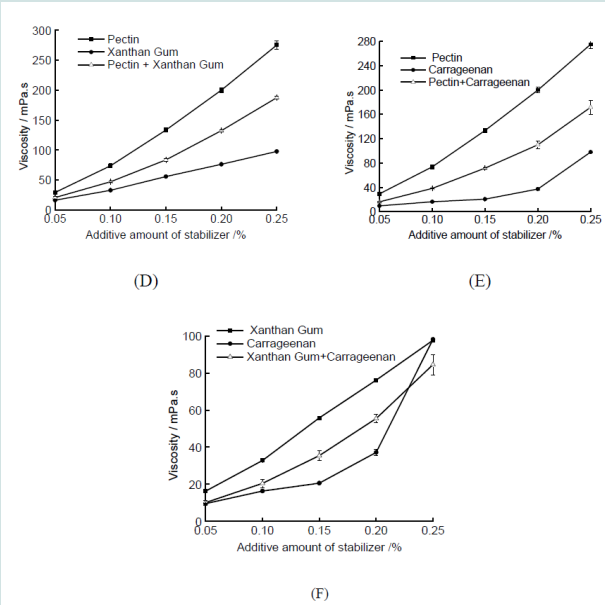


**Figure 7:** Effect of different stabilizers on the stability factor and viscosity of compound beverage.

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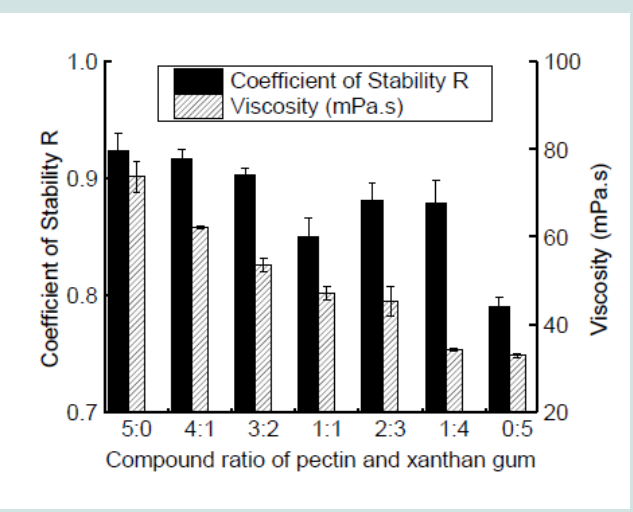


**Figure 8:** Effect of compound ratio of pectin and xanthan on the stability of compound beverage.

**Table 4:** Verification test results of basic formulation of compound beverage.

| Test plan | $Y_1$/the ratio of sugar to acid | $Y_2$/ Sensory score | Comprehensive score |
|---|---|---|---|
| $A_2B_2C_3D_1$ | 5.73 | 92.32 | 0.91 |
| $A_2B_2C_2D_1$ | 5.16 | 91.6 | 0.87 |

fungus powder was 1.85% and 2.45%, the color of compound beverage changed to black, the taste was not good and sticky with a strong black fungus taste. Therefore, 0.65% was selected as the additive amount of black fungus powder for subsequent tests (Figure 4)

### Orthogonal Optimization Test Results

According to the results of single factor test, the influencing factors of compound beverage were determined. Orthogonal test was carried out to optimize the basic formulation of compound beverage. The results were shown in (Table 3).

It can be seen from (Table 3) that the compound ratio of passion fruit and pitaya fruit, the ratio of material to liquid, the additive amount of sugar and the additive amount of black fungus powder all had different effects on the quality of compound beverage. In the orthogonal test, the combination with the highest comprehensive score was $A_2B_2C_3D_1$, which was 0.88. From the range R in (Table 3), it can be seen that factor A (compound ratio of passion fruit and pitaya) had the greatest influence on R, followed by factor B (ratio of material to liquid) and factor D (additive amount of black fungus powder), while factor C (additive amount of sugar) had little influence. Therefore, the influence order of each factor was A> B> D> C, that is, the compound ratio of passion fruit and pitaya > the ratio of material to liquid > the additive amount of black fungus powder > the additive amount of sugar.

### Verification Test Results

According to the value of k in the optimal combination obtained by range analysis was $A_2B_2C_2D_1$, that is, the compound ratio of passion fruit and pitaya was 1:1, the ratio of material to liquid was 1:3, the additive amount of sugar was 8% and the additive amount of black fungus powder was 0.35%. Since the combination did not appear in the orthogonal test number, the verification test was carried out. The results were shown in (Table 4).

According to the highest comprehensive score was 0.91, which was $A_2B_2C_3D_1$. Therefore, the optimal basic formulation combination of passion fruit-pitaya compound beverage was $A_2B_2C_3D_1$, that is, the compound ratio of passion fruit and pitaya was 1:1, the ratio of material to liquid was 1:3, the additive amount of sugar was 9% and the additive amount of black fungus powder was 0.35%.

### Screening Single Stabilizer

Showed that the additive amount of four stabilizers was 0.1%, the stability of compound beverage could be improved, among which pectin was the best stability. The stability factor and viscosity of four stabilizers were: pectin > xanthan gum > carrageenan > guar gum. Therefore, three kinds of stabilizers with relatively high stability factor were selected to be mixed in pairs, which were pectin, xanthan gum and carrageenan (Figure 5).

### Determination of Compound Stabilizer and Total Addition

According to (Fig 6A) and (Fig 7D), when the pectin content was 0.1%, the stability factor increases to 0.923, but the taste of compound beverage was relatively viscous and the fluidity was poor. The additive of pectin and xanthan gum was 0.1%, the stability factor was 0.85, and the compound beverage had appropriate viscosity and certain fluidity. From (Fig 6B) and (Fig 7E), when the compounded amount of pectin and carrageenan was 0.15%, the stability factor was 0.77, the viscosity was as high as 71.62 mPa • s, and the viscosity was large and the stability effect was general. When xanthan gum and carrageenan were added in an amount of 0.25%, the stability factor was only 0.759 and the viscosity was 84.55 mPa • s. When the additive amount was below 0.1%, the compound beverage with carrageenan, pectin and carrageenan, xanthan gum and carrageenan had different stratification phenomenon after 7 days. It may be that carrageenan was prone to acid catalyzed hydrolysis in acidic solutions, especially in solutions with pH4.0, the gel strength and viscosity will decrease [22] (Figure 6).

In conclusion, the combination of three stabilizers could not only improve the stability of compound beverage certain extent, but also reduce the amount of single stabilizer and the viscosity of the compound beverage system. Among them, the combination of pectin and xanthan gum had the optimal stability effect, followed by pectin and carrageenan. It may be that pectin was a negatively charged polysaccharide, which could be electrostatically polymerized with protein and play a stable role by wrapping the protein under certain conditions. Xanthan gum had very strong hydrophilicity [23]. It could absorb positively charged protein molecules under acidic conditions, and reduce protein precipitation by forming steric hindrance. At the same time, xanthan gum was very suitable for compounding with other stabilizers, which had a good synergistic interaction [24]. Considering comprehensively, 0.1% of pectin and xanthan gum was selected as the stabilizer combination of passion fruit and pitaya compound beverage (Figure 7).

### Determination of the Optimal Ratio of Compound Stabilizer

Showed that when the total addition was fixed at 0.1%, the

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compound ratio of pectin and xanthan gum had different effects on the stability factor and viscosity of compound beverage. When the compound ratio of pectin and xanthan gum was 5: 0 and 3: 2, the stability factors were 0.92 and 0.902 in the compound beverage system, and the viscosities were 73.72 mPa • s and 53.58 mPa • s. It showed that two different compounding ratios had little effect on the stability of the system, but the viscosity of the two systems was quite different. When the compound ratio of pectin and xanthan gum was 0:5, the stability factor of compound beverage system was only 0.79. Considering the stability and taste of compound beverage, it was determined that the compound ratio of pectin and xanthan gum was 3: 2, and the total addition amount was 0.1%. The passion fruit-pitaya compound beverage had a high stability factor and a suitable viscosity under this condition (Figure 8).

## Conclusion

In the test, the main raw materials were whole passion fruit and pitaya, sugar, black fungus powder and stabilizers were used as the supplementary material. The basic formulation of passion fruit-pitaya compound beverage was as follows: The compound ratio of passion fruit and pitaya was 1: 1, The material-liquid ratio was 1: 3, the additive amount of sugar was 9%, the additive amount of black fungus powder was 0.35%; the amount of stabilizer was 0.06% pectin, and 0.04% xanthan gum. Under the condition of this process, the product had good sensory effect, and the system was uniform and stable. It was a kind of compound beverage with rich nutrition and unique flavor. Its quality indexes meet the relevant national standards.

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