Research on the Preparation of Rose Powder and Medlar Compound Beverage

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Abstract: Lycium barbarum contains betaine, unsaturated fatty acids, amino acids, and other vitamins, which can nourish the liver, kidney, benefit essence and so on, while roses contain more than 300 kinds of chemical components, such as dendrobium bark glycosides, fatty oil and organic acids, as well as 18 kinds of amino acids and trace elements needed by human body, which have whitening, moisturizing, nourishing face, regulating meridians and so on. In this study, rose powder and wolfberry were used as raw materials. Through single factor experiment and orthogonal analysis, sensory evaluation score was used as the main measurement index, supplemented by its precipitation rate, the raw and auxiliary materials of rose powder and wolfberry composite beverage were tested to determine the best formula and stabilizer ratio. The rose pollen medlar compound beverage with good tissue and taste was prepared by the technology of beverage preparation, and its acidity and soluble solids content were determined by physical and chemical indexes.

1. Introduction

1.1 Function of Rose Powder and Wolfberry

Lycium barbarum is a plant of solanaceae. Lycium barbarum has sweet taste, characteristics of mild. lycium barbarum contains betaine, unsaturated fatty acid, amino acid and many vitamins. Betaine can protect normal hepatocytes. Lycium barbarum has the effect of nourishing liver and kidney, benefiting astute eyes, etc. Wolfberry is also rich in K, Na, CA, Mg, Fe, Cu, Mn, Zn and other elements. [2]In particular, lycium barbarum polysaccharide contained in lycium barbarum has the pharmacological and health functions of lowering blood sugar, enhancing immunity, protecting liver, anti-aging, anti-tumor, anti-oxidation, anti genetic damage, etc., and is also the main component of improving exercise ability. Rose is a kind of flower food with better nutritional structure. [3]Rose contains more than 300 chemical components, such as dendrobioside, fatty oil and organic acids, as well as 18 kinds of amino acids and trace elements needed by human body. [4]

1.2 Research Significance of Rose Powder and Medlar Compound Beverage

It has an important position in traditional medicine of the country, and has the effect of nourishing liver and kidney, improving the eye, wetting the lung to stop cough and delaying aging. Rose powder has the functions of regulating “Qi” and blood, soothing liver and relieving depression, reducing fat and weight, moistening skin and nourishing face. In particular, it has a wonderful effect on women's menstrual pain. It also has the functions of whitening, humidifying, raising the appearance and regulating the menstruation. Many studies have shown that the polysaccharide of lycium has the effect of promoting immunity, anti-aging, anti-tumor, free radical removal, anti-fatigue, anti-radiation, liver preservation, reproductive function protection and improvement. Therefore, the beverage made of rose powder and medlar is very nutritious and has high health value and efficacy..

1.3 Current Situation and Development Trend of Domestic and Foreign Research

In this experiment, rose and lycium barbarum were used as main raw materials. This product not only realized the complementary nutrition and flavor of raw materials, but also opened up a new way for the development and utilization of roses and lycium barbarum. This natural health drink with natural color, pure flavor and rich nutrition is bound to have a broad market prospect.

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1.4 Study Content

Using rose pollen and lycium barbarum juice as main raw materials, the ratio of mixed volume to citric acid, VC, sucrose and honey and the addition of stabilizer xanthan gum, sodium alginate and sodium carboxymethyl cellulose were used as variables. The optimum ratio of rose pollen and lycium barbarum juice was investigated by single factor experiment and orthogonal analysis, and the physical and chemical indexes of rose pollen lycium barbarum compound beverage were determined.

2. Materials and Methods

2.1 Experimental Materials

Canned wolfberry and rose powder purchased on the market; white granulated sugar and honey purchased on the market; citric acid and vitamin C purchased on the market; food stabilizer: Xanthan gum, sodium alginate and sodium carboxymethylcellulose. The above raw materials are food grade.

2.2 Experimental Instruments and Equipment

JS39D-250 type juicer: Zhejiang Shaoxing Suzhou Boer Life Electric Co., Ltd.; YB-2500A type crusher: Yongkang City Kefeng Industry and Trade Co., Ltd.; IH13E8-2100 type electromagnetic oven: Zhejiang Shaoxing Suzhou Boer Life Electric Co., Ltd.; HC-1016 type centrifuge: Zhongjia Equipment Co., Ltd.; BS-110S type electronic balance: Beijing Soren Instrument System Co., Ltd.; S5RK-NAR-3T-type Abbe refractometer: Beijing and Western Yuanda Science and Technology Co., Ltd.; and so on.

2.3 Experimental Design and Method

2.3.1 Preparation of Rose Powder

Proper amount of the rose powder is put into the YB-2500A type crusher to carry out wall breaking treatment, and the wall breaking rate of the rose powder is increased as much as possible when the wall-breaking treatment is carried out. The YB-2500A type pulverizer shall be cleaned with distilled water before use. After cleaning, it needs to be dried and then used. Putting the prepared rose powder into a bottle, and freezing and storing at a temperature of 0 DEG C for later use.

2.3.2 Preparation of Rose Pollen Solution

The broken rose pollen was added to distilled water according to the ratio of solid to liquid than 1:35, and put into a flat bottom stainless steel pot. IH13E8- 2100 electromagnetic furnace was used as heat source to heat the rose pollen for 10 min at 50 ℃, so that the substance in rose pollen could be dissolved better. The basin needs to be washed with distilled water when using flat-bottomed stainless steel basin. Put the prepared rose pollen liquid in the bottle and wait for use.

2.3.3 Selection and Preparation of Lycium Barbarum

The lycium barbarum bought from the market was washed, soaked at 40 ℃ for 24 hours and boiled for 10 min. the effective substances in lycium barbarum could be precipitated better. The boiled lycium barbarum was removed and put into the container for use after cooling.

The prepared lycium barbarum was crushed and cooled in JS39D- 250 juicer, then filtered with gauze and placed in bottle for use.

2.3.4 Study on the Ratio of Rose Pollen Solution to Lycium Barbarum Juice

The prepared rose pollen liquid and lycium barbarum juice were placed in the container at the same time. The volume ratio of rose pollen liquid to lycium barbarum juice was set to 1: 1, 1: 2, 1: 3, 2: 1, 2: 3, 3: 1, 3: 2. The sensory score (taste 60%, tissue shape 15%, color 10%, aroma 15%) was used as the experimental index. 20 professionals scored the rose pollen lycium barbarum compound

drink.

2.3.5 Study on the Optimum Formula of Rose Pollen Lycium Barbarum Compound Beverage

Firstly, the optimal ratio of the rose powder liquid and the medlar juice is determined, and the rose powder and the medlar composite beverage prepared with the best ratio of the rose powder and the medlar juice are selected to carry out the next test. The effects of the mass fraction of honey, the mass fraction of sucrose, the mass fraction of citric acid and the mass fraction of VC on the sensory score of the Chinese wolfberry composite beverage were determined by single factor test. Then the optimal sensory score group of each single factor is selected, the orthogonal analysis is performed, and the development conditions of the rose powder and the medlar composite beverage are optimized by adopting a response surface analysis method.

2.3.6 Study on the Optimal Proportion of the Stabilizer for the Composite Beverage of the Rose Powder.

After the experiment of determining the best formula of rose pollen lycium barbarum compound beverage, the best formula group of rose pollen lycium barbarum compound beverage was selected and mixed. The mixed rose pollen lycium barbarum compound beverage was selected for the next experiment. The effects of xanthan gum, sodium alginate and sodium carboxymethyl cellulose on the sedimentation rate of rose pollen lycium barbarum compound beverage were determined by single factor experiment. The stability of beverage can be evaluated by the sedimentation rate of sample liquid after centrifugation. The higher the sedimentation rate, the worse the stability of the drink. Then the optimal sedimentation rate group of each single factor was selected, and the orthogonal analysis was carried out. Response surface analysis was used to optimize the development conditions of rose powder and medlar compound beverage.

2.3.7 Determination of Physicochemical Indexes of Rose Pollen Lycium Barbarum Compound Beverage

After the experiment of determining the optimal formula of rose powder and the optimum proportion of the stabilizer of the composite beverage, the optimal formula and the best proportion of the stabilizer were chosen. The next experiment was carried out by taking the mixed rose powder of lycii composite. The content of soluble solids in the composite beverage of rose powder was analyzed by S5RKNAR3T Abe refractometer, while the pH of the composite beverage was determined by acid-base titration.

3. Results and Analysis

3.1 Determination of the Volume Ratio of Rose Pollen Solution to Lycium Barbarum Juice

The volume ratio of rose pollen solution to lycium barbarum juice was 1: 1, 1: 2, 1: 3, 2: 3, 3: 1, 3: 2. The blending of rose pollen solution and wolfberry juice was studied. Sensory score (taste 60%, tissue morphology 15%, color 10%, aroma 15%) was used as the index of this experiment. Twenty professionals were invited to carry out sensory evaluation of rose pollen lycium barbarum compound beverage. When the volume ratio of rose pollen solution to lycium barbarum juice was 2: 1, the sensory score of rose pollen lycium barbarum compound beverage was the highest. Therefore, when the volume ratio of rose powder and wolfberry juice is 2:1, it is the best volume ratio.

3.2 Determination of the Optimum Formula of Rose Pollen Lycium Barbarum Compound Beverage

3.2.1 Effect of Sucrose Content on Rose Pollen Lycium Barbarum Compound Beverage

And the mixture of the rose powder and the medlar juice with the optimal volume ratio of 2:1 is selected according to the optimal volume ratio of the rose powder and the medlar juice as determined by the experiment 2.1. Set the volume ratio of rose powder and wolfberry juice as 2:1, citric acid as 0.08%, honey as 2.5%, VC as 1.3%, measure the single factor under the six gradients

of sucrose as 4.5%, 5.0%, 5.5%, 6.0%, 6.5% and 7.0%, and measure the influence of sucrose content on rose powder wolfberry compound beverage according to sensory evaluation Ring. When the sucrose content is about 6.0%, the sensory evaluation of rose powder and medlar compound beverage is the best.

3.2.2 Effect of the Mass Fraction of Citric Acid on the Composite Beverage of the Rose Powder and the Chinese Wolfberry

The optimum volume ratio of rose pollen solution to lycium barbarum juice determined by experiment 2.1 was used to mix rose pollen wolfberry compound beverage at 2:1. The volume ratio of rose pollen solution to lycium barbarum juice was 2 ⩽ 1, sucrose 6.0%, honey 2.5%, VC 1.3%, citric acid 0.06%, 0.8%, 0.12%, 0.14% and 0.16%, respectively, and scored according to sensory evaluation. The effect of citric acid content on rose pollen lycium barbarum compound beverage was determined. Citric acid When the mass fraction is about 0.08%, the sensory evaluation of rose pollen lycium barbarum compound beverage is the most suitable.

3.2.3 Effect of Vc Content on Rose Pollen Lycium Barbarum Compound Beverage

The optimum volume ratio of rose pollen solution to lycium barbarum juice determined by experiment 2.1 was used to mix rose pollen wolfberry compound beverage at 2:1. The volume ratio of rose pollen solution to lycium barbarum juice was 2 ⩽ 1, sucrose 6.0%, honey 2.5%, citric acid 0.08%, VC 0.07%, 0.09%, 0.11%, 0.13%, 0.15% and 0.17%, respectively, and scored according to sensory evaluation. The effect of VC content on rose pollen lycium barbarum compound beverage was determined. VC When the mass fraction is about 1.3%, the sensory evaluation of rose pollen lycium barbarum compound beverage is the most suitable.

3.2.4 Effect of Honey Content on Rose Powder and Medlar Compound Beverage

And the mixture of the rose powder and the medlar juice with the optimal volume ratio of 2:1 is selected according to the optimal volume ratio of the rose powder and the medlar juice as determined by the experiment 2.1. the volume ratio of the rose powder to the medlar juice is 2:1, the mass fraction of the sucrose is 6.0 percent, the mass fraction of the VC is 2.5 percent, the mass fraction of the citric acid is 0.08 percent, the single factor measurement is carried out under the six gradients of the honey mass fraction of 1.5 percent, the 2.0 percent, the 2.5 percent, the 3.0 percent, the 3.5 percent and the 4.0 percent respectively, And the effect of the quality fraction of the honey on the composite beverage of the rose powder and the Chinese wolfberry is measured according to the sensory evaluation. The honey quality score is set to at the time of about 2.5%, the sensory evaluation of the composite beverage of the rose powder and the Chinese wolfberry is the most suitable.

3.2.5 Optimization of the Formula of the Composite Beverage of the Rose Powder and the Chinese Wolfberry

Table 1 Level Table of Four Factors and Three Levels

level	Element			
	sucrose(A)	Honey(B)	VC(C)	citric acid(D)
1	5.0%	2.5%	1.3%	0.08%
2	5.5%	2.0%	1.5%	0.1%
3	6.0%	3.0%	1.7%	8%

In order to determine the optimum addition amount of each single factor in the additive, orthogonal experiments were carried out on the basis of single factor experiments on sucrose, honey, VC and citric acid. In the orthogonal design, sucrose, honey, VC and citric acid were used as the experimental factors to determine the three experimental levels. The sweetness and taste were taken as the evaluation indexes of rose pollen lycium barbarum compound beverage, the sensory score was taken as the evaluation index, and the optimum addition amount of each additive was determined by orthogonal experiment. As can be seen from Table 1, the mass fraction of sucrose,

honey, VC and citric acid are 6.0%, 2.5%, 1.3% and 1.3% respectively. When it was about 0.08%, the sensory evaluation of rose pollen lycium barbarum compound beverage was the most suitable.

3.3 Determination of the Optimal Proportion of the Stabilizer of the Composite Beverage of the Rose Powder and the Chinese Wolfberry

3.3.1 Effect of the Mass Fraction of Xanthan Gum on the Composite Beverage of Chinese Wolfberry and Chinese Wolfberry

The optimum volume ratio of rose pollen solution to lycium barbarum juice determined by 2.1 and 2.2 was 2 ⩽ 1, sucrose 6.0%, VC 2.5%, citric acid 0.8% and honey 2.5%. The mass fraction of sodium carboxymethyl cellulose and sodium alginate in rose pollen lycium barbarum juice compound beverage were 0.06% and 0.07%, respectively. the single factor determination was carried out under the five gradients of xanthan gum 0.02%, 0.04%, 0.08% and 0.10%, respectively. The results showed that the content of sodium carboxymethyl cellulose and sodium alginate in rose pollen wolfberry juice compound beverage were 0.06% and 0.07%, respectively. The HC-1016 type centrifuge was centrifuged and the precipitation rate was determined after centrifugation at 2000 r/ min for 15 min. When the mass fraction of xanthan gum is 0.08%, the precipitation rate of the composite beverage of the rose powder and the Chinese wolfberry is the lowest, and the stability of the beverage is the highest.

3.3.2 Effect of Sodium Carboxymethyl Cellulose on Rose Pollen Lycium Barbarum Compound Beverage

The optimum volume ratio of rose pollen solution to lycium barbarum juice determined by 2.1 and 2.2 was 2 ⩽ 1, sucrose 6.0%, VC 2.5%, citric acid 0.8% and honey 2.5%. The mass fraction of xanthan gum and sodium alginate in rose pollen lycium barbarum juice compound beverage was 0.08% and 0.07%, respectively. the single factor was used to determine the content of xanthan gum and sodium alginate in the five gradients of sodium carboxymethyl cellulose (0.02%, 0.04%, 0.06%, 0.08% and 0.10%), respectively. the content of xanthan gum and sodium alginate were 0.08% and 0.07%, respectively. The HC- 1016 centrifuge was centrifuged and the sedimentation rate was measured after centrifugation of 15min under the condition of 2000r/min. When the mass fraction of sodium carboxymethyl cellulose was 6.6%, the sedimentation rate of rose pollen lycium barbarum compound beverage was the lowest and the stability of the drink was the highest.

3.4 Determination of Physical and Chemical Indexes of Rose Powder and Medlar Compound Beverage.

3.4.1 Determination of Acidity of Chinese Wolfberry Fruit Composite Beverage

the optimal volume ratio of the rose powder and the medlar juice determined by the experiments 2.1, 2.2 and 2.3 is 2:1, the mass fraction of the sucrose is 6.0 percent, the mass fraction of the VC is 2.5 percent, the mass fraction of the citric acid is 0.08 percent, the mass fraction of the honey is 2.5 percent, the mass fraction of the xanthan gum is set to be 0.08 percent, The mass fraction of methyl cellulose sodium is set to be 0.06% and the mass fraction of sodium alginate is set to 0.07%, and the mixed beverage of the rose powder and the Chinese wolfberry is prepared. The acidity of the prepared beverage was measured by acid-base titration, and the acidity was 0.530%.

3.4.2 Determination of Soluble Solid Content of Rose Powder and Chinese Wolfberry Composite Beverage

The optimum volume ratio of rose pollen solution to wolfberry juice determined by 2.1, 2.2 and 2.3 was 2 ⩽ 1. The mass fraction of sucrose, VC, citric acid, honey and xanthan gum were 6.0%, 2.5%, 0.08%, 2.5% and 0.08%, respectively. The mass fraction of sodium carboxymethyl cellulose and sodium alginate were 0.06% and 0.07%, respectively. The compound beverage of rose pollen lycium barbarum was mixed with sodium carboxymethyl cellulose and sodium alginate. A little of the prepared drink was determined in S5RK / NAR- 3T Abbe refractive meter. The results showed that the rose pollen lycium barbarum was compound. The content of soluble solids in the beverage

was 11.4 brix.

4. Conclusion

In this experiment, rose pollen solution and lycium barbarum juice were mixed at 2:1 by volume ratio, and the finished products were obtained by adding additives sucrose, citric acid, honey and VC, as well as stabilizer xanthan gum, sodium carboxymethyl cellulose and sodium alginate, after filtration, homogenization, deaeration, sterilization, can sealing and cooling.

Taking sensory evaluation score as the main index and sedimentation rate, the addition of raw and auxiliary materials of rose pollen lycium barbarum compound beverage was tested. The optimum formula of the beverage was optimized by single factor and orthogonal test as follows: the volume ratio of rose pollen solution to lycium barbarum juice was 2 ⩽ 1, the mass fraction of sucrose was 6.0%, the mass fraction of VC was 2.5%, the mass fraction of citric acid was 0.08%, and the mass fraction of honey was 2.5%. The mass fraction of xanthan gum, sodium carboxymethyl cellulose and sodium alginate were 0.08%, 0.06% and 0.07%, respectively. The rose powder and medlar compound beverage has good texture and good taste, which meets the requirements of modern people.

After the physical and chemical indexes of rose pollen lycium barbarum compound beverage were determined, the acidity was 0.530% and the soluble solid content was 11.4 brix.

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