

# *Development Technology of Honeysuckle Wolfberry and Chrysanthemum Tea*

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**Abstract:** This study mainly takes honeysuckle, chrysanthemum, wolfberry as the main raw materials, supplemented by cassia, jujube and rock sugar for bagging, develop honeysuckle wolfberry chrysanthemum tea, combined with the sensory evaluation standards, according to the optimal range of one-factor experiment, combined with the response surface software analysis of the best formula. Develop a honeysuckle with heat protection and sweet taste wolfberry chrysanthemum tea. The best formula obtained according to the response surface method software is honeysuckle 1.049 g, chrysanthemum 0.405g, wolfberry 0.578g, cassia seed 0.447g, jujube 0.710g, rock sugar 0.978g. At this time, the honeysuckle wolfberry chrysanthemum tea developed bright and transparent color, tea mellow fragrance, is a kind of flower tea drink with heat and detoxification and liver protection.

## 1. Introduction

Flower tea, also known as incense tea and incense burner, is a unique tea category in China. Flower tea is the main tea consumer product in northern China, and occupies a large market in Yunnan, Guizhou and Sichuan. Different scented teas have their unique effects and effects.

## 2. Research background and significance

### 2.1 Research background of honeysuckle

Honeysuckle is a traditional and pure medicinal materials, and at the same time, honeysuckle medicinal history is very long, often as one of the medicinal materials of clearing away heat and detoxification and clearing the fire and moistening the throat. According to statistics in China has about a third of the Chinese medicine prescriptions in honeysuckle and mountain honeysuckle, " the 1963 edition of the Chinese Pharmacopoeia first loaded honeysuckle for honeysuckle honeysuckle dry buds or with flowers, 2005 edition of the Chinese Pharmacopoeia increased the mountain silver flower, clear the mountain honeysuckle for honeysuckle plants, gray felt honeysuckle, red gland honeysuckle, south China honeysuckle or yellow brown honeysuckle dry bud or with early flowers<sup>0</sup>." Honeysuckle is also one of the precious Chinese medicinal materials in China. The word

"honeysuckle" comes from the Compendium of Materia Medica, the reason is because the first flowering is white, and then yellow, hence the name. Honeysuckle variety resources are rich, grow in all parts of our country, and honeysuckle to the environment requirement is not too high, the root power is strong, so the planting scope is very broad. At the same time, the ornamental and economic value of honeysuckle are very high, so the development prospect of honeysuckle is also very broad. Honeysuckle combination flower tea can maintain health and increase resistance, which is the perfect choice for modern people. Honeysuckle as a flower tea product color is gray and green, the aroma is more pure and meaningful, the soup color is yellow and green and bright, the taste is very delicious, tender and soft leaf bottom. Honeysuckle is an excellent source of anthocyanins with a variety of health functions, mainly associated with antioxidant and anti-inflammatory activities<sup>0</sup>.

## **2.2 Research background of chrysanthemum**

Chrysanthemum is also one of the common Chinese medicinal materials, is a perennial herb in the family Asteraceae. The main thing used to make tea is the head inflorescence, which has a little bitter taste. Chrysanthemum can not only be used as an ornamental plant, but also has a high medicinal value. Drinking chrysanthemum tea in summer has the effect of preventing heat, lowering blood lipid, blood pressure, beauty and skin. And chrysanthemum itself is a kind of fire medicine, and honeysuckle tea together can enhance the effect of honeysuckle heat and fire. Chrysanthemum tea contains flavonoids, a variety of vitamins and trace elements and other substances, which contains flavonoids substances have been proven through research, has a very high scavenging effect in free radicals. The amino acids contained in chrysanthemum can not only enhance the resistance of capillaries, but also resist pathogens. Extract from chrysanthemum can remove reactive oxygen species free radicals, reduce blood pressure and blood sugar in the blood, anti-aging, and enhance the resistance of capillaries. Echinacea is rich in chemical composition, has a variety of pharmacological activities, and is a highly concerned immunomodulator<sup>0</sup>. From the nutritional point of view, chrysanthemum petals also have a high utilization value, which is rich in vitamins and high content of glutamate and other components, can be used to make tea, and has an incomparable utility to vegetables and fruits.

## **2.3 Research background of Chinese wolfberry**

Goji berry serves as a ripe fruit of small shrubs in the Solanaceae. Not only one of the Chinese medicinal materials, Chinese wolfberry has a long history in the same origin of medicine and food. At the same time, berry berries, betaine and other unique nutrients, have the effect of regulating blood lipid and immunity. Chinese wolfberry bubble water has improved eye fatigue, beauty and other effects. At the same time, Chinese wolfberry contains trace elements that can resist the oxidation of free radicals in the human body. Chinese wolfberry can also be used as a nutrient supplement (functional food) food important raw material, an important health food for both medicine and food. "Modern medical research has proved that Chinese wolfberry, its taste is sweet, flat, return to the liver, kidney meridian, has the function of tonifying the liver, beneficial kidney, Ming purpose. Chinese wolfberry has the pharmacological effects of tonifying the kidney and nourishing the liver, enhancing immunity, anti-aging, anti-tumor, anti-oxidation, anti-fatigue and synergistic cancer prevention<sup>0</sup>".

## **2.4 Research background of cassia seed**

Cassia is made of dry and mature seeds from legume cassia and small cassia. Because cassia seed is listed as one of the 109 kinds of identical Chinese medicinal materials and is used as a raw

material for a long time, then the reports on the negative impact of cassia seed health care products are also increasing<sup>0</sup>. Cassia is also a kind of substance homologous to medicine and food in the food industry, which has a representative role in the treatment of vascular diseases. Cassia will also have a very broad prospect in the development of flower tea. "The medicinal value of cassia seed has always been the attention of scientists from all walks of life; cassia seed contains a large number of bioactive chemical components to give cassia seed a variety of health benefits<sup>0</sup>". At the same time, the cassia seed in the excipients can not only improve insomnia and many dreams, but also can relieve liver fever. Because the liver plays an important role for the eyes, so cassia seed has the main effect for the people who often use their eyes. Reiko can relieve eye fatigue and effectively protect the eyes. When cassia and honeysuckle water together, can relieve internal heat, protect the purpose.

## 2.5 Research background of red dates

Red date is a mild plant, its planting range is wide and good adaptability, has the utility of nourishing blood and calming god. Jujube soaked in water tastes slightly sweet, which can not only improve the taste of the combination of scented tea, but also promote serum protein and protect the liver, and a large number of sugars contained in red dates can also play a protective role in protecting the liver, but also can enhance the constitution and supplement its nutrition. Fresh red dates are rich in vitamin C, flavonoids, and cyclic adenosine phosphate (cAMP)<sup>0</sup>. Red dates can not only be eaten in daily life, but also soaked together with honeysuckle and cassia seeds, which can not only increase the unique aroma of red dates, but also improve the taste of combined scented tea. Red dates also have the effect of nourishing blood and tonifying qi, often soak in water to drink, can have the effect of nourishing the appearance, in yan freckle.

## 2.6 Research background of rock sugar

Rock sugar is a crystalline heavy product of granulated sugar. Rock sugar can be used as candy in daily consumption, or as a medicinal combination of flower tea to adjust the taste. Rock sugar also protects the respiratory tract and moistens the throat. Rock sugar can not only improve the bitterness of combination tea itself, moisten lung cough. At the same time, because the rock sugar bubble water is rich in rich vitamins, it has a good protective effect for the respiratory tract cells. It can also be used in combination with different Chinese medicinal materials, not only can improve its taste, but also has the effect of nourishing the lungs. Because rock sugar is rich in glucose and it itself is too much sweet, so it has defects for patients with sugar medicine disease.

## 2.7 Study significance

Through the development process of honeysuckle wolfberry chrysanthemum tea, make a combination of scented tea with the effect of clearing heat and detoxification and clearing liver. In people's growing life, most people like to choose separate scented tea for brewing, but the effect and effect will be relatively single, and the taste and taste will also be relatively lacking. However, the developed combination flower tea not only solves the choice of the people, but also greatly improves its function and efficacy. At the same time, they can choose the suitable combination flower tea through their own needs. Combined with modern pharmacology, the influence of accessories in single factor experiment, the effect of the components of the combined flower tea was optimized, predicting the proportion of the combined flower tea and improving its taste and taste. For the further development and utilization of honeysuckle and a new combination of flower tea.

### 3. Materials and methods

#### 3.1 Test materials and instruments

Test materials: Honeysuckle (from Henan); chrysanthemum (from Huangshan); Chinese wolfberry (from Ningxia); cassia seed (from Ningxia); red jujube (from Xinjiang); rock sugar (supermarket).

Test instrument: ME204 one in ten thousand analysis balance (Mettler-Toledo International Trade Co., Ltd.); Tea Set (Chinese ceramics)

#### 3.2 Test method

##### 3.2.1 Preparation of combined scented tea

Honeysuckle, chrysanthemum, Chinese wolfberry, cassia seed (cooked), red dates and rock sugar are called with the bag finished product, using a constant temperature cooking and cooling and leaving fragrance process.

##### 3.2.2 Determination of sensory quality evaluation

The experiment was conducted through sensory evaluation of color, tissue form, flavor and fragrance, and the six factors of honeysuckle, chrysanthemum, wolfberry, cassia, jujube and rock sugar to determine the optimal range, and then the optimal formula of combined flower tea was obtained through the response surface method. Sensory evaluation was performed using the "100 points scale" scoring method<sup>00</sup>As shown in Table.1 below, a group of ten people is evaluated.

Table.1: Sensory evaluation criteria of Honeysuckle wolfberry and chrysanthemum tea

organoleptic indicator	code of points	Score / score
colour and lustre (30 Points)	Brown and yellow, clear and bright	21~30
	Darmer or light	11~20
	The color is dark and opaque	1~10
Organization form (30 Points)	Clarification, no obvious precipitation	21~30
	Have a little precipitation, more bright	11~20
	The precipitation is obvious	1~10
Taste and fragrance (40 Points)	Sweet and delicious, taste harmonious, slightly bitter	31~40
	honeysuckle, chrysanthemum fragrance and wolfberry sweet	
	The taste is light and bitter	21~30
	Bitter obvious	11~20

#### 3.3 One-factor experimental design

##### 3.3.1 Influence of honeysuckle addition on the sensory evaluation of combined scented tea

Univariate experiments were designed with 0.2g, 0.6g, 1.0g, 1.4g, 1.8g, 2.2g, 2.6g for added amounts of honeysuckle in chrysanthemum 0.5g, content of wolfberry 0.6g, 0.6g, 0.7g of jujube and

0.8g of rock sugar.

As can be seen from Figure.1, with the addition of chrysanthemum, wolfberry, cassia, jujube and rock sugar, the amount of the added amount of 1.4g, the combined flower tea is rich and the color is bright, the color will be too rich, and the taste will become bitter and unacceptable, and the sensory score will decrease.

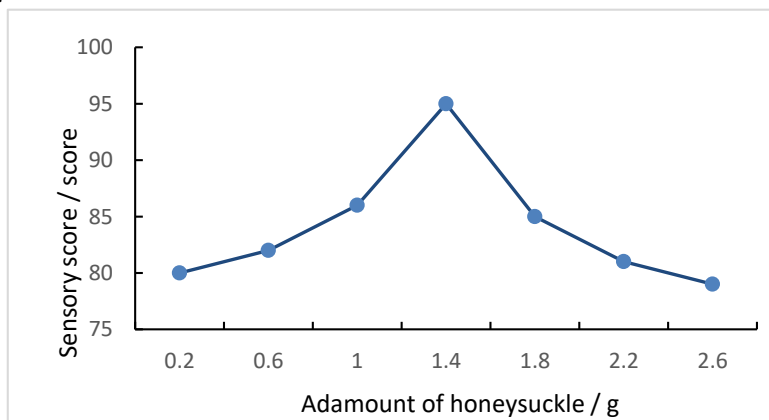


Figure 1: Effect of the addition amount of honeysuckle on the sensory scores

### 3.3.2 Influence of chrysanthemum addition on the sensory evaluation of combined flower tea

Univariate experiments were designed as 0.1g, 0.2g, 0.3g, 0.4g, 0.5g, 0.6g, 0.7g for honeysuckle at 1.4g, wolfberry at 0.6g, 0.6g cassia at 0.6g, jujube at 0.7g and 0.8g rock sugar.

As can be seen from Figure.2, with a certain amount of honeysuckle, wolfberry, cassia seed, jujube and rock sugar added, with the increase of chrysanthemum addition, the aroma of chrysanthemum in the combined flower tea will be too strong, the color will also deepen, and the score of sensory evaluation will also increase. But when the chrysanthemum is 0.5g, the combined flower tea will taste best. If the increase of chrysanthemum added continues, the chrysanthemum fragrance of the combined flower tea will be too heavy, the taste is slightly bitter, difficult to enter, and the sensory score will also be reduced.

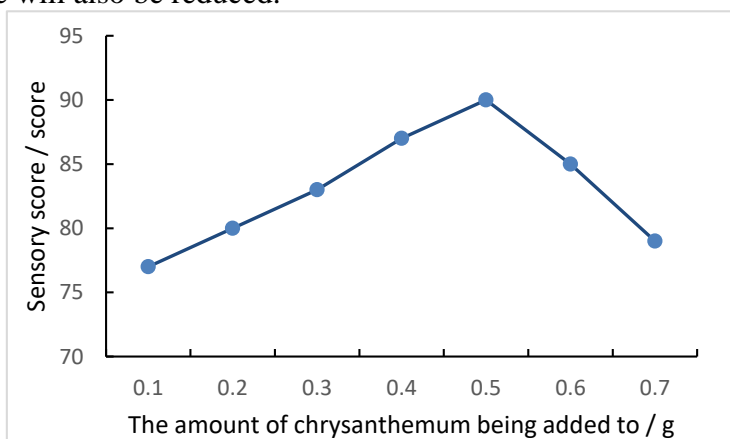


Figure 2: Effect of the addition amount of chrysanthemum on the sensory scores

### 3.3.3 Influence of Chinese wolfberry addition on the sensory evaluation of combined scented tea

Univariate experiments were designed with 0.2g, 0.4g, 0.6g, 0.8g, 1.0g, 1.2g, 1.4g at the levels of 1.4g of honeysuckle, chrysanthemum content of 0.5g, cassia seed content of 0.6g, red dates

content of 0.7g, and rock sugar content of 0.8g.

As can be seen from Figure. 3, with a certain amount of honeysuckle, chrysanthemum, cassia seed, jujube and wolfberry added, with the increase of wolfberry added, the fragrance of wolfberry in the combined flower tea will gradually increase, the color will gradually become light red, and the score of sensory evaluation will also increase. But when the amount of wolfberry is 0.6g, the taste of combination tea will be better. If we continue to increase the amount of Chinese wolfberry, the wolfberry fragrance of the combination of flower tea will be too heavy, and the taste will lose the unique aroma of honeysuckle tea, so that the sensory score will also be reduced.

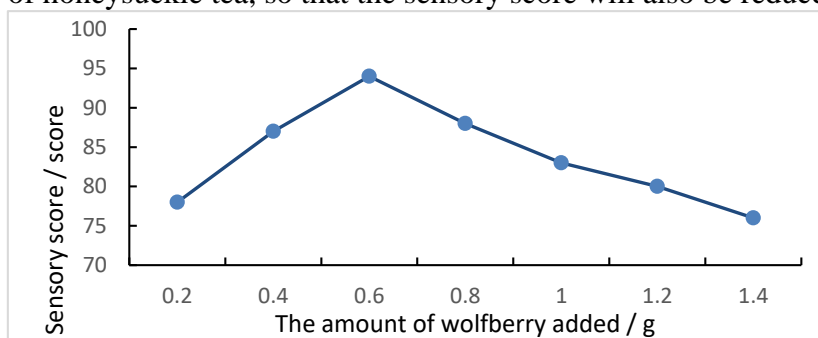


Figure 3: Effect of the amount of wolfberry on sensory scores

### 3.3.4 Effect of cassia seed addition on the sensory evaluation of combined scented tea

Univariate experiments were designed as 0.4g, 0.5g, 0.6g, 0.7g, 0.8g, 0.9g, 1.0g under the conditions of 1.4g honeysuckle, 0.5g chrysanthemum, 0.6g wolfberry, jujube 0.7g and 0.8g rock sugar.

It can be concluded from Figure.4 that in the certain amount of honeysuckle, chrysanthemum, wolfberry, jujube and rock sugar, the amount of cassia seed addition increases, the color of combined flower tea is yellow and the fragrance of tea flavor, and the score of sensory evaluation will also increase. However, when the amount of cassia seed added is 0.8g, the combination of scented tea will taste the best. If the added amount of cassia seed is further increased, the cassia seed fragrance of the combined scented tea will be too strong, the taste will be sweet and bitter, the color will be dark, and the sensory score will also be reduced.

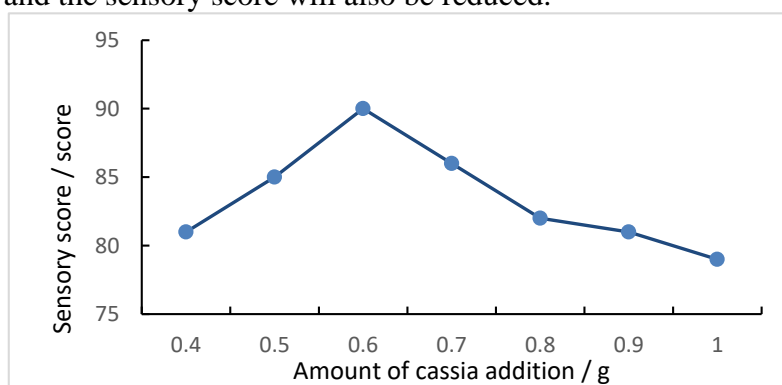


Figure 4: Effect of the addition amount of determinants on sensory scores

### 3.3.5 Influence of the addition amount of red dates on the sensory evaluation of combined scented tea

Univariate experiments were designed with 1.4g honeysuckle, 0.5g chrysanthemum, 0.6g wolfberry, 0.6g cassia seed and 0.8g rock sugar with 0.2g jujube addition and 0.4g, 0.6g, 0.8g, 1.0g,

1.2g, 1.4g.

As can be seen from Figure.5, with a certain amount of honeysuckle, chrysanthemum, wolfberry, cassia seed and rock sugar added, with the increase of dates added, the aroma of dates in the combined flower tea will be too strong, the color will gradually become light red, the taste is slightly sweet, and the score of sensory evaluation will also increase. But when the amount of jujube added is 0.8g, the combination of flower tea tastes the best. If the added amount of red jujube continues to be increased, the red date flavor of combined flower tea will be too strong, and the taste is relatively sweet, which covers up the unique fragrance of combined flower tea itself, and the sensory score will also decline accordingly.

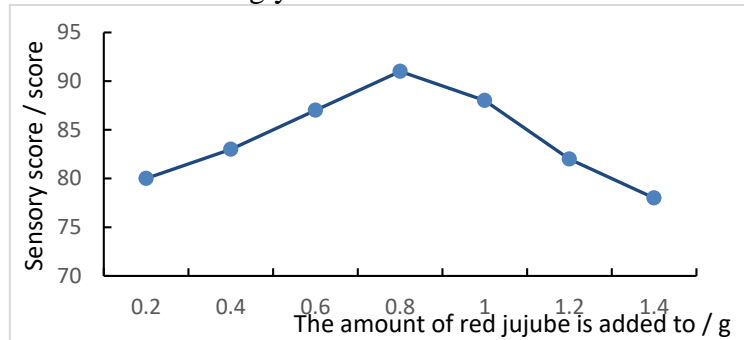


Figure 5: Effect of the addition amount of red dates on the sensory scores

### 3.3.6 Influence of rock sugar added amount on the sensory evaluation of combined flower tea

Univariate experiments were designed as 0.2g, 0.4g, 0.6g, 0.8g, 1.0g, 1.2g, 1.4g with 1.4g honeysuckle, 0.5g chrysanthemum, 0.6g wolfberry rock sugar, 0.6g cassia seed, and 0.7g red dates.

As can be seen from Figure.6, under the premise of a certain amount of honeysuckle, chrysanthemum, wolfberry, cassia and jujube, with the increase of rock sugar addition, the taste of the combined flower tea will be too sweet. But when the rock sugar is added to 0.8g, the combination tastes best. If the amount of rock sugar is further increased, the sweetness of combined flower tea will gradually increase, and the taste is too sweet and greasy, covering the unique taste of combined flower tea itself, so that the sensory score will also be reduced.

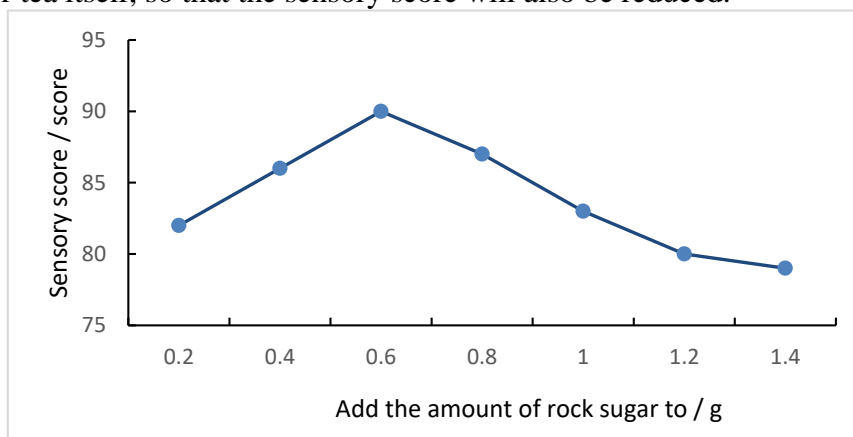


Figure 6: Effect of the added amount of rock sugar added on the sensory score



### 3.4 Response surface method design

#### 3.4.1 Test factor level of the response surface

Effect of the amount of material added in the univariate experiment above<sup>0</sup>, Select honeysuckle content is (A), chrysanthemum content is (B), Chinese wolfberry content is (C), cassia seed content is (D), red jujube content is (E) and rock sugar content is (F) the six affect the combination of flower tea larger interval, according to the Box-Behnken response surface optimization experiment design of the data results, get the following response surface test factor level coding table<sup>0</sup>. As shown in Table.2 below, select the level segment with great influence of addition amount on sensory evaluation.

Table 2: Colevel of response surface

horizontal	Honeysuckle content of A / g	Chrysanthemum content was B / g	The Chinese wolfberry content was C / g	Determinant content of D / g	Red date content of E / g	Rock sugar content is F / g
-1	1.0	0.4	0.4	0.4	0.6	0.6
0	1.4	0.5	0.6	0.6	0.7	0.8
1	1.8	0.6	0.8	0.8	0.8	1.0

#### 3.4.2 Response surface optimization experiment

According to the response surface test factor level coding table above, the response surface principle experimental data was analyzed<sup>0</sup>. The experimental design results are shown in Table.3 below.

Table 3: Design of the B o x-Behnken test

test number	A	B	C	D	E	F	Sensory score / score
1	1	-1	0	-1	0	0	80
2	-1	0	-1	0	0	1	80
3	0	-1	0	0	1	-1	79
4	1	0	0	-1	1	0	81
5	1	0	0	-1	-1	0	80
6	-1	0	1	0	0	1	82
7	0	1	0	0	1	-1	83
8	1	0	-1	0	0	1	82
9	-1	0	-1	0	0	-1	78
10	-1	0	0	-1	-1	0	76
11	1	0	0	1	1	0	85
12	0	-1	0	0	1	1	81
13	0	0	1	-1	0	1	82
14	1	0	0	1	-1	0	81
15	-1	1	0	-1	0	0	79
16	1	0	1	0	0	1	86
17	0	0	0	0	0	0	97
18	0	1	0	0	-1	1	80



Table 3.1 (continued)

test number	A	B	C	D	E	F	Sensory score / score
19	0	0	0	0	0	0	95
20	0	1	0	0	1	1	85
21	0	-1	1	0	-1	0	80
22	0	-1	1	0	1	0	81
23	0	1	-1	0	-1	0	80
24	-1	0	1	0	0	-1	79
25	1	1	0	1	0	0	86
26	1	1	0	-1	0	0	81
27	0	0	-1	-1	0	1	79
28	0	0	-1	1	0	1	82
29	0	1	1	0	-1	0	82
30	1	0	-1	0	0	-1	80
31	0	1	0	0	-1	-1	81
32	0	0	0	0	0	0	95
33	1	-1	0	1	0	0	82
34	0	0	0	0	0	0	96
35	0	-1	0	0	-1	1	79
36	-1	1	0	1	0	0	81
37	-1	0	0	1	-1	0	80
38	0	0	1	1	0	1	84
39	0	0	-1	1	0	-1	81
40	0	-1	-1	0	-1	0	77
41	-1	0	0	-1	1	0	76
42	0	0	0	0	0	0	96
43	0	1	1	0	1	0	85
44	0	-1	0	0	-1	-1	78
45	-1	0	0	1	1	0	84
46	-1	-1	0	1	0	0	82
47	1	0	1	0	0	-1	82
48	0	0	1	1	0	-1	80
49	0	0	1	-1	0	-1	83
50	0	-1	-1	0	1	0	81
51	0	0	-1	-1	0	-1	78
52	0	1	-1	0	1	0	83
53	-1	-1	0	-1	0	0	76

Table 3.1 (continued)

test number	A	B	C	D	E	F	Sensory score / score
54	0	0	0	0	0	0	95

## 4. Results and Analysis

### 4.1 Model building and anova

From the experimental data above, the experimental data results were analyzed using Design-Expert software. As shown in Table.4 below.

As shown by the experimental results in Table 4.1 below, the model is highly significant (p 0.01). Factors CD and DE had significant effects on the sensory scores (p 0.05), and factors A, B, C, D, E, F, and A<sup>2</sup>, B<sup>2</sup>, C<sup>2</sup>, D<sup>2</sup>, E<sup>2</sup> And F<sup>2</sup> The effect on the sensory scores was extremely significant (p 0.01). As can be seen from the F value in Table 4.1 below, the effect of the addition of the six materials on the score results of the sensory score is from large to small in order: cassia seed> honeysuckle> chrysanthemum> jujube> wolfberry> rock sugar. After analyzing the regression fitting of the data, the quadratic polynomial regression fitting equation prediction model with sensory score (Y), honeysuckle (A), chrysanthemum (B), wolfberry (C), cassia seed (D), jujube (E) and rock sugar (F) as the independent variables is:

$$Y=95.67+1.37A+1.25B+1.04C+1.54D+1.25E+0.8333F+0.3750AB+0.3750AC-0.5000AD+0.1250AE+0.1250AF++0.1250BC-0.1250BD+0.3125BE-0.2500BF-0.8750CD-0.3750CE+0.2500CF+0.8750DE+0.6250DF+0.5000EF-5.03A^2-4.74B^2-4.57C^2-5.03D^2-5.24E^2-4.94F^2$$

The coefficient of variation was 1.38% and the correlation coefficient was R<sup>2</sup>=0.9767, R<sup>2</sup><sub>Adj</sub>=0.9525. It indicates that the model is well fit.

Table 4: Analysis of ANOVA

source of variation	quadratic sum	free degree	mean square	F price	p price	conspicuousness
regression model	1415.66	27	52.43	40.37	<0.0001	**
A	45.37	1	45.37	34.93	<0.0001	**

Table 4 (continued)

source of variation	quadratic sum	free degree	mean square	F price	p price	conspicuousness
B	37.50	1	37.50	28.87	<0.0001	**
C	26.04	1	26.04	20.05	0.0001	**
D	57.04	1	57.04	43.92	<0.0001	**
E	37.50	1	37.50	28.87	<0.0001	**
F	16.67	1	16.67	12.83	0.0014	**
AB	1.13	1	1.13	0.8661	0.3606	
AC	1.13	1	1.13	0.8661	0.3606	
AD	4.00	1	4.00	3.08	0.0911	
AE	0.1250	1	0.1250	0.0962	0.7589	
AF	0.1250	1	0.1250	0.0962	0.7589	
BC	0.1250	1	0.1250	0.0962	0.7589	
BD	0.1250	1	0.1250	0.0962	0.7589	
BE	1.56	1	1.56	1.20	0.2828	
BF	0.5000	1	0.5000	0.3849	0.5404	
CD	6.13	1	6.13	4.72	0.0392	*
CE	1.000	1	1.000	0.8661	0.3606	
CF	6.13	1	6.13	4.72	0.3883	
DE	3.13	1	3.13	2.41	0.0392	*
DF	2.00	1	2.00	1.54	0.1330	
EF	2.00	1	2.00	1.54	0.2257	
A <sup>2</sup>	260.01	1	260.01	200.18	<0.0001	**
B <sup>2</sup>	230.72	1	230.72	177.63	<0.0001	**
C <sup>2</sup>	214.76	1	214.76	165.35	<0.0001	**
D <sup>2</sup>	260.01	1	260.01	200.18	<0.0001	**
E <sup>2</sup>	282.00	1	282.00	217.11	<0.0001	**
F <sup>2</sup>	251.46	1	251.46	193.60	<0.0001	**

Table 4 (continued)

source of variation	quadratic sum	free degree	mean square	<i>F price</i>	<i>p price</i>	conspicuousness
residual	33.77	26	1.30			
Unplanned item	30.44	21	1.45	2.17	0.1986	
pure error	3.33	5	0.6667			
sum	1449.43	53				

pour:  $R^2=0.9767$ ,  $R^2_{Adj}=0.9525$ ; "\*" indicates a significant difference ( $p < 0.05$ ), and "\*\* \*" indicates that the difference is extremely significant ( $p < 0.01$ ).

As can be seen from the ANOVA in Table 3.2 above, the model of  $F = 40.37$ ,  $p < 0.0001$ , so  $p < 0.01$ , shows that the quadratic model used in the experiment is extremely significant, and no misfitting factors exist, which is statistically significant. Therefore, the regression equation can be used instead of the experimental real point to analyze the experimental results.

#### 4.2 Response surface map interaction influence and contour map analysis

Response surface curves and contour images were drawn according to the regression equation. According to the shape of the fitted response area, the proportion of individual factors was studied. The following figure shows the influence of the amount of honeysuckle (A), the amount of chrysanthemum (B), the amount of wolfberry (C), the amount of cassia (D), the amount of jujube (E) and the amount of rock sugar (F) on the sensory evaluation score. The interaction between the factors can be reflected by the response surface maps and contour maps below.

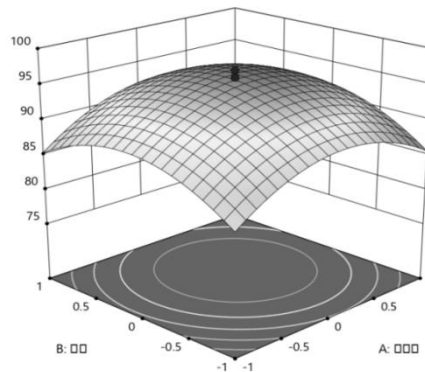


Figure 7: Response surface diagram of the interaction effect of Honeysuckle (A) and chrysanthemum (B) on sensory evaluation

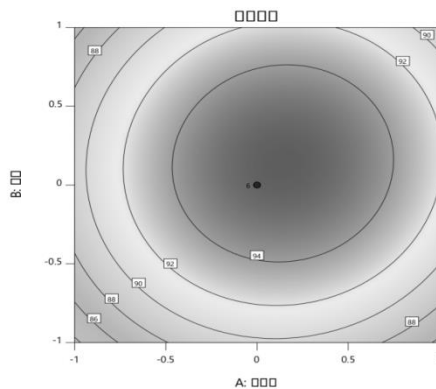


Figure 8: Contour plot of the interaction effect of Honeysuckle (A) and chrysanthemum (B) on sensory evaluation

It can be concluded from Figure.7 and Figure.8 above that the sensory score of combined flower tea gradually increases as the amount of honeysuckle added increases, and the maximum sensory score value in the amount of honeysuckle added is 1.0g~1.8g.It can be seen from the response surface that the amount of chrysanthemum added reached the best sensory score and the maximum sensory score at 0.4g~0.6g. From the contour map above, we can conclude that the interaction between honeysuckle (A) and chrysanthemum (B) is not significant.

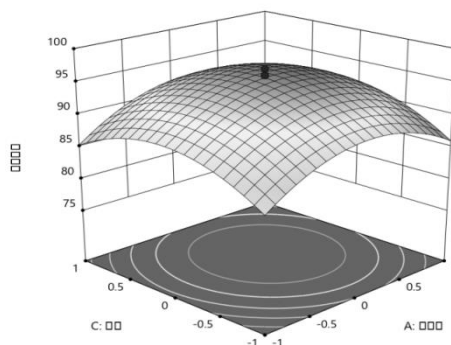


Figure 9: Response surface curve of the interaction of Honeysuckle (A) and Wolwolfberry (C) on sensory evaluation

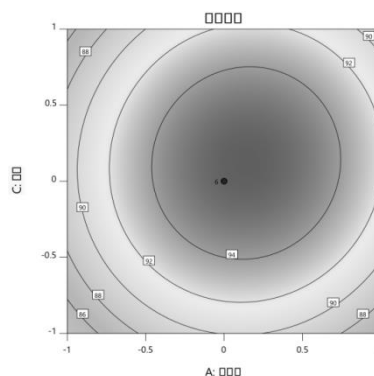


Figure 10: Contour plot of the interaction of Honeysuckle (A) and Wolwolfberry (C) on sensory evaluation

It can be concluded from Figure.9 and Figure.10 above that at the fixed level, the sensory score of the combination flower tea gradually increased, and the maximum sensory score appeared in the range of 0.4g~0.8g. The amount of honeysuckle added reached the best sensory score at 1.0g~1.8g, and the sensory score also reached the maximum. From the contour map above, we can conclude that the interaction between honeysuckle (A) and wolfberry (C) is not significant.

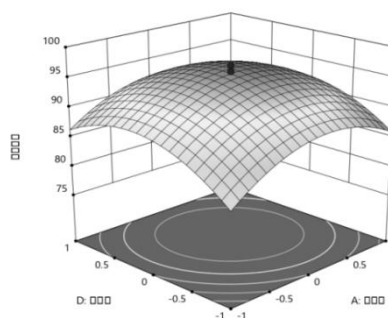


Figure 11: Response surface diagram of the sensory interaction of honeysuckle (A) and cassia (D)

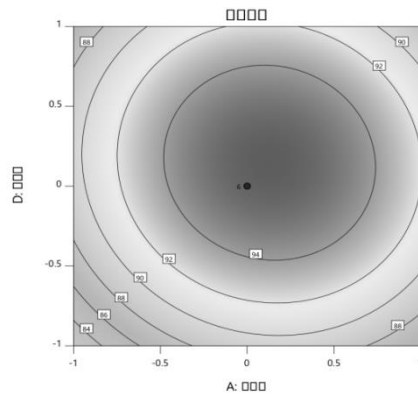


Figure 12: Contour plot of the interaction effect of the Honeysuckle (A) and the cassia seed (D) on the sensory assessment

It can be concluded from Figure.11 and Figure.12 above that the sensory score of the combined flower tea is gradually increased, and the maximum sensory score value in the amount of honeysuckle is 1.0g~1.8g. Moreover, the amount of cassia addition on 0.4g~0.8g reaches the best sensory score, and the sensory score also reaches the maximum. From the contour map above, the interaction between honeysuckle (A) and cassia (D) is not significant.

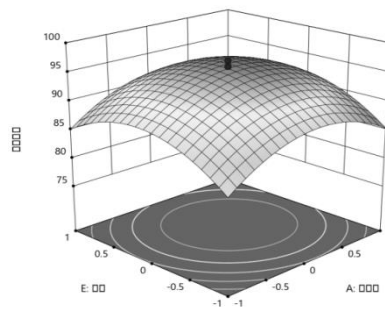


Figure 13: Response surface diagram of the interaction effect of Honeysuckle (A) and jujube (E) on sensory evaluation

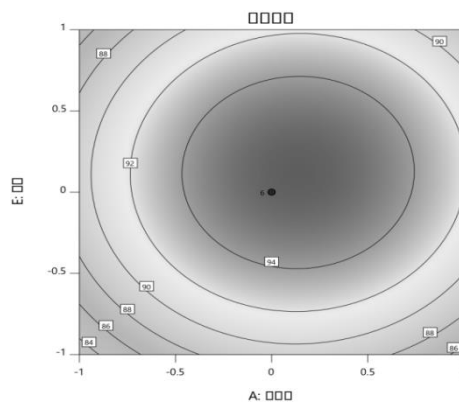


Figure 14: Response surface diagram of the interaction effect of Honeysuckle (A) and jujube (E) on sensory evaluation

It can be concluded from Figure.13 and Figure.14 above, it is a fixed level that the sensory score of the combination of scented tea gradually increases with the increase of jujube added, and the maximum value appears in the range of 0.6g~0.8g. And honeysuckle added amount in 1.0g~1.8g

sensory evaluation reached the best, sensory score also reached the maximum. The interaction between honeysuckle (A) and jujube (E) was not significant.

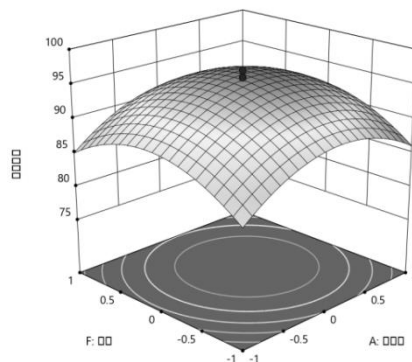


Figure 15: Response surface diagram of the interaction effect of Honeysuckle (A) and rock sugar (F) on sensory evaluation

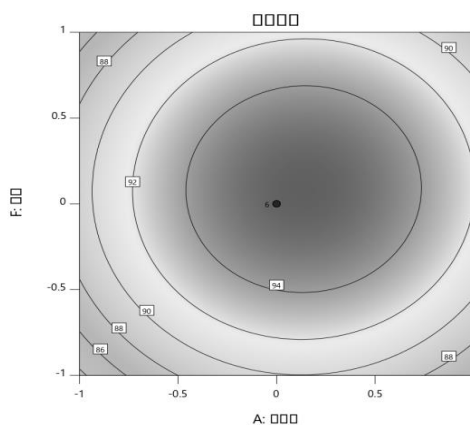


Figure 16: Contour plot of the interaction effect of Honeysuckle (A) and rock sugar (F) on sensory evaluation

It can be concluded from Figure.15 and Figure.16 that the sensory score of the combined flower tea gradually increased, and the maximum sensory score value in the amount of honeysuckle is 1.0g~1.8g. And the amount of rock sugar added in 0.6g~1.0g sensory evaluation reached the best, the sensory score also reached the maximum. From the contour map above, we can conclude that the interaction between honeysuckle (A) and rock sugar (F) is not significant.

## 5. Results and discussion

### 5.1 Results

The final product of honeysuckle medlar chrysanthemum tea is yellow-green, clear and not bitter; with honeysuckle unique flower tea aroma; sweet and delicious, harmonious taste, no bad flavor. At this time, the optimal value of the sensory formula obtained by the analysis of the response surface software was 85.433 points, that is, the optimal formula was: 1.049g honeysuckle, chrysanthemum 0.405g chrysanthemum, wolfberry 0.578g, cassia 0.447g, jujube 0.710g and 0.978g rock sugar.

## 5.2 Discussion

Combination flower tea is a tea made of making the flowers or leaves of different kinds of plants or their fruit combination. Its taste, effect and efficacy mostly come from the kind of flower tea added. Honeysuckle is an excellent source of anthocyanins, with a variety of nutritional and health care effects<sup>0</sup>.

This study mainly takes honeysuckle, chrysanthemum and wolfberry as the main materials, cassia seed, jujube and rock sugar as the raw materials, to develop a clear heat protection and sweet taste of honeysuckle wolfberry chrysanthemum combination flower tea. This study adopts the process of constant temperature cooking and cooling, to ensure that the color and fragrance of combined flower tea are retained to the best, so that the color, aroma and taste of combined flower tea are retained to the best. At the same time, the combination of scented tea is made by tea bag packaging, which has the advantages of convenient carry and use, and can be loved by the masses. Combination of flower tea has a certain protective effect on the eyes of people who now like to play with mobile phones or computers, relieving eye fatigue, improving the body's immunity, antioxidant, and reducing anger<sup>0</sup>. Moreover, in this study, with sensory evaluation as the index, combined with univariate experiment and Design-Expert software optimization analysis, the material and the final formula of honeysuckle combined flower tea were reassembled to improve the color and taste of the combined flower tea.

Although this study obtained the optimal formulation of the materials in the combined flower tea, there are still some problems to be solved due to the insufficient time and research ability. At the same time, due to the different taste of the combined flower tea and the influence of its own physical factors, and the different choice and pursuit of the combined flower tea, the sensory evaluation of the experimental data has certain limitations.

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