

Research Article

The Research of Shixiang Functional Liquid Flavoring Agent

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Abstract: To deep processing of shixiang vegetable, sufficient development of shixiang vegetable, using fresh shixiang and soy sauce as the main raw material, develop shixiang functional liquid flavoring agent. The functional liquid flavouring agent was studied through single factor experiment and orthogonal experiment, blanching temperature, blanching time, extraction time, extraction temperature, the proportion of shixiang and soy sauce and the deployment test were studied. The optimal conditions for production of shixiang functional liquid flavoring agent: blanching temperature 95°C, blanching time 2 min, extraction temperature 95°C extraction time 6 min, the proportion of ten parsley and soy sauce 1:15 (g:mL), the optimal deployment of combination: sugar 1%, alcohol 3%, caramel 0.5%. According to the above process in the production of shixiang functional liquid flavoring agent will meet the needs of the consumers' taste and health.

Keywords: Functional liquid flavoring agent, shixiang, technological process

INTRODUCTION

Shixiang vegetable also called a drug grass, perennial herbaceous plants, shixiang unique fragrance, both herba schizonepetae MaShuang, have cool and refreshing mint, twigs and leaves can make fresh flavor, the main course deserve to act the role, can also be fried food. Shixiang contains rich essential oils, after processing, as a seasoning (Han *et al.*, 2015; Yang *et al.*, 2014; Zhang *et al.*, 2011a). The coriander essential oil has inhibitory effect on some of the food pathogenic bacteria, shixiang sheen, cool, non-toxic, with breeze cooling, facilitating, detoxification, antiphlogistic, hemostatic, convergence effect and so on (Zhang *et al.*, 2011a, 2011b). For wind hot cold, consumptive cough, catch cold cough, headache, eye red, sore throats, opaque measles, rubella cuo itch, liver depression and qi stagnation, chest stuffy pain and so on has certain curative effect. Therefore, the development and utilization and deep study of ten parsley, will encourage new drugs, new preparation and the new formula (Choudhury *et al.*, 2006; Chalkos *et al.*, 2010).

With the improvement of people's diet health care consciousness, more and more demand for shixiang, to meet consumer demand, in many places in the intensive cultivation. But the edible parts of ten parsley is the tender stem and leaf, after the harvest is still in the high

state of physiological metabolism, respiration intensity is bigger, is not conducive to storage and long-distance transportation. Secondly, ten parsley picking mainly concentrated in two seasons, spring, summer, the seasonal and seasonal supply is stronger, this limits the supply and consumption of ten parsley. If the stem and leaf of ten parsley will be processed into the functional liquid of good taste with soy sauce seasoning, already can keep shixiang flavor and nutrition and can overcome the shortage of seasonal and the poor water resistance. In this study, through single factor experiment and orthogonal experiment research using ten parsley in the production of functional liquid flavoring optimum technological process, aims at providing a large-scale development and utilization of the effective ways for shixiang.

MATERIALS AND METHODS

Materials:

Materials: Shixiang, commercially available; Soy sauce, commercially available, accord with the national standard of soy sauce; Baking soda, salt, alcohol, caramel, etc.

Main instrument: Electric furnace, constant temperature drying oven, constant temperature water bath pot, etc.

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Table 1: Levels of orthogonal factors

Levels	Factors		
	A Leaching temperature (°C)	B Leaching time (min)	C Proportion (g:mL)
1	90	4	1:15
2	95	6	1:20
3	100	8	1:25

Table 2: Levels of orthogonal factors

Levels	Factors		
	A sugar (%)	B alcohol (%)	C caramel (%)
1	1	1	0.5
2	2	2	1.0
3	3	3	1.5

Experimental process: Choose fresh stems and leaves of shixiang, clean, put into 80-100°C hot water for 3 min, into the room temperature water cooling (below 40°C), drain well, put into the oven drying at 50°C (about 10 h), crushed to 20 mesh, according to certain proportion mixed with soy sauce, at 80-100°C heating leaching for 2 to 10 min, after cooling at room temperature for 24 h, adding 1 to 3% sugar, 1-3% alcohol, 0.5 to 1.5% caramel to allocate, clarify, via sensory evaluation appraisal, the finished product.

The effect of blanching on shixiang quality: The stems and leaves of shixiang with slightly bitter, easy to change color, blanched treatment can reduce an indication, prevent discoloration, keep fragrance and reduce the nitrite content. Put shixiang into aqueous solution containing 1% salt and 1% sodium bicarbonate for blanched treatment, set blanching temperature 80 85, 90, 95 and 100°C, respectively and blanching time 1, 2 and 3, compare different combinations of temperature and time on its quality.

The effect of leaching temperature on functional liquid flavouring agent quality: Soy sauce was heated to different temperature (85, 90, 95, 100°C), after drying, accordance with the ratio 1:10 (g: mL) to join ten parsley, leaching for 5 min, cooling at room temperature for 24 h, compare the effects of different extraction temperature on quality of seasoning.

The effect of leaching time on functional liquid flavoring agent quality: Soy sauce was heated to 95°C,

accordance with the ratio 1:10 (g: mL) to join shixiang, respectively, leaching for 2, 4, 6, 8, 10 min, cooling at room temperature for 24 h, compare the effects of different extraction time on quality of seasoning.

The effect of the proportion on functional liquid flavoring agent quality: Soy sauce was heated to 95 °C, accordance with the ratio 1:10, 1:15, 1:20, 1:25, 1:30 (g:mL) to join ten parsley, respectively, leaching for 5 min, cooling at room temperature for 24 h, compare the effects of different proportion on quality of seasoning.

The optimal process conditions of functional liquid flavoring agent: Ten parsley functional liquid flavoring leaching conditions was studied through single factor experiment and orthogonal experiment, scheme was shown in Table 1.

Determine the optimal allocation of functional liquid flavoring agent: Functional seasoning sensory quality is affected by other raw materials added, usually to add certain caramel, sugar and alcohol to improve the sensory quality of functional liquid flavoring agent. Alcohol added occurs and acid in the hydrolysate creating ester aroma substances, induced aromatic substances at the same time, increase the fragrance; Sugar added to adjust all kinds of flavor and reacts with soy sauce ingredients in pigment and fragrance; Caramel increased the rate of the concentration of the soy sauce, color and also can improve the taste and flavor of soy sauce and improve the red brightness of soy sauce. Therefore, when the mixing liquid functional seasoning, color, shape, aroma and taste of four measures of sensory evaluation as the basis, choose caramel and sugar, alcohol as the experimental factors, choose $L_9(3^3)$ orthogonal table for orthogonal experiments. On the basis of consulting a large number of data, each factor in three levels (Table 2).

Sensory evaluation standard of functional liquid flavoring agent: Sensory evaluation norm of functional liquid flavoring agent is aroma 40%, taste 40%, colour and lustre 20%, the combined total score 100 points, seasoning grading basis shown in Table 3. Appraisal group composed of 10 people carries on the, evaluating its average.

Table 3: Sensory evaluation standard of functional seasoning spices

Items	Sensory evaluation standard	Grade
Aroma (40 scores)	Rich smell, outstanding unique fragrance, no peculiar smell	26-40
	Light fragrance, fragrant aroma of ten parsley slightly pale, unique oil with mild taste, smell	16-25
	Light fragrance, no fragrant aroma of ten parsley, slightly heavier oil flavor and odor	0-15
Taste (40 scores)	Freshness is concentrated, thick	26-40
	Freshness, aftertaste	16-25
	Freshness, no aftertaste	0-15
Colour and lustre (20 scores)	Dark brown, shiny, high transparency	14-20
	Red brown, luster is a bit dark, transparency is poor	7-13
	Brown, tarnish, transparency is poor	0-6

Table 4: Effect of different blanching conditions on the quality of shixiang

Blanching temperature (°C)	Blanching time (min)	Sensory evaluation standard
80	1	Raw astringency heavier, fragrance, color and luster good, blunt
	2	Raw astringency heavy, fragrance, color and luster good, blunt
	3	Raw astringency heavy, fragrance, color and luster good, slight elastic tissue
85	1	Raw astringency heavier, fragrance, color and luster good, blunt
	2	Raw astringency heavy, fragrance, color and luster good, slight elastic tissue
	3	Raw astringency heavy, fragrance, color and luster good, elastic tissue
90	1	Raw astringency heavy, fragrance, color and luster good, blunter
	2	Raw astringency heavy, fragrance, color and luster good, slight elastic tissue
	3	No born astringency, fragrance, color variation, tissue elastic
95	1	Raw astringency heavy, fragrance, color and luster good, tissue elastic
	2	No born astringency, something has cooked taste, fragrance, colour and lustre good, tissue elastic
	3	No born astringency, something has cooked taste heavy, fragrance, colour and lustre poor, soft tissue
100	1	No born astringency, fragrance, colour and lustre good, slight elastic tissue
	2	No born astringency, something has cooked taste, fragrance, colour and lustre poor, soft tissue
	3	No born astringency, something has cooked taste heavy, fragrance, colour and lustre poor, soft rotten part of the organization

Table 5: The effect of leaching temperature on functional liquid flavoring agent quality

Blanching temperature (°C)	Fragrance (40)	Taste (40)	Colour and lustre (20)	Composite scores (100)
80	26.0	27.0	18.8	71.8
85	28.6	30.1	18.2	76.9
90	30.5	32.4	18.3	81.2
95	31.1	36.2	18.2	85.5
100	30.3	37.1	17.5	84.9

Table 6: The effect of leaching time on functional liquid flavoring agent quality

Blanching temperature (min)	Fragrance (40)	Taste (40)	Colour and lustre (20)	Composite scores (100)
2	29.5	32.3	18.7	80.5
4	30.2	35.6	18.4	84.2
6	33.5	36.4	18.2	88.1
8	32.3	36.2	17.5	86.0
10	30.3	33.4	16.6	80.3

Table 7: The effect of the proportion on functional liquid flavoring agent

Proportion (g:mL)	Fragrance (40)	Taste (40)	Colour and lustre (20)	Composite scores (100)
1:10	33.5	36.4	18.2	88.1
1:15	33.7	36.6	18.8	89.1
1:20	34.5	37.4	18.9	90.8
1:25	34.3	36.2	18.5	89.0
1:30	32.9	35.8	17.7	86.4

RESULTS AND DISCUSSION

The effect of blanching on shixiang quality: The effect of different blanching temperature and blanching time on ten parsley quality, the results are shown in Table 4. Table 4 shows that blanching temperature 95°C, blanching time 2 min, shixiang is no indication, fragrance, color and luster good and tissue elastic; Therefore, the optimum blanching temperature 95°C, blanching time 2 min.

The effect of leaching temperature on functional liquid flavoring agent quality: The effect of different blanching temperature on functional liquid flavoring agent quality, the results are shown in Table 5.

Table 5 shows that low extraction temperature can result in ten parsley fragrant aroma and freshness insufficient material leaching, high temperature and can

lead to poor color quality accompanied by the smell. Best leaching temperature at 95°C or so ideal.

The effect of leaching time on functional liquid flavoring agent quality: The effect of different blanching time on functional liquid flavoring agent quality, the results are shown in Table 6.

Table 6 shows that when the leaching time for 6 min, shixiang functional liquid flavoring agent comprehensive score the highest, quality the best.

The effect of the proportion on functional liquid flavoring agent quality: Table 7 shows that the best proportion of soy sauce and shixiang is 1:20 (g:mL), the functional liquid flavoring agent is better.

The optimal process conditions of functional liquid flavoring agent: According to the orthogonal

Table 8: The orthogonal test results of extraction conditions of shixiang functional liquid flavoring agent

Number	A	B	C	Average score of sensory evaluation
1	1	1	1	87.1
2	1	2	2	88.7
3	1	3	3	85.2
4	2	1	2	88.8
5	2	2	3	92.6
6	2	3	1	90.3
7	3	1	3	85.5
8	3	2	1	87.8
9	3	3	2	84.3
k_1	87.000	87.133	88.400	
k_2	90.567	89.700	87.267	
k_3	85.867	86.600	87.767	
R	4.7000	3.1000	1.1330	

Table 9: The orthogonal experiment results of the optimal preparation of shixiang functional flavoring agent

Number	A	B	C	Average score of sensory evaluation
1	1	1	1	93.1
2	1	2	2	93.6
3	1	3	3	93.4
4	2	1	2	92.6
5	2	2	3	92.9
6	2	3	1	93.8
7	3	1	3	92.4
8	3	2	1	92.8
9	3	3	2	93.5
k_1	93.367	92.700	93.233	
k_2	93.100	93.100	93.233	
k_3	92.900	93.567	92.900	
R	0.4067	0.8670	0.3330	

experiment design Table 1, orthogonal experiment was carried out, the results are shown in Table 8. Table 8 shows that leaching temperature is the most important influence factors, leaching time second, the proportion of shixiang and soy sauce least. The optimum combination of $A_2 B_2 C_1$ can be got, leaching temperature 95°C, leaching time 6 min, the proportion of shixiang and soy sauce 1:15 (g:mL), in condition, the average score of the sensory evaluation is 93.3.

The deployment test of shixiang functional flavoring agent: Table 9 shows that alcohol is the most important influence factors, sugar second, caramel least. The optimum combination of $A_1 B_3 C_1$ can be got, sugar 1%, alcohol 3%, caramel 0.5%.

CONCLUSION

The functional liquid flavouring agent was studied through single factor experiment and orthogonal experiment, blanching temperature, blanching time, extraction time, extraction temperature, the proportion of shixiang and soy sauce and the deployment test were studied. The optimal conditions for production of shixiang functional liquid flavoring agent: blanching temperature 95°C, blanching time 2 min, extraction temperature 95°C, extraction time 6 min, the proportion of shixiang and soy sauce 1:15(g: mL), the optimal deployment of combination: sugar 1, alcohol 3, caramel 0.5%.

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