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Current Situations and Development Ideas of Buckwheat Tea Industry in Liangshan Prefecture

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Abstract This paper firstly introduces current situations of buckwheat tea industry in Liangshan Prefecture, current situations of intellectual property right of buckwheat tea in whole China, and total flavonoid content in buckwheat tea. On the basis of these current situations, it analyzes drawbacks of buckwheat tea sold in the market. Finally, it presents development ideas of buckwheat tea industry in Liangshan Prefecture. **Key words** Liangshan, Buckwheat tea, Current situations, Development ideas

Buckwheat is a plant cultivated for its grain-like seeds, and also used as a cover crop. It is also called Fagopyrum esculentum or Tartary buckwheat. It belongs to polygonum, similar to polygoni multiflori, rhubarb, and Rhizoma Polygoni Cuspidati. It is rare grain and medical resource. In China, it is only planted in middle and western high altitude cold regions. Buckwheat contains much bioflavonoid which has blood sugar reduction, fat lowering anticancer, anti-oxidant, senile-resistant, and cardio-cerebrovascular diseases. It is raw material for developing functional food and medical and health-care products. In recent years, buckwheat tea industry in Liangshan Prefecture develops from small to big and from weak to strong. At present, more than 20 buckwheat processing enterprises have formally registered in Liangshan Prefecture. Its products are various, such as buckwheat rice, buckwheat powder, buckwheat soap, buckwheat tea, buckwheat wine, buckwheat vinegar, buckwheat noodle, buckwheat candied fritter, and Rutoside, etc. Among these, buckwheat tea is simple in production process and high in added value, so buckwheat processing enterprises fall over each other to produce it, leading to low quality and price competition of buckwheat tea production enterprises. This not only harms industrial goodwill and disrupts market order, but also damages enterprises. Thus, it is an irresponsible action.

To regular market behavior and promote benign cycle of buckwheat tea industry, Liangshan Technical Committee for Standardization of Agriculture and Liangshan Quality and Technical Supervision Bureau organized experts from Xichang College, Xichang Institute of Agricultural Sciences, Liangshan Prefecture Agricultural Bureau, Liangshan Prefecture Science and Technology Bureau and Liangshan Prefecture Quality Supervision and Inspection Institute to review the local standard Liangshan Prefecture Buckwheat Tea. This local

standard was drafted by Xichang College, Sichuan Huantai Industrial Company, Xichang HangFei Tataricum Technology Development Company, Xichang Sanjiang Tartary Buckwheat Development Company, Xichang Zhengzhong Food Company, and Liangshan Huiqiao Biological Technology Company on the basis of extensive investigation, researches, tests and analyses and listening to suggestions from various circles of society. The formulation of this standard plays a great role in promoting healthy development of buckwheat tea industry in Liangshan Prefecture, improving Liangshan's buchwheat tea quality, setting up quality buckwheat tea brand, and declaration of geographical indication (GI) product.

1 Current situations of intellectual property right of buckwheat tea in China

At present, there are a total of 24 patents for invention related to buckwheat tea, 8 of which have been approved, as listed in Table 1.

According to raw material characteristics, buckwheat tea can be divided into whole-wheat buckwheat tea (or seed buckwheat tea), granulated buckwheat tea and buckwheat bud leaf tea. The whole wheat buckwheat tea is made through screening and baking of buckwheat rice. Whole wheat has two meanings: firstly, the production raw material is the intact shelled buckwheat granules; secondly, the whole production raw material is buckwheat without any other composition; granulated buckwheat tea takes buckwheat bran or powder as raw material, is formed through extrusion, drying, and baking added with other additives; buckwheat bud leaf tea takes the buckwheat leaf or bud leaf as raw material with or without additives.

Among the 8 patents, 2 are granulated buckwheat tea, 5 are whole wheat buckwheat tea (or seed buckwheat tea), and 1 is the buckwheat bud leaf tea. From the perspective of application time, the sequence of these three types of buckwheat tea is granulated buckwheat tea, whole wheat buckwheat tea and buckwheat bud leaf tea.

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2 Comparison and analysis of total flavonoid content in Liangshan buckwheat tea

In November 2011, we collected 25 types of products from 10 buckwheat tea production companies, and compared and analyzed

Table 1 Statistics of patents for invention related to buckwheat tea

their total flavonoid content.

Among these, 8 types belong to whole wheat buckwheat tea and the total flavonoid content is listed in Table 2.

No.	Application Number	Patent name	Status of approval
1	02113212.7	Production process of buckwheat tea	Approved
2	03111344.3	Buckwheat tea and its production methods	Approved
3	03130369.2	Methods for preparing buckwheat tea	Approved
4	03133663.9	Buckwheat tea and its production methods	
5	03130370.6	Methods for preparing tartary buckwheat tea	
6	03143290.5	Tartary buckwheat tea	
7	200310109635.7	Production methods of buckwheat tea	Approved
8	200310109892.0	A processing technology of buckwheat tea	
9	200410041261.4	Methods for making tartary buckwheat tea	Approved
10	200410060014.9	Methods for preparing tartary buckwheat tea	Approved
11	200510021064.0	A type of buckwheat tea and its preparation method	Approved
12	200510029933.4	Methods for preparing tartary buckwheat tea	
13	200510020654.1	A method of preparing pill-shaped buckwheat tea	
14	200510126570.6	A type of buckwheat tea and its preparation process	
15	200520036503.0	Tartary buckwheat tea siftings	
16	200610020990.0	A type of tartary buckwheat tea and its preparation method	Approved
17	200610048844.9	A type of tartary buckwheat tea and its preparation method	
18	200610134935.4	Buckwheat tea drink and its production methods	
19	200610163823.1	A type of tartary buckwheat tea and its preparation method	
20	200710197049.0	Tartary Buckwheat tea and its production methods	
21	200810177324.7	A type of tartary Buckwheat tea and its production methods	
22	200910076306.4	A type of tartary buckwheat tea and its preparation methods	
23	200910211776.7	A type of buckwheat tea	
24	201010136285.3	Super-micro tartary Buckwheat tea and its production methods	

Table 2 Total flavonoid content in whole wheat buckwheat tea

Name	Average content	Name	Average content
Yuanhui tartary buckwheat plumule tea	1.07	Yunji pearl tartary buckwheat tea	0.97
Huantai tartary buckwheat whole plumule tea	1.01	Ziyuan tartary buckwheat whole plumule tea	1.81
Sanjiang tartary buckwheat whole plumule tea	0.99	Hangfei tartary buckwheat plumule tea	1.23
Huiqiao tartary buckwheat whole plumule tea	0.88	Hangfei buckwheat whole wheat tea	1.94

From Table 2, it can be known that the highest content of total flavonoid in whole wheat buckwheat tea is 1.94%, and the lowest content is 0.88%, indicating that there is distinctive difference in total flavonoid content in whole wheat buckwheat tea produced by different companies. Among these 8 products, 3 have to-

tal flavonoid content lower than 1.00% and 5 have total flavonoid content higher than 1.00%.

Among the 25 types of buckwheat tea products, 15 types belong to granulated buckwheat tea and the total flavonoid content is listed in Table 3.

Table 3 Total flavonoid content in granulated buckwheat tea

Name	Average content	Name	Average content
Yuanhui tartary buckwheat tea	3.04	Hangfei buckwheat tea for skin care	2.43
Yuanhui buckwheat tea	3.01	Hangfei buckwheat tea for skin care (new)	5.02
Huantai tartary buckwheat tea	2.29	Hangfei Jiejie buckwheat tea	2.95
Huiqiao tartary buckwheat tea	2.50	Hangfei Jiejie buckwheat tea (new)	2.45
Qinghe tartary buckwheat tea	3.22	Hangfei tartary buckwheat tea	2.82
Anxi buckwheat tea	1.28	Hangfei tartary buckwheat tea (new)	3.91
Hangfei buckwheat herbal tea	2.56	Hangfei tartary buckwheat Vitamin P tea	5.29
Hangfei buckwheat herbal tea (new)	3.87		

From Table 3, it can be known that the highest content of total flavonoid in granulated buckwheat tea is 5.29%, and the lowest content is 1.28%, indicating that there is distinctive difference in total flavonoid content in granulated buckwheat tea produced by different companies.

Among these, 2 types belong to buckwheat bud leaf tea and

the total flavonoid content is listed in Table 4.

From Table 4, it can be known that the total flavonoid content in the measured 2 types of buckwheat bud leaf tea is 6.29% and 2.54% respectively, with the ratio up to 2.48, showing a sharp difference.

From comparison of the total flavonoid content in three types

of buckwheat tea, as listed in Table 5, it can be known that the total flavonoid content is whole wheat buckwheat tea < granulated buckwheat tea < buckwheat bud leaf tea, and the ration of total flavonoid content is whole wheat buckwheat tea: granulated buckwheat tea: buckwheat bud leaf tea = 1.00:2.51:3.56.

Table 4 Total flavonoid content in buckwheat bud leaf tea

Name	Average content
Sanjiang tartary buckwheat whole plant	2.54
Bud leaf tea	6.29

Table 5 Comparison of total flavonoid content in three types of buckwheat tea

Type of buckwheat tea	Average content	A:B:C
Whole wheat buckwheat tea A	1.24	1.00:2.51:3.56
Granulated buckwheat tea B	3.11	
Buckwheat bud leaf tea	4.42	

For the same type of buckwheat tea, the maximum difference in the total flavonoid content is the buckwheat bud leaf tea, next is granulated buckwheat tea, and the minimum is the whole wheat buckwheat tea. Major reason lies in that raw material of whole wheat buckwheat tea is not added with other composition, and the total flavonoid content mainly depends on the flavonoid content of the buckwheat itself; total flavonoid content in buckwheat bud leaf tea and granulated buckwheat tea mainly depend on the proportion of added bud lead and buckwheat bran, which is greatly different in products made by different enterprises.

(From page 39)

China's annual fertilizer use accounts for 30% of the total fertilizer use in the world, but the use of pesticides per unit area is higher than in the developed countries. At the same time, the utilization rate of chemical fertilizer and pesticides is only 30% to 40%. Thus the use of chemical fertilizer and pesticides in Hohhot City should be based on the carrying capacity of soil, and it is necessary to optimize fertilization proportion structure and improve fertilization methods.

The contribution of mechanical power to agricultural output value in Hohhot City has not yet been fully made in Hohhot's agriculture. Both from the survey results and model fitting results, total mechanical power makes little contribution to agricultural output value, but in future agricultural development, the mechanical power input can not be ignored. We should also take into account that the traditional family operation in China's agriculture has made the land fragmentation become serious, impeding the mechanization implementation. This requires Hohhot to on the one hand strengthen the building of farm machinery public facilities in the future development of agriculture, and on the other hand promote small-scale farm machinery to adapt to agricultural production based on the characteristics of small and medium-sized peasant households, and vigorously improve agricultural mechanization level.

The remaining production inputs include the technological input, and the contribution rate of technological progress is

3 Advantages and disadvantages and development ideas of buckwheat tea

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Compared with traditional tea, buckwheat tea has high content of flavonoid. Besides, it is unique fragrance and free of caffeine, so it is extremely suitable for people with 3H (hypertension, high blood cholesterol, and high blood sugar) symptoms and those suffering from insomnia. At the same time, however, the buckwheat tea available in the market at present still has following drawbacks:

- (1) There is no uniform production standard and considerable difference exists in the same type of buckwheat tea produced by different companies;
 - (2) The taste is insipid;
- (3) The nutrient content is single and major attraction point lies in richness in rutin:
- (4) There is no difference in grade of products, and the price generally depends on package.

In line with the above situations, the buckwheat tea industry in Liangshan Prefecture should formulate uniform production standard. Besides, it is recommended to improve nutritive value of buckwheat tea using accumulation feature of γ – aminobutyric acid and D-chiro inositol in the sprouting process of buckwheat and the decomposition of buckwheat compound protein, and improve the taste of buckwheat tea using the feature that rutin can be decomposed into Quercetin by β – D – Glucosidase.

35.69%, indicating that we should pay attention to the technological input in the future development of agriculture. From simple correlation analysis, we also know that the material input makes smaller and smaller contribution to agricultural development. Agricultural science and technology innovation is the inevitable choice for the future development of sustainable agriculture in Hohhot. Hohhot should enhance the ability of technological innovation in agriculture^[6], strengthen ties with major universities, timely promote agricultural research results, increase the introduction of superior varieties in agriculture, and increase agricultural science and technology content.

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