

Current Situation and Prospect of Vegetable Processing Industry in Guangxi

Li Li^{1, 2}, Xinming^{1, 2}, Li Changbao^{1, 2*}, Sun Jian^{1, 2}

¹Institute of Agricultural Products Processing, Guangxi Academy of Agricultural Sciences, Nanning 530007, Guangxi, China

²Key Laboratory of New Technologies for Fruit and Vegetable Storage and Processing, Nanning, 530007, Guangxi, China

Keywords: Vegetables; Processing Industry; Current Situation; Prospect

Abstract: In order to promote the development of vegetable processing industry in Guangxi and improve the economic benefits of vegetable industry. By introducing the present situation of vegetable processing and production level in Guangxi, the present situation of vegetable processing industry in Guangxi was briefly introduced. The problems and solutions in the processing industry are proposed, and the vegetable processing industry in Guangxi is expected.

1. Introduction

China's vegetable processing industry has made considerable progress in recent years. As an important link of vegetable production, vegetable processing is also a key link of vegetable industrialization. It is an important carrier for the transformation, promotion and expansion of vegetable industry. Its rise and fall not only affects the integrity and efficient operation of the entire vegetable industry chain, but also vegetable. Vegetable-producing areas and important support for new rural construction in urban suburbs [1-2]. Guangxi and Hainan, Guangdong, Fujian and other provinces belong to the south and southwest winter and spring vegetable advantage areas. The development of autumn and winter vegetables has unique conditions and obvious advantages. Guangxi has become an important production base for autumn and winter vegetables and a "Southern Vegetable North" base [3]. This paper describes the current production status of the vegetable processing industry in Guangxi, aiming to promote the healthy, rapid and orderly development of the vegetable industry in Guangxi.

2. Current Situation of Vegetable Production in Guangxi

The scale of vegetable industry in Guangxi has increased steadily in recent years, and the vegetable varieties and planting regional planning and layout have been continuously optimized. It has become the most important vegetable production base of "South-to-North Vegetable Transport" and the largest open-field vegetable production base in autumn and winter in China. In 2017, the planting area of vegetables was 19.72 million mu, the output was nearly 30 million tons, and the output value was 70 billion yuan. The edible fungus planting area was 225,000 mu, the total output of fresh products was 1,286,400 tons, and the output value was 11.526 billion yuan. There are 224 edible fungus production and processing enterprises, cooperatives, and family farms, an increase of 96 from 128 in 2015, an increase of 75% [4].

At present, the vegetable industry has achieved certain results in the stable expansion of perennial production bases, selection and improvement of new varieties, introduction and screening of excellent new varieties, promotion and application of applicable technologies, scientific and technological support and quality supervision, brand building and publicity, such as vegetable production. According to the requirements of per capita annual vegetable area of urban population of 0.03 mu, the base construction will be promoted. Since 2016, Guiqing No.1 and No.2 cucumbers, Guiyou No.8 and Guiyou No.12 melons have been selected. Baiyun No. 6 Yuner has more than 30 new varieties with independent intellectual property rights. It integrates and demonstrates a number of green prevention and control technologies, such as "applying grafting cultivation techniques to

overcome obstacles of vegetable continuous cropping”, “water and fertilizer integrated drip irrigation under film” and “water, fertilizer and medicine integrated application technology”. It innovates and integrates demonstration and popularizes rice ear (mushroom) rotation and “straw”. Advanced production technologies and ecological circulation modes such as mushroom production-fungus chaff returning to farmland and sugarcane-cow-mushroom have achieved outstanding results in promoting the reform of agricultural supply-side structure, increasing farmers' income and eliminating poverty. They have become the highlight industries of agricultural efficiency, increasing farmers' income, increasing rural greening and promoting ecological circulation agriculture [5].

Table 1 Layout of Key Industries in Vegetable Processing Industry

Key Construction	Layout scope
Beibu Gulf Industrial Belt	Focus on developing superior vegetables for foreign exchange earning in Nanning, Qinzhou, Beihai, Fangcheng and Yulin
Youjiang River Basin Industrial Belt	Focus on Developing Superiority Vegetables of Baise Outward-mixing in Autumn and Winter
Hunan-Guangxi Corridor Industrial Belt	Emphasis should be placed on the development of off-season vegetables from Liuzhou, Guilin and visitors in summer and Autumn
Industrial Belt of Xijiang River Basin	Focus on the Development of Vegetable Baskets in Guigang, Wuzhou and Hezhou

3. Current Situation of Vegetable Processing Industry in Guangxi

Vegetable processing refers to the process in which vegetables are used as raw materials, after cleaning, peeling, slicing (or without peeling, slicing) and blanching pretreatment, different processing methods are used to produce various products. Vegetable processing is an important means to ensure a bumper harvest of agriculture. It is an important link in the production, sales and consumption of raw materials. It can adjust the regional and seasonal production, and achieve annual supply. It can also improve the flavor of products and realize the comprehensive utilization of raw materials. At present, in addition to the production of fresh vegetables in Yunnan, processed vegetables include pickled vegetables, dried vegetables, frozen vegetables, canned vegetables, vegetable juices, sugar vegetables and clean vegetables [6-8].

3.1 Raw vegetables

Vegetables sold in Guangxi are mainly fresh, with processing capacity less than 5% of the total. Vegetables sold in Guangxi include leafy vegetables, melons and fruits, tubers, root vegetables, pods, fungi, etc. Due to the limited shelf life of fresh vegetables, it is not conducive to long-distance transportation, and there are fewer companies that are bigger and stronger.

3.2 Fresh-cut vegetables

Fresh-cut vegetable refers to fresh vegetable as raw material. After pretreatment, cleaning, segmentation, disinfection, removal of surface water, packaging and other treatments in a clean environment, it can change its shape but still keep fresh and be transported by refrigeration.

Vegetable products with stereotyped packaging that are sold in refrigerators [9]. Fresh-cut vegetables are divided into ready-to-eat fresh-cut vegetables and ready-to-use fresh-cut vegetables. The ready-to-eat index finger can be directly eaten without cooking, heating or other sterilization. Ready-to-use (non-ready-to-eat) refers to the use of cooking heating without further cleaning. Fresh cut vegetables are clean, safe, nutritious, hygienic, fresh, easy to eat, and have an edible rate of up to 100%. With the acceleration of living standards and rhythm, consumers will be welcomed by the fast food industry. In recent years, influenced by foreign fast food, Chinese fast food has developed rapidly. The Chinese food and beverage industry, such as Chinese fast food, hot pot and central kitchen, need a lot of fresh cut vegetables, especially fresh cut vegetables. More than 80% of the

fresh cut vegetables needed for Chinese food and beverage are ready-to-use fresh cut vegetables. Therefore, in the future, the fresh-cut vegetable processing industry will surely develop rapidly, and the types and quantities of demand will increase rapidly. The entire industrial chain will usher in a leap-forward development opportunity. At present, there are fewer enterprises in Guangxi for processing vegetables.

3.3 Pickle

Pickled vegetable refers to the product which is processed by infiltrating salt into vegetable tissues, selectively controlling microbial fermentation and adding various ingredients. It can be divided into fermented pickled vegetable and non-fermented pickled vegetable. Fermented pickled vegetable includes pickled vegetable and acid, and non-fermented pickled vegetable includes pickled vegetable (pickled vegetable, pickled vegetable). Pickles and sweet and sour vegetables [10]. Pickled cucumber skin is a traditional flavor food in Qinzhou, Yulin and other places in Guangxi, and it is a kind of food that people love very much [11].

3.4 Dried vegetables

Drying is a general term for drying and dehydration. Drying vegetable refers to vegetable raw materials after pretreatment, natural drying or artificial drying to increase the concentration of soluble substances to the extent that microorganisms are difficult to use [11]. According to the different drying methods, it can be divided into dried vegetables (AD vegetables), freeze-dried vegetables (FD vegetables), vacuum dried vegetables (VD vegetables), vacuum low temperature dried dehydrated vegetables (VF vegetables). According to the shape of dried vegetable products, it can be divided into Tablets, strips, silk, granules, powder, and the like. Dried chili, bitter melon, cabbage, coriander, ginger, garlic, radish, tomato, broccoli, etc.

3.5 Quick-frozen vegetable

Vegetables must be frozen in the center temperature within 30 minutes, from - 1 to - 5 and then to - 15 C. Frozen vegetables that can reach or exceed this speed are called quick-frozen vegetables [12]. The main processed products include quick-frozen corn, quick-frozen beans, and quick-frozen fungi.

3.6 Vegetable canning

Vegetable Canning is a method of vegetable preservation, in which vegetable raw materials are pretreated and sealed in containers or bags, and most microbial vegetative cells are killed by sterilization process. Vegetable canning can be preserved at room temperature for a long time under the condition of keeping airtight and vacuum [13]. The main products of Guangxi vegetable cans include fungi and a range of chili products.

3.7 Vegetable juice

Vegetable juice is obtained directly from fresh vegetables by pressing or other methods without adding any foreign substances [14]. At present, there are few enterprises that process vegetable juice in Guangxi. The main products are tomato juice, pumpkin juice, and carrot juice.

3.8 Problems in Vegetable Industry in Guangxi

At present, there are the following difficulties and problems in the development of vegetable industry in Guangxi. First, the construction standard of production base is low. Infrastructure construction needs to be improved and matched, and poor soil needs to be improved, which makes open-air vegetable production weak in response to natural disasters, and the phenomenon of “feeding on the sky” is widespread. Secondly, post-harvest commercialization should be strengthened. Vegetable post-harvest commercial treatment facilities are inadequate, and many vegetable bases do not have pre-cooled storage, storage and post-harvest commercial treatment facilities, resulting in high loss rate of vegetable decay. The third is less processing and lack of well-known brands. The processing variety and processing volume are small, the processing ratio is

low, the vegetable road products are numerous, the brand building is lagging behind, and the influence and competitiveness are not strong. Fourth, the degree of industrialization needs to be improved. Vegetables are mainly farmer households, with more concurrent operations, less franchise, more small-scale operations, less modest scale operations, fewer farmers' cooperative organizations and vegetable leading enterprises, and most cooperative organizations and leading enterprises and farmers cooperate in the initial stage. The operational mechanism needs to be improved and the investment in science and technology needs to be increased.

4. Development direction

4.1 Strengthening the Construction of Special Raw Material Base

We will further strengthen the construction of the bases for the transportation of Southern vegetables to the north and for the transportation of Western vegetables to the east, and accelerate the development of vegetable facilities; build demonstration bases for the production of standardized edible fungi such as *Agaricus bisporus*, *Lentinus edodes* and *Auricularia auricula*; actively build professional supply bases for local cultivation substrates; and support the construction and improvement of edible fungi factory production enterprises to carry out annual growth. Introducing and demonstrating new excellent vegetable and edible fungus varieties. Improve the resources of alien germplasm; promote the construction of intensive seedling bases, actively transform and promote the application of standardized and green production technologies, and expand the vegetable cultivation area of “three products and one standard”.

4.2 Vigorously Develop the Preliminary Processing of Vegetable Origin

Focus on promoting post-natal pretreatment and processing technology focusing on pre-cooling, fresh-keeping and transportation, promoting the construction of auxiliary facilities and equipment such as Tiantou pre-cooling, storage and fresh-keeping, cold chain logistics, and improving product efficiency and added value; Encourage new business entities such as cooperatives and enterprises to develop processing lines such as washing and dewatering, sorting and grading, and blanching in the main producing areas to produce dehydrated, quick-frozen, fresh-cut, ready-to-eat vegetables and other products.

4.3 Focus on Fostering Food Processing Enterprises

To build a complex enterprise from primary processing to intensive processing of food, health care, cosmetics, medicine, etc., improve product circulation efficiency through information exchange and resource sharing within the industry, enrich processing products with vegetable resources, develop and produce beverages, powder, leisure food, health food and other processed products; Guide the application of “Internet +”, improve the integration level of production and marketing of vegetables and edible fungi, support the establishment of a traceable quality control system for planting, logistics processing and sales; promote the comprehensive utilization of by-product resources such as rapeseed meal and bacillary dysentery.

4.4 Promoting the Establishment of Guixi Vegetable Brand

Strengthen the work of “three products and one standard” of vegetables, create a number of geographical indications products; excavate history and culture, cultivate Gui series exquisite products with national characteristics and organic ecology, such as Baise Yun'er and Zhuangjiamushroom; broaden circulation channels and promote brand sales; With the help of the famous special agricultural products fair, China-ASEAN Expo and other platforms for publicity and promotion, expand the influence of the vegetable brand of Guizhou, and form a brand advantage.

4.5 Establishment of Vegetable-based Industrial Park

Making full use of the ecological environment resources of the vegetable industry base, developing new varieties cultivation, new agricultural facilities and high-tech demonstration, and exploring a new mode of vegetable production ecological cycle combined with aquaculture. To

achieve a variety of industrial forms such as vegetable production science, agronomic display, and processing product sales.

5. Prospect

Guangxi shoulders the historic mission of building a radiation center facing South Asia and Southeast Asia in China. The province should take key counties (districts) as a demonstration, take accelerating the transformation of the development mode of vegetable industry as the main line, take physical efficiency as the main direction of attack, improve the market and cold chain logistics facilities, develop diversified and intensive processing products, and cultivate and strengthen them. Leading enterprises should give full play to the role of leading enterprises, build a five-in-one development model of “company + base + standardization + brand + market”, and strengthen the brand construction of “Guicai”. According to the domestic and international market demand, we should vigorously develop pollution-free, green, organic vegetables and processed products, improve product quality, reduce costs, improve market competitiveness, and promote the development of Guangxi vegetable industry.

Acknowledgement

Special funds for innovation-driven development in Guangxi (No: Guike AA17204042); National Key Research and Development Program (No. 2018YFD0401301); In 2014, the National Organization Department's “Ten Thousand People Plan” Youth Top-notch Talent Project (Group Office Zi [2015] No.48); Eight Gui Scholars' Project Special Funds ([2016]21); Basic Scientific Research of Guangxi Academy of Agricultural Sciences Business Fee Project (Guinongke 2015YT86; Guinongke 2018YM04; Guinongke 2018YT27).

References

- [1] Zhao Xiaoyan. Present situation and Prospect of vegetable postharvest processing industry in China [J]. Chinese vegetable, 2013 (03): 1-5.
- [2] Han Bing. Analysis of the present situation of vegetable processing industry organization in China [J]. Rural Economy and Technology, 2011,22(10): 123-124.
- [3] Kang Dexian, Jiang Yaqin, Gan Guiyun, Li Jianyong, Mo Yongcheng, Wu Yongguan, Wang Yikui, Lu Fashi, Li Yan, Li Wenjia. Current situation and Countermeasures of suburban vegetable industry in Guangxi [J]. Changjiang vegetable, 2018 (09): 4-7.
- [4] Wei Rongmin. Reflections on the transformation and development of vegetable industry in Guangxi [J]. Guangxi Agricultural Journal, 2017,32(02): 42-45+56.
- [5] Huang Qilin, Zhou Ziyuan. Empirical Study on the Influencing Factors of Vegetable Export in Guangxi [J]. Science and Technology Economic Guide, 2017 (35): 187.
- [6] Zhang Xuejie, Wang Jinyu, Fang Zhiyuan. Current situation of vegetable processing industry in China [J]. Chinese vegetables, 2007 (04): 1-4
- [7] Danyang. Current situation and development strategy of fruit and vegetable processing industry in China [J]. Chinese Journal of Food Science, 2010,10(01): 1-9.
- [8] Ouquan. Current situation and development of fruit and vegetable processing industry in China [J]. Agricultural Engineering Technology (Agricultural Products Processing Industry), 2009 (09): 28-29.
- [9] Mao Linchun, Fang Xuefa. Key Processing Technologies of Pure Vegetable and Their Application Status and Development Trend [J]. Preservation and Processing, 2003 (04): 1-3.
- [10] Ji Xiaoxiang, Ruan Hui, Fan Qiliang. Current situation and development direction of vegetable

fermentation in China [J]. Modern Food, 2016 (24): 18-20.

[11] Jiang Zhenwu, Liu Xiaoling. Study and Analysis on heavy metal index of pickled cucumber peel in Guangxi [J].Light Engineering Technology, 2016,32(07): 6-7.

[12] Yu Yang, Qi Yanlong, Xu Yanwen, Zhang Yijie, Songyu, Song Fangfang. Current situation and existing problems of frozen vegetables in China [J]. Processing of agricultural products, 2018 (24): 86-87+90.

[13] Niu Guangcai, Meng Xianjun, Zhou Liping. Present situation and development prospects of fruit and vegetable processing in China [J]. Grain and oil processing and food machinery, 2003 (02): 61-62+65.

[14] Ouquan. Current situation and development of fruit and vegetable processing industry in China [J]. Agricultural Engineering Technology (Agricultural Products Processing Industry), 2009 (09): 28-29.