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Industry Development Status and Prospect of *Cinnamomum longepaniculatum*

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Abstract

Cinnamomum longepaniculatum is mainly produced in Yibin, Sichuan, and is a unique natural spice tree species in China. The *Cinnamomum longepaniculatum* oil extracted from branches and leaves is internationally known as "China Eucalyptus Oil" and has high economic value. *Cinnamomum longepaniculatum* is an important timber and economic tree species in the subtropical evergreen broad-leaved forests of China. 1,8-eucalyptus oil, linalool and natural borneol are important export products in *Cinnamomum longepaniculatum* leaf oil, they are also the main raw material for medicine, fragrance and daily chemical industry. This paper mainly discusses the current situation and development of cultivation, the utilization of *Cinnamomum longepaniculatum* oil products, the problems existing in the current development and the future development and expectation of *Cinnamomum longepaniculatum*, which can provide reference for driving the development of the whole industry and promoting the development of the local economy.

Subject Areas

Agricultural Science

Keywords

Cinnamomum longepaniculatum, Development Status, Utilization Value, Prospect

1. Introduction

1.1. Research Background

Cinnamomum longepaniculatum (Gamble) N. Chao belongs to Lauraceae, with

a height of 20 m and a DBH of 1m. It is mainly distributed in Sichuan and common in evergreen broad-leaved forests. Yibin, Sichuan is the main producing area of *Cinnamomum longepaniculatum* in China, with an area of 31,330 hm^2, and the industry of *Cinnamomum longepaniculatum* has become one of the city's leading industries and a "cash cow" for local farmers [1]. There are many ways to use *Cinnamomum longepaniculatum*, and the most important one is to extract the essential oil of *Cinnamomum longepaniculatum*, which has also brought great benefits to the local villagers and driven the economic development of Yibin City.

1.2. Status of Previous Research

However, the current development of the *Cinnamomum longepaniculatum* industry has encountered bottlenecks in production, planting, processing and market constraints, with low comprehensive benefits, and an unclear direction [2]. In Yibin, the processing method of *Cinnamomum longepaniculatum* is still relatively backward, mainly family workshops, and no large-scale factory processing has yet been formed, which poses a certain threat to the utilization efficiency of *Cinnamomum longepaniculatum* and the harm of environmental pollution.

The current processing technology of camphor oleifera is not yet mature, and the existing method of extracting essential oil of camphor oleifera also makes the residue of *Cinnamomum longepaniculatum* cannot be fully utilized, thereby causing waste of resources, and causing certain pollution to the environment at the same time. There is still a shortage of technical talents and insufficient government policy support in the oil *Cinnamomum longepaniculatum* processing industry. This needs to be adjusted and changed in a timely manner, and requires the intervention and support of the government.

1.3. The Problem to Be Solved

In order to promote the development of *Cinnamomum longepaniculatum* industry, there are many studies on *Cinnamomum longepaniculatum*, mainly the extraction of *Cinnamomum longepaniculatum* oil and the utilization of some other ancillary products. This article gives an overview of the current development of the *Cinnamomum longepaniculatum* and the future development prospects, hoping to promote the development of the *Cinnamomum longepaniculatum* industry. The current processing methods of family workshops can no longer meet the development of *Cinnamomum longepaniculatum*, in order to solve the problems of immature processing technology, lack of technical guidance talents and changes in processing forms in the *Cinnamomum longepaniculatum* processing industry, large-scale processing plants are required for processing. At the same time, there must be a good residual recovery or reuse system to reduce environmental pollution, improve the utilization rate of oil *Cinnamomum longepaniculatum*, and achieve the goal of green environmental protection.

2. Development Status of *Cinnamomum longepaniculatum*

Cinnamomum longepaniculatum in China is mainly distributed in Yibin City, Sichuan Province. The reserve of improved varieties of *Cinnamomum longepaniculatum* is mainly the cultivation of seed seedlings and clonal seedlings of improved varieties [3]. Yibin, Sichuan Province is the main producing area of *Cinnamomum longepaniculatum* in China, known as the "Kingdom of *Cinnamomum longepaniculatum*". Yibin has about 33,000 hectares of *Cinnamomum longepaniculatum*, accounting for 85% and 65% of Chinese and global *Cinnamomum longepaniculatum* resources, respectively. The local *Cinnamomum longepaniculatum* is also known as "Yibin *Cinnamomum longepaniculatum*".

2.1. Current Status of Cultivation

The current status of cultivation is not very good, only good *Cinnamomum longepaniculatum* can be processed into good products. At present, the cultivation techniques for *Cinnamomum longepaniculatum* mainly include the seed cultivation technology and the cutting propagation technology. Among them, the seed cultivation technology is not only to effectively carry out field management during the seedling stage, but also to control the growth of lateral buds within 2 m of the sapling height. The strategy of breaking off lateral branches can be adopted to reduce nutrient loss and promote the growth of good canopy, trunk, and main shoot. The rooting types of cutting propagation include skin rooting type and healing rooting type. Most of them are suitable for cutting in spring. The cutting rooting of *Cinnamomum longepaniculatum* is a healing rooting type, and the comprehensive effect of cutting is easily affected by several aspects [4]. In a word, by establishing a good base and carrying out various researches such as vegetative propagation technology, we can gradually expand the planting range of *Cinnamomum longepaniculatum*, and continuously promote the development scale and industrial production [5].

2.2. Status of Processing Industry of *Cinnamomum Longepaniculatum*

So far, there is no large-scale and standardized processing factory in the processing industry of *Cinnamomum longepaniculatum*. It is mainly processed in the form of family workshops [6]. This has certain restrictions on the development of *Cinnamomum longepaniculatum* processing industry without standardized processing workshops and corresponding technical guidance, there are still many technical deficiencies in the processing of *Cinnamomum longepaniculatum oil*, and it also causes a waste of resources. At the same time, there is also a phenomenon that the processing depth is not enough in the *Cinnamomum longepaniculatum* processing industry. The current processing technology only stays on the extraction of the essential oil of *Cinnamomum longepaniculatum* leaves, and the processing of the subsidiary products of *Cinnamomum longepaniculatum* has not been further developed.

At present, there is still the phenomenon of littering processing residues in *Cinnamomum longepaniculatum* processing industry, which has caused great harm to the environment. At the same time, the management of the government is not enough. The government should standardize the disposal methods and methods of the residues of *Cinnamomum longepaniculatum* processing. At the same time, it should increase the support for the *Cinnamomum longepaniculatum* industry, and promote the development of the industry through various policies and systems.

3. Utilization Status of *Cinnamomum longepaniculatum*

3.1. Extraction of *Cinnamomum longepaniculatum* Oil

Cinnamomum longepaniculatum is an excellent plant for both wood and medicinal purposes. Scholars have done some basic research on the chemical composition, extraction and preparation of essential oil and its physiological functions, and have achieved remarkable results [7]. There are also many methods for the extraction of *Cinnamomum longepaniculatum* essential oil, among which enzyme-assisted solvent extraction, enzyme-assisted steam distillation, enzyme-assisted simultaneous distillation extraction, supercritical carbon dioxide extraction is the main method we use when extracting essential oils from *Cinnamomum longepaniculatum* [8]. *Cinnamomum longepaniculatum* extract can block the division of human liver cancer BEL-7402 cells in G0/G1 phase and S phase, and induce apoptosis of BEL-7403 cells [9]. Some studies believe that the enzyme-assisted simultaneous distillation and extraction method can efficiently extract 1,8-eucalyptol, the main component of eucalyptus leaves. And the essential oil extracted by this method has better inhibitory and bactericidal effects on Escherichia coli and Staphylococcus aureus.

At the same time, *Cinnamomum longepaniculatum* oil also has analgesic, antibacterial, diuretic, insecticidal, wound treatment, and other functions. In general, *Cinnamomum longepaniculatum* oil plays a great role, has many benefits to our human body, and there are many studies on the extraction of *Cinnamomum longepaniculatum* oil [10] [11].

3.2. Utilization of the Residues of *Cinnamomum longepaniculatum* Branches and Leaves

At present, the development of *Cinnamomum longepaniculatum* is mainly based on the extraction of essential oils and the utilization of its by-products, and the research content is lesspment Status, which limits the development of *Cinnamomum longepaniculatum* industry to a certain extent. After the essential oil is extracted from *Cinnamomum longepaniculatum* leaves, the rigid structure of the cells is destroyed, and the remaining macromolecular skeletons such as cellulose, hemicellulose and lignin still maintain the porous structure. In the industrial extraction process, some unextracted small molecular substances will remain. The residues of *Cinnamomum longepaniculatum* oil extraction often have pungent odor

due to residual volatile substances, so most of them are discarded, which not only causes environmental pollution, but also wastes resources [12] [13] [14]. Therefore, the reuse of biomass waste extracted from *Cinnamomum longepaniculatum* branches and leaves can realize the multi-level green and pollution-free comprehensive utilization of *Cinnamomum longepaniculatum* resources, meet the requirements of contemporary green environmental protection chemistry, and is of great significance to maximize the benefits of *Cinnamomum longepaniculatum* resources and the sustainable development of green environment.

In addition, incineration, landfill, and biotransformation are the main methods to deal with industrial waste, but incineration and landfill are very harmful to the environment, so it is generally not recommended to use this method for industrial waste treatment. Compared with conventional methods, the prospect of pyrolysis to biomass is more promising. Pyrolysis conversion refers to the thermal degradation of biomass by chemical process under certain temperature conditions, and the degradation of macromolecular compounds into substances with smaller molecular weights, which can produce chemical products such as fuels and other technical means [9] [15]-[20]. By comparing various methods of industrial waste treatment, it can be known that using the method of pyrolysis conversion to treat the extraction residue of *Cinnamomum longepaniculatum* can maximize the use of renewable resources and reduce environmental pollution.

4. Problems and Countermeasures in the Development of *Cinnamomum longepaniculatum*

4.1. The Processing Technology of *Cinnamomum longepaniculatum* Is Backward and the UtilizationRate Is Low

Cinnamomum longepaniculatum is the main economic tree species in Yibin, and it is also the "cash cow" of the local villagers, but the processing technology of *Cinnamomum longepaniculatum* is relatively backward. *Cinnamomum longepaniculatum* oil production and processing equipment is simple, mainly family-style workshops, and there are few centralized processing points for *Cinnamomum longepaniculatum* crude oil. This results in a very low utilization rate of the *Cinnamomum longepaniculatum*, and causes a lot of waste. The branches and leaves of the *Cinnamomum longepaniculatum* cannot be deeply processed, resulting in a part of the essential oil could not be completely extracted.

At the same time, the utilization rate of the residue after extracting the essential oil from *Cinnamomum longepaniculatum* is also low, according to statistics, nearly 300,000 tons of waste leaf residues are produced every year after processing steam oil [13], which not only pollutes the environment, but also wastes resources. For the shortcomings of the backward technology of *Cinnamomum longepaniculatum* technicians, measures should be actively taken to rectify them, and the existing processing methods can be changed, instead of family workshop-style processing, instead of professional factory-style processing. At the same time, it is

necessary to introduce many technical personnel to guide it.

4.2. The *Cinnamomum longepaniculatum* Species Is Single and the Planting Area Is Small

It is necessary to expand the planting area of *Cinnamomum longepaniculatum* and to enrich the varieties of *Cinnamomum longepaniculatum* species, so saplings are needed; to raise seedlings, there must be tree seeds. However, in the past, the predatory picking of *Cinnamomum longepaniculatum* leaves and the cutting down of trees and digging pockets to extract sassafras oil resulted in the lack of mother trees, so it was difficult to collect tree seeds [21]. Therefore, we should proceed from the existing conditions, adopt the optimal extraction method to extract essential oil from *Cinnamomum longepaniculatum*, and at the same time pay attention to protecting the *Cinnamomum longepaniculatum* tree so that it will not be damaged, and also carry out certain research on the cultivation of *Cinnamomum longepaniculatum*, let professional personnel carry out the work of raising *Cinnamomum longepaniculatum* seedlings, and the government needs to give certain financial support to speed up the selection and breeding of fine varieties and realize modern management.

The *Cinnamomum longepaniculatum* can be planted in a centralized manner, and professional personnel can provide technical guidance, which can facilitate the management of the *Cinnamomum longepaniculatum* trees, and can also greatly improve the quality and survival rate of *Cinnamomum longepaniculatum*. While expanding the planting area of *Cinnamomum longepaniculatum*, the varieties of *Cinnamomum longepaniculatum* are also increased, realizing a variety of choices, and improving the utilization rate.

4.3. It Is Urgent to Develop Essential Oil Products and Improve Added Value

Like the spice plants such as Camphor, sassafras, and cedar, there are some key technologies and common technologies that have not yet been resolved in the utilization of non-wood resources of *Cinnamomum longepaniculatum*. The extraction of *Cinnamomum longepaniculatum* essential oil is still in an extensive state, the storage and pretreatment of raw materials are too simple, and there is a lack of technical support for the research on the influence of different pretreatment time and methods on the yield of essential oils and the content of main components. In the deep processing of essential oils, there are problems of insufficient deep processing capacity and low technical level. Therefore, we urgently need to carry out the key technology research and equipment development of essential oil extraction, separation, and deep processing, so as to provide technical support and lay the foundation for industrial development. There is also an urgent need to develop high value-added products of essential oils, thereby enhancing the economic and scale benefits of the industry.

We also need to make full use of the residue after the essential oil extracted from

Cinnamomum longepaniculatum, so as to improve the utilization efficiency of *Cinnamomum longepaniculatum*, increase the added value of *Cinnamomum longepaniculatum*, and reduce the waste of resources. For the development of essential oil products, we can carry out in-depth development for its medicinal value, and strive to develop products suitable for consumers.

4.4. Insufficient Government Support

In order to make full use of the scarce and advantageous resource of *Cinnamomum longepaniculatum*, and make a determination to expand and strengthen the industry, we should actively introduce intensive processing households, guide social capital to plant *Cinnamomum longepaniculatum*, and develop the output value of *Cinnamomum longepaniculatum* industry to more than 10 billion yuan through standardized planting, mechanized harvesting, large-scale production and market-oriented operation, so as to benefit the people. However, the government has not issued some specific relevant policies and systems or insufficient efforts, which make the interests of the *Cinnamomum longepaniculatum* planters and processors, have no certain protection, so it will be prohibitive.

Therefore, the government should increase its support for the *Cinnamomum longepaniculatum* industry, introduce relevant policies, invest a certain amount of funds, introduce relevant technical and management talents, promote the development of the *Cinnamomum longepaniculatum* industry, and then drive the development of the local economy.

5. Prospects

5.1. Processing of *Cinnamomum longepaniculatum* and Seedling Cultivation

Continuous improvement and innovation in the processing technology of *Cinnamomum longepaniculatum* to find the best processing technology. When cultivating oil *Cinnamomum longepaniculatum* seedlings, attention should be paid to the growth environment and required material conditions of the seedlings, and the optimal varieties should be cultivated for propagation and cultivation.

5.2. *Cinnamomum Longepaniculatum* Processing and Green Environmental Protection

The continuous improvement of *Cinnamomum longepaniculatum* processing technology can reduce the environmental pollution caused by the extraction of *Cinnamomum longepaniculatum*. At the same time, it is necessary to improve the system and operation of camphor oil processing, reduce the discharge of pollutants and improve the utilization rate of residues, so as to realize the concept of green environmental protection [22] [23] [24] [25].

5.3. Government Policy

The government should increase the support for the *Cinnamomum longepani-*

culatum industry, introduce relevant policies and systems, and carry out characteristic resource development based on local conditions and its own advantages, and carry out multi-faceted development to drive the development of the local economy.

5.4. *Cinnamomum Longepaniculatum* Processing and Personnel Training

The sustainable talent training system should be standardized, and the talent introduction strategy should be implemented. For the sustainable development of the *Cinnamomum longepaniculatum* industry, new vitality must be continuously injected, innovation and experimentation are required, and many modern and knowledgeable young people are required to display their talents, so the cultivation of talents is very important.

6. Conclusion

To sum up, this paper discusses the extraction of essential oil, the utilization of residues, the processing technology, and the development. It is hoped that by establishing and improving the technical personnel training and talent introduction system, it will provide technical guidance for the processing of *Cinnamomum longepaniculatum*, and speed up the development process of the *Cinnamomum longepaniculatum* industry. At the same time, it is hoped that the government can increase the support for the *Cinnamomum longepaniculatum* industry and inject new vitality into the development of the *Cinnamomum longepaniculatum* industry.

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Conflicts of Interest

The authors declare no conflicts of interest.

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