

*Review*

## New vitality of ancient ethnomedicine in China: Review of Li ethnomedicine

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Nowadays, with the development of nature drug, herbal medicine is gaining more attention from scientists in various countries. In China, ancient ethnomedicine based on natural medicinal plants faces new opportunities and challenges. This paper examines Li ethnomedicine, which has not attracted much attention among researchers yet. Four special species, which had important significance for modern research and were very helpful for treating modern diseases, such as cancer, cardiovascular, and cerebrovascular disease, were selected for a concrete analysis from the perspective of function, economic value, developmental potential, and industrial base in order to introduce the Li ethnomedicine to the world. The development status and main problems of Li ethnomedicine were summarized and discussed for further study.

**Key words:** Li ethnomedicine, function, economic value.

### INTRODUCTION

Natural medicine appeared with the existence of human society. Before the eighteenth century, it provided the main therapeutic agents for human diseases. With the rapid development of modern medicine and the chemical pharmaceutical industry in the nineteenth century, natural medicine gradually fell by the wayside, especially in the west. In fact, the active ingredients of natural medicine or retrofitting its structure to get new chemicals have always been one of the most important sources of chemical medicine. In recent years, developed countries had shifted their research focus to the natural medicinal plants, indicating that herbal medicine is gaining more and more attention among scientists from various countries. This shift also brings new opportunities and challenges to the exploitation and development of ancient medicinal herbs in China. This paper examines Li ethnomedicine and a few special species were selected for deeper study. The development status and main problems of Li ethnomedicine are summarized and discussed for further study.

### OVERVIEW OF LI ETHNOMEDICINE

#### Representative plants of Li ethnomedicine

The Li people have lived in Hainan for more than 3,000 years and were the earliest ancestors to live on the island. As a minority population with more than 100 million people (Haofu and Wenli, 2008), the Li people have struggled with diseases for thousands of years and formed a unique set of medical theories and clinical experience using local herbs with significant regional and national characteristics, that are very different from the traditional Chinese medicine (Bingchun et al., 2007).

Most of the Li population on Hainan traditionally lived in mountainous area, which is rich in flora and fauna, with poisonous insects and snake everywhere and terrible traffic conditions (Junqing et al., 2009). As a result, the Li drugs have obvious geographical features. The Li pharmacy introduction (Mingsheng, 2008), includes 128 kinds of Li drugs; one sixth of them are for the treatment

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of bone injury, such as *Gendarussa vulgaris* Nees (Weijing et al., 2011) and *Croton crassifolius* Geiseler (Xianhui, 2009); while one tenth are for hepatitis, such as *Eudia lepta* (Spreng.) Merr (Changyu et al., 2012) and *Abrus mollis* Hance (Xiaobai et al., 2010). In addition, 8 are used to treat snakebites (e.g. *Ervatamia hainanensis* Tsiang (Xingqi, 2003)); 8 are used for cirrhosis ascites (e.g. *Brucea javanica* (Linn.) Merr. (Haifeng et al., 2012)); 7 for infertility (e.g. *Cyrtomium fortunei* J. Sm. (Junqing, 2009)); 6 are used for nephropathy (e.g. *Drynaria fortunei* (Kunze) J. Smith. (Long et al., 2005)); 4 are used for inflammation (e.g. *Ficus pumila* L.) (Junqing et al., 2009). The drugs are administered externally, orally, through fumigation and by carrying them (A kind of way to carry some particular drugs with small bag).

Recent studies have found that, besides the remarkable effect in the treatment of snakebites and bruises, Li drugs also have very significant effects as anti-inflammation and anti-tumor drugs, especially leukemia, and may provide a new therapeutic approach for cancer, hepatitis, rheumatism, and other illnesses (Caicheng, 2007).

### Historical records

The Li nationality has no words of its own, which means it is difficult to record the concrete history and development exhibition of its medicine. But it can be traced from some monographs of Traditional Chinese Medicine. "An Account of the Plants and Trees of Southern China", written by Ji Han (Jin Dynasty, 265-420 AD), is the earliest botany literature in China. The book reproduces several species such as *Aquilaria sinensis* (Lour.) Gilg, *Dalbergia odorifera* T.C. Chen, *Alpinia oxyphylla* Miq., *Areca cathecu* Linn, *Cocos nucifera* Linn, *Saccharum officinarum* L. and many others. These varieties are produced in Hainan and have the same utilization with Li ethnomedicine.

"Findings in Lingnan Area", written by Liu Xun (Tang Dynasty, 618-907 AD), described the precious animals and plants in Lingnan area. In this book, some plants used by Li people as medicine are mentioned, such as dendrobe, olives, hawkbill. In 1950s, the Li ethnomedicine attracted the attention of Chinese government. The data of Li pharmacology were gathered and arranged. "Survey of Li nation in Hainan" was published in 1954, which documented the Li ethnomedicine specifically for the first time (Caicheng, 2007). The book "200 kinds of Chinese Herbal Medicine in Hainan" edited on the base of investigation in Hainan summed up 200 kinds of Chinese herbal medicinal materials which are used frequently by people. "Dictionary of Li nation in China" (Yingbo et al., 1994) recorded about 70 kinds of Li drugs.

Recently, two specialized books of Li ethnomedicine, "Li pharmacy Introduction" and "Records of Li Folk Medicine" were edited in 2008, which summarized more

than 100 kinds of Li drugs including the ingredient, usage, dosage, and treatment (Mingsheng, 2008; Haofu, 2008). Nowadays, the government of Hainan is paying more attention to the development of Li ethnomedicine. They have made many efforts in terms of the protection, mass production, and innovation in order to help this ancient ethnomedicine regain its vital activity.

According to this review of Li ethnomedicine and the concrete analysis of special medicinal plants as follows, we can see that although Li ethnomedicine is ancient, with a history dating back 3,000 years, it still has important significance for modern research. It is very helpful for treating modern diseases, such as cancer, cardiovascular, and cerebrovascular disease (Caicheng, 2007). Some of these medicinal plants are good for people's health and can be eaten daily.

### FOUR SPECIAL MEDICINAL PLANTS

This paper selects 4 species from 128 Li medicinal plants for deeper research: *Callicarpa nudiflora* Hook. & Arn., *Nauclea officinalis*, *A. oxyphylla*, and *Dracaena angustifolia* Roxb. These four species have the common feature of high added value and economic value, as well as great exploitation potential; they are also already used in drug production. In addition, although some are used in traditional Chinese medicine, they are used in different ways for the treatment of diseases in Li ethnomedicine (Table 1).

#### *C. nudiflora* (Luohuazizhu)

*C. nudiflora*, whose leaves can be used as medicine, is harvested in the summer and autumn and can be dried into powder from the plains to hills, valleys, streams and forests or bushes at an altitude of 1200 m located in Hainan, Guangdong, Guangxi. Wuzhishan in Hainan is the most appropriate place for growing it as it has the highest medicinal value. The *C. nudiflora* has an acerbic taste that is slightly spicy and bitter. Li people use it as anti-bacterial, anti-inflammatory, and hemostatic. As early as the Qin and Han dynasties, the Li people pounded the roots and leaves of *C. nudiflora* for external use on wounds or boiled them for oral administration to treat several diseases. The Li people regard *C. nudiflora* as precious and have used it for many generations.

In modern times, the *C. nudiflora* is used as an essential herb for healing by military soldiers in China. It is found that the *C. nudiflora* is very helpful for some modern diseases such as thrombus (Ying and Guocai, 2006), and can delay the process of decrepitude (Bin et al., 1995). Today, the market demand for this medicinal material is about 3,500 tons every year, with an average price of 2,500 yuan per ton and it is estimated that the demand will increase to 5,000 tons within two years,

**Table 1.** Comparison of four medicinal plants of Li ethnomedicine

Name	<i>Callicarpa nudiflora</i>	<i>Nauclea officinalis</i>	<i>Alpinia oxyphylla</i>	<i>Dracaena angustifolia</i>
Pharmacological property	Antithrombotic (Ying and Guocai et al., 2007), anti-inflammatory (Ying and Guocai et al., 2006), anti-aging (Bin et al., 1995).	anti-inflammatory, acesodyne (Liang et al., 2011), lower blood pressure (Jian et al., 2002), anti-virus.	anti-dementia (Dehuan et al., 2002; Hongmei et al., 2012), anti-diarrhea (Xinghua et al., 2009), anti-aging (Huiling et al., 2006), neuroprotective effect (Shui et al., 2006)	Anti-inflammatory analgesic (Yuli et al., 2010), anti-thrombosis (Nian et al., 2010), stop bleeding, anti-tumor (Wenli et al., 2005)
Clinical use	Bleeding(Jie et al., 2010), infectious diseases (such as respiratory tract infections), viral hepatitis (Jinping et al., 2012)	Acute tonsillitis, acute pharyngitis, acute conjunctivitis and upper respiratory tract infection, diabetes	Hyperactivity, insomnia, Older night urine, urinary frequency, sexual dysfunction, amnesia	Bruises, chronic hepatitis, whooping cough, bronchitis, tuberculosis, chronic tonsillitis, pharyngitis
Application in Li ethnomedicine	leaves, fruits: stop the bleeding	anti-inflammatory	fruit (dry milling): stop stomach pain	resin: throat dry pain
Li ethnomedicine production	Tablet, capsule, Suppository.	Injection, extract capsule, extract tablets(Yan and Yanli et al., 2012), wine.	Soft capsule, wine.	Powdered medicine, capsule.
Economical efficiency	Huge market demand	Low cost, high market demand	Extensive use	high added value products- dragon's blood

indicating a positive market preview.

Some enterprises have already found the commercial opportunities for *C. nudiflora* and have invested in planting and production, such as Luohuazizhu suppository, which have the indications as anti-inflammatory (Ying and Guocai, 2006), for detoxification, convergence, hemostasis, bacterial infection caused by inflammation, acute infectious hepatitis, and respiratory and gastrointestinal bleeding (Jie et al., 2010).

### ***N. officinalis* (Danmu)**

The *N. officinalis* is a kind of common drug used by Li people as anti-inflammatory drug. The modern research found that the main effects of *N. officinalis* included not only anti-inflammation, but also heat-clearing, detoxicating, and analgesia (Liang et al., 2011). It is used to treat acute tonsillitis, acute pharyngitis, acute conjunctivitis, and upper respiratory tract infection (Yan and Yanli, 2012), and has demonstrated extraordinary

efficacy on diabetes mellitus (Gidado, 2004).

The growth period of *N. officinalis* is 5 to 6 years. It has strong adaptability, good resistance, and great growth ability after cutting. It grows easily and has no serious pest problems (Zhiyuan et al., 2010). The planting of *N. officinalis* in Hainan has been formed to a certain scale. The *N. officinalis* has been planted on Wuzhishan up to 1000 acres and the investment has been more than 10 million RMB since 2003.

The present productions include Danmu injections, Danmu extract tablets, and Danmu extract capsules. In daily consumption, it can be made into Danmu wine. The *N. officinalis* is one of the representative species of large-scale production in Li ethnomedicine. It has good medicinal value and is edible.

### ***A. oxyphylla* (Yizhi)**

*A. oxyphylla* mostly grows on Hainan Island, because of the warm and humid environment. Its

flowering period is about 2 to 5 months, and the maturing period is 6 months. The medicinal part is its fruit. Wildlife resources have decreased since the 1950s, and the present products are cultivated versions. *A. oxyphylla* is very good for the cardiovascular system (Shoji et al., 1984) and gastrointestinal system (Yamahara et al., 1990; Kubo et al., 1995) and has a significant effect on the treatment of allergies (Kim et al., 2002) and cancer (Chun et al., 2002). The Li people made the fruit into powder to treat stomach pain (Mingsheng, 2008). One clinical study found that *A. oxyphylla* is effective in the treatment of diarrhea (Sakai et al., 1986), enuresis, hyperactivity, and insomnia (Hengliang et al., 2002).

Meanwhile, modern research has found that it contains a high amount of taurine (Junping et al., 2002), the "smart factor", and one of the essential nutrients for the body, especially for infants' growth and educational nourishment as well as for delaying aging among the elderly (Huiling, 2006). Its isolated compounds can be used as therapeutic agents for sexual dysfunction and

amnesia (Kubo et al., 1995). Therefore, *A. oxyphylla* has a strong potential as a health food.

Due to its short growth cycle and more and increased attention from the government, more farmers are planting *A. oxyphylla*.

### ***D. angustifolia***

*D. angustifolia* is distributed only along the coastal areas of Hainan Island. It has been shown to be 8,000 years to 10,000 years old. It grows slowly and is one of the national protected species. Its resin, which is known as "Dragon's blood" is used as medicine in many places and promotes a variety of pharmacological activities, including anti-inflammatory (Yuli et al., 2010), anti-fungal (Yodosuka et al., 2000), anti-arrhythmic (Nambu et al., 1989), anti-thrombotic (Nian et al., 2010), hemostatic (Dongxu, 2001), and wound healing (Ping et al., 2000; Dongxu, 2001). In recent years, compounds with anti-tumor activity (Wenli et al., 2005) have been isolated from it; these have shown an inhibition effect on the growth of nasopharyngeal carcinoma cells (Reddy et al., 1984), liver cells, and leukemia (Yodosuka et al., 2000). The Li people use the resin to treat throat pain (Mingsheng, 2008).

### **PROBLEMS**

Based on the literature review, some problems have been identified with Li ethnomedicine. First of all, the planting of Li medicinal material is still based on scattered plantings by farmers (Wang Yeqiao, 2006), making it difficult for standardized production and large-scale industrialization due to the lack of an effective quality standard system and monitoring (Yali et al., 2009). And the sustainable use of Li medicinal resources has become another outstanding problem. Due to the lack of collection, collation, purification, and rejuvenation of the herbal resources, some species have been over-harvested and leading to destruction of their ecological environment. Many wild medicinal resources with special effects, such as periwinkle, gall wood, and the leader of maple have been rapidly depleted or have altogether disappeared. The manufacturers that use these herbs as raw materials, such as the Periwinkle medicine, cannot produce them at full capacity.

Secondly, the Li nation has no writing system. The heritage of Li drugs relies on an oral tradition between teacher and student. This way of sharing knowledge has resulted in the loss of many drugs and prescriptions. Moreover, the knowledge of Li ethnomedicine is fragmented. It has no systematic theory or drug standards. The existing national and local policies conflict with the practice of physicians using Li ethnomedicine, whose practice qualification is not recognized by the government. This situation is not conducive to the heritage and development of Li ethnomedicine.

### **SUGGESTIONS**

First of all, the comprehensive utilization of Li ethnomedicine resources needs to be strengthened. The utilization includes two aspects. The first is the comprehensive evaluation and exploration of resources in the development process, making full use of medicinal plants in a variety of ways. Studies have confirmed that the root and leaf of *Bryophyllum pinnatum* (L.f.) Oken can stop bleeding, cure swelling and pain (Surong et al., 2004); the fruit and leaf of *Amomum longiligulare* T.L.Wu contain some common active ingredients. These examples underscore the need for the comprehensive utilization of different parts of herbal medicine. The second is the transfer of useless or low efficacy ingredients in the waste into a chemical composition with medicinal value through synthesis or structural modification. The extent and level of comprehensive utilization of medicinal plants reflect the degree of scientific research and standards. China attaches great importance to comprehensive utilization of herbal and drug production drugs, such as alkaloids extracted from *Cephalotaxus* which in recent years has shown good effects on the treatment of leukemia (Yumei et al., 1995); taxol extracted from the yex, which is a strong inhibitor of tumor cells (Slichenmyer and Von Hoff, 1991); and insulin analogue from the seeds of some cucurbits (Shouyan, 1992), which is helpful for the treatment of diabetes (Zheng et al., 1996; Toshihiro et al., 2009).

And then, we should strengthen the promotion of new technologies and new methods. The development and utilization of Li ethnomedicine need new technologies and the application of new methods. The bio-pharmaceuticals developed rapidly thanks to high-tech tools during the past 10 years, especially genetic engineering, which has become an important technology for pharmaceutical products replacement. In the future, cell engineering, genetic engineering, and fermentation engineering will greatly promote the development and utilization of Li ethnomedicine.

In addition, the research into Li traditional medicine needs to be strengthened. The collation of Li medicine theory and clinical experience needs to be increased. The relevant departments, including the government of Hainan province, the Administration of Traditional Chinese Medicine of Hainan, and the Ministry of Health, should pay more attention to resource surveys and research to rescuing the Li culture as soon as possible. Specific conservation and research institutions need to be established in order to conduct further research and enhance the role of Li drugs. The protection of the ecological environment in the process of developing of the Li drugs needs to be also considered.

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