

In Terms of Compendium of Materia Medica Introducing Chinese Yam's Application and Developing the Traditional Clinical Dispensing Technology of Chinese Medicine Master Jin Shiyuan

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Abstract

The original name of Chinese Yam (*Dioscoreae Rhizoma*, Shan Yao) is Shu Yu, which is one of the four Huai medicines commonly used in clinical medicine. Chinese Yam (*Dioscoreae Rhizoma*, Shan Yao) was firstly recorded as upper in *Classics of the Materia Medica (Shen Nong Ben Cao Jing)*, the upper grade nourishes life. Many classical prescription manuals included Chinese Yam (*Dioscoreae Rhizoma*, Shan Yao), such as Liuwei Dihuang Pills, Jingui Shenqi Pills, Guishao Dihuang Pills, and so on. Donghan Dynasty (A.D. 25-220) Zhang Zhongjing recorded that Shuyu Pill is the prescription mainly treats weak disease in *Synopsis of the Golden Chamber (Jin Gui Yao Lve)*. Li Shizhen summarized Chinese Yam's medicinal action as five aspects including toughen up kidney Qi, strengthening the spleen and stomach, arrest diarrhea, reduce phlegm, nourish pelage in *Compendium of Materia Medica (Ben Cao Gang Mu)*. The Chinese Medicine master Jin Shiyuan inherited Li Shizhen's academic thought, medicine culture, and developed nine Chinese medicinal clinical dispensing technologies. This paper is based on Li Shizhen's description of Chinese Yam (*Dioscoreae Rhizoma*, Shan Yao) in the *Compendium of Materia Medica (Ben Cao Gang Mu)*. In the process of analysis, CNKI, Wanfang, and other databases were searched with "Chinese Yam (*Dioscoreae Rhizoma*, Shan Yao)", "Li Shizhen", "Jin Shiyuan", "clinical dispensing technology", "processed products", "prescription payable", "specifications and grades" as keywords. To collect the historical origin, processing methods, processing products, prescription payables, specifications and grades, clinical application, and modern development from recording such as the *Compendium of Materia Medica (Ben Cao Gang Mu)* on Chinese Yam (*Dioscoreae Rhizoma*, Shan Yao) in the history, inheriting Li Shizhen's academic thought, medicine culture, and studying the Chinese Medicine master Jin Shiyuan's clinical dispensing technology experience.

Keywords: Li Shizhen; Chinese yam (*Dioscoreae rhizoma*, Shan Yao); Jin Shiyuan; Clinical dispensing technology; Processed products; Prescription payables; Specifications and grades

Introduction

Compendium of Materia Medica (Ben Cao Gang Mu) [1] is written by China's most celebrated herbalist, Li Shizhen. This book was summarized the knowledge of traditional Chinese medicine before the Ming Dynasty (A.D. 1368-1644), first printed in 1,596, including 1,892 medicinal substances, 1,173 from plants, 444 from animals, and 275 from minerals. It is the best known example of Chinese materia medica literature and portions of this classic have been translated into over 60 languages. Its greatness lies in Li Shizhen's earnest and realistic scientific attitude, which represents the characteristics of Oriental medicine. Li Shizhen was based on the succession of the pharmacological basis of the predecessors, corrected a lot of mistakes from predecessors, such as for quite some time, emperors of the past dynasty believed that materia medica were used to longevity as immortal through alchemy, unapproved taking Realgar (Xionghuang), *Coptidis Rhizoma* (Huanglian), *Genkwa Flos* (Yuanhua), *Cinnabaris* (Zhuasha) and so on, Li Shizhen not only explain and enrich in theory, but also clearly pointed out the harm which superstitious this method. In addition, Li Shizhen added a lot of Chinese material medicine in his book. Darwin said that *Compendium of Materia Medica* is China's Science Encyclopedia [2]. This scientific masterpiece is still effective in guiding clinical practice, and has a profound-lasting influence on the later development of pharmacology, we should not only good to inherit and excavate the essence, but also innovate and develop it. *Compendium of Materia Medica (Ben Cao Gang Mu)*, *Special records*

of Famous doctors (Ming Yi Bie Lu), *Chinese pharmacopoeia (2015 Edition)* and other medicine books were accessed, summarizing the historical characteristics of processing methods and clinical application of Chinese Yam in both ancient and modern medicine. Li Shizhen and other physicians recorded the historical origin, processing methods and clinical application of Chinese Yam in detail, Chinese Medicine master Jin Shiyuan developed and improved the clinical dispensing technology of Chinese Yam on the basis of inheriting Li Shizhen's academic thought, to provide scientific pharmaceutical care for the clinical application of Chinese Yam.

Chinese Yam (*Dioscoreae Rhizoma*, Shan Yao) is the dry rhizome from *Dioscorea oppositifolia* of *Dioscorea* plants, Shuyu is the original name of *Dioscoreae Rhizoma*, which was first recorded as upper in *Classics of the Materia Medica (Shen Nong Ben Cao Jing)* [3], the name

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Received March 04, 2017; Accepted March 27, 2017; Published March 30, 2017

Citation: Ningning W, Huaqiang Z, Ying D, Yiping Y, Zhaojuan G, et al. (2017) In Terms of Compendium of Materia Medica Introducing Chinese Yam's Application and Developing the Traditional Clinical Dispensing Technology of Chinese Medicine Master Jin Shiyuan. Med Chem (Los Angeles) 7: 824-827. doi: 10.4172/2161-0444.1000435

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as Shan Yao first appeared in *Amplification on Material Medica (Ben Cao Yan Yi)* [4] from Song Dynasty (A.D. 960-1279) by Kou Zongshi. Huai Shan Yao first appeared in *Longevity and Life Preservation (Shou Shi Bao Yuan)* [5] from Ming Dynasty by Gong Yanxian, which is one of the national famous Four Huai Medicine Niuxi (*Achyranthis Bidentatae Radix*), Chinese Yam (*Dioscorea Rhizoma*), Dihuang (*Rehmanniae Radix*), Juhua (*Chrysanthemi Flos*) [6]. In order to avoid same as the royal name Yu of Tang Dynasty, (A.D. 618-907) which was changed to Shu Yao, Shu is Song Dynasty emperor's name, so changed to Shan Yao. *Herbal for Relief of Famines (Jiu Huang Ben Cao)* mentioned that Chinese Yam is best in Huai (Henan old Huaiqing Fu) and Meng (Henan Mengxian) [7], that was one of the most famous Four Huai Medicines (*Dioscoreae rhizoma*, *Radix rehmanniae*, *Achyranthes bidentata*, *Chrysanthemum*) currently [8]. The purpose of this paper is to analyze Li Shizhen and other physician view on historical origin, processing products, prescription payable and specifications and grade of Chinese Yam, and analyze the Chinese Medicine master Jin Shiyuan's experience of clinical dispensing technology for Chinese Yam, inherit and develop the clinical dispensing technology of Chinese Yam, and provide useful reference for the clinical application and experimental studies of Chinese Yam. Chinese Yam with sweet flavor, neutral in nature, non-toxic property, it can invigorate the spleen to benefit the stomach, promote the production of body fluid to benefit the lung, and tonify the kidney to astringent the essence [9]. Chinese Yam is innocuous, edible, and completely non-toxic. Chinese Yam has the effect of invigorating the spleen, nourishing the stomach and invigorating the lung and kidney, which used as an important herb of tonify deficiency, tonifying the lung, spleen and kidney, rectifying the imbalance between yin and yang, reinforcing qi and replenishing blood. It plays a large part in harmonizing the middle, tonifying the kidney, replenishing qi, blood, yin and yang. Donghan Dynasty Zhang Zhongjing recorded that Shuyu Pills are the prescription mainly treats weak disease in *Synopsis of the Golden Chamber* [10]. At present, it has been proved that Chinese Yam has the pharmacological effects of lowering blood glucose, anti-oxidation, anti-senility, enhancing immunity, and have a useful health protection and treating efficacy of high blood pressure, asthma, neurasthenia, and various diseases [11].

Traditional Chinese medicine dispensing is right or wrong, directly related to the safety of clinical medication. Chinese Medicine master Jin Shiyuan has been engaged in the traditional Chinese medicine studies for more than 70 years, he not only proficient in clinical dispensing technology, but also quite successful in clinical dispensing technology [12]. Professor Jin divided traditional Chinese medicine dispensing into 9 elements, including character identification technology, clinical processing technology, prescription audit technology, prescription payables technology, dispensing account technology, clinical decocting technology, dispensing supply technology, Purchasing management technology, and Storage and maintenance technology [13]. Processor Jin is based on Li Shizhen's academic thought and medicinal culture, he has a knowledge structure of being proficient in medicine and pharmacy, he always take traditional Chinese medicinal science and medicine as a whole to think, forming the academic characteristics of compromising medicine and pharmacy [14], developing and improving the clinical dispensing technology of Chinese Yam, to provide scientific pharmaceutical care for the clinical application of Chinese Yam. The Chinese Medicine master Jin Shiyuan, inherit and develop the clinical dispensing technology of Chinese Yam, and provide useful reference for the clinical application and experimental studies of Chinese Yam.

Results and Discussion

Li Shizhen recorded 11 affiliated prescription manuals about Chinese Yam in the *Compendium of Materia Medica*, and different

Chinese Yam processing products from each of prescription manuals. Wild Chinese Yam is good at medicine; cultivated Chinese Yam is winner than wild Chinese Yam dieted day to day, yellowish brown skin and white meat, cooked sweet and smooth, same as its root. Chinese Medicine master Jin Shiyuan summarized the different medicinal action and clinical application of different the processing products of Chinese Yam that he inherited Li Shizhen's medicinal thought and combined the condition of service of Chinese Yam up to date, strictly in accordance with the implementation of Chinese Pharmacopeia. And integrated this idea into clinical dispensing technology of traditional Chinese medicine, developed, improved other medicinal dispensing technology.

In terms of the different processing products of Chinese Yam

Traditional Chinese medical science advocated that treatment according to syndrome differentiation, in the *Compendium of Materia Medica*, Li Shizhen used different processing products to treat different symptom. Reviewing the successive books on Chinese medicine, Chinese Yam has more than 10 kinds of processing products [15]. For example, when abdomen deficient distention, four limbs reversal, vomiting before eating and suffering from lack of appetite, the victims should take mince of half crude and half stir frying Chinese Yam; when frequent urination, the victims should use alum water boiled Chinese Yam and eat with Fuling (*Poria cocos*), which mince; when swelling toxic in initial stage, the victims can use Chinese Yam which is with mud and add water grinding with castor bean and polished glutinous rice, when chilblain in hands and feet, the victims can take a section of Chinese Yam grinding as muddy directly; when tubercle at retrocollic, red and swollen with hard pain, the victims can use a section raw Chinese Yam of removing the peel, grinding with 2 castor bean; when diarrhea, the victims should take mince of half crude and half stir frying Chinese Yam; when sputum Qi and breathe heavily, the victims can take mix together a half mashed raw Chinese Yam and a half sugar cane juice; so on.

At present, the country's records, the main varieties of Chinese Yam processing products including raw Chinese Yam, stir fried with bran Chinese Yam, stir baked with soil Chinese Yam, honey stir fried with bran Chinese Yam and stir baking simply Chinese Yam and stir baking to yellowish Chinese Yam [16]. But only raw Chinese Yam and stir fried with bran Chinese Yam are included in Chinese Pharmacopeia 2015 Edition. Professor Jin introduced the medicinal action in his book name is *National physician master Jin Shiyuan's script of traditional Chinese medicinal clinical dispensing technology*. Raw Chinese Yam is good at promote the production of body fluid to benefit the lung, and tonify the kidney to astringent the essence, for dyspnea due to deficiency of lung, emission with renal asthenia, leucorrhea, frequency of micturition, symptom-complex of excessive eating due to kidney deficiency and so on. Stir fried with bran Chinese Yam is good at invigorate the spleen to benefit the stomach, for insufficiency of the spleen with reducing diet, having diarrhea and loose stool, excessive leucorrhea and so on.

In terms of the prescription payables of Chinese Yam

Traditional Chinese medicine prescription payables is one of the important link in 9 clinical dispensing technology, including distinguish between raw and cooked, if prescription has not the foot natation or the cooked products name, pharmacist should take cooked products to patient, but raw products' names, raw products; clearing medicinal parts, some drugs has different medicinal action due to different medicinal parts, and so on. That asked the dispensing staff to adjust the doctor's prescription and the traditional habit of dispensing

medicine, and prescription payables must accord with the requirement of Chinese Pharmacopoeia. Because different processing products have different medicine action to treat different symptom, the dispensing personnel must check patient's prescription from his attending doctor when prescribing medicine to patient.

Prescription has name is Shan Yao, the dispensing personnel must prescribing Huai Shan Yao to patient, prescription has name is Huai Shan Yao, prescribing Huai Shan Yao, too. But if prescription has name is Fu Chao Shan Yao (stir fried with bran Chinese Yam), the dispensing personnel must prescribing the processing products of Chinese Yam, which is Stir fried with bran Chinese Yam (Table 1).

The different point between Shan Yao (raw Shan Yao) and Fu Chao Shan Yao (Stir fried with bran Shan Yao) is processing technology. Shan Yao (raw Shan Yao) is the Chinese Yam crude herbal product of removing impurities, dividing into big size and small size, washing out, soaking for one day to two days, take out products when saturating about 70 percent, moistening two hours to four hours until the humidity of inside and outside is identical, fating slice, drying, and sieving to the debris. Fu Chao Shan Yao (Stir fried with bran Chinese Yam) is the Shan Yao processing product of stir fried with bran, putting wheat bran into the hot pot, putting Shan Yao slices into hot pot when the wheat bran smoking, flipping out quickly, stir fried with the middle fire until light brown, getting out, sieving to the wheat bran, cooling. The ratio of wheat bran and Chinese Yam slices is ten: one.

In terms of the specifications and grades of Chinese Yam

In *Compendium of Materia Medica*, Chinese Yam has different processing products, so each of different has different specifications and grades in currently. Chinese Yam should be purchased in the pharmaceutical wholesale enterprises which have license for pharmaceutical trading and pharmaceutical business license. Follow the following principles, first Pharmacopoeia standards, the quality of Chinese Yam should be consistent with the People's Republic of China Pharmacopoeia (2015 version), water shall not be 12.0%, the total ash shall not be 2.0%.

Grade specification: Guang Shan Yao Specifications, first class, dry goods. It is cylindrical, the bar is straight, smooth and rounded, two flush. Both inside and outside are unified white. Quality and solid are texture. Powder enough. Tasteless and it is More than 15 cm long, more than 2.3 cm in diameter. No cracks, hollow, fried head, impurities, insects, mildew. Guang Shan Yao Specifications, second class, dry goods. It is the original column, the strips are straight, smooth and rounded, two flush. Both inside and outside are unified white. Quality and solid are texture. powder enough. Tasteless and it is More than 13 cm long, more than 1.7 cm in diameter. No cracks, hollow, fried head, impurities, insects, mildew. Guang Shan Yao Specifications, third class, dry goods. It is the original column. Straight, smooth and rounded, two flush. Both inside and outside are unified white. Quality and solid are texture. Powder enough. Tasteless and it is 10 cm long, more than 1 cm in diameter. No cracks, hollow, fried head, impurities, insects, mildew. Guang Shan Yao Specifications, fourth class, dry goods. It is the original column, the strips are straight, smooth and rounded, two flush. Both inside and outside are unified white. Quality and solid are texture.

Prescription name	Prescribing medicine
Shan Yao	Huai Shan Yao (raw Huai Shan Yao)
Huai Shan Yao	Huai Shan Yao (raw Huai Shan Yao)
Fu Chao Shan Yao	Fu Chao Shan Yao (Stir fried with bran Chinese Yam)

Table 1: The table of Chinese Yam's prescription payables.

Powder enough. Tasteless and it is Diameter 0.8 cm above, regardless of length, between the pieces. No impurities, insects, mildew.

Mao Shan Yao Specifications, first class, dry goods. It is long strip, curved slightly flat, with wrinkles or circumference, to the net skin. Both inside and outside are white or yellow-white, pink. Tasteless and it is More than 15 cm long, the middle of more than 10 cm thick. No rupture, hollow, yellow bars, impurities, insects, mildew. Mao Shan Yao Specifications, second class, dry goods. It is long strip, curved slightly flat, with wrinkles or trench, to the net skin. Both inside and outside are white or yellow-white, pink. Tasteless and it is More than 10 cm long, the middle of more than 6 cm thick. No rupture, hollow, yellow bars, impurities, insects, mildew. Mao Shan Yao Specifications, third class, dry goods. It is long strip, curved slightly flat, with wrinkles or trench, to the net skin. Both inside and outside are white or yellow-white, pink. Tasteless and it is More than 10 cm long, the middle of more than 3 cm thick, between pieces. No impurities, insects, mildew.

Remarks, first, the specifications of the Shan Yao are the processed products of the long-shaped family of Shan Yao, which do not include wild Shan Yao or cultivate Shan Yao. Second, Guang Shan Yao and Mao Shan Yao have the same medicine actions; in order to save labor and costs, the future domestic sales should be mainly Mao Shan Yao. Third, Mao Shan Yao has long strip and slightly flat, two different thickness. Therefore, the rank is divided by the middle of the rough. Guang Shan Yao is processed into rubbed round products, the thickness of the dry is uniform, and that is still divided by the size of diameter.

In terms of the medicine and food of Chinese Yam

Chinese Yam is a kind of medicine and food with high nutritional value. It has a very market prospect and commercial value. Chinese Yam is an important traditional Chinese medicine, and it is a kind of common vegetables plants, being well received by people's concern and love all over the world, because of its excellent medicinal and delicious tastes [17]. Chinese Yam has high nutritional value, medicinal value and economic value. It is a kind of economic food with good market prospect and potential of industrial development [18]. Therefore, Chinese Yam is an international alimentary crop about traditional Chinese medicine [19].

In our country, the traditional method of edible Chinese Yam is cooking dishes or decocting as a medicinal herb. In the real sense, there are few kinds of Chinese Yam is circulating in the commercial circulation market, and single taste. Chinese Yam is not conducive to long-term preservation and transportation [20], because of its high moisture content, easy to browning, easy to break and so on [21]. At present, there are many drinks in the market, for example, carrot compound beverage [22], Chinese yam medals beverage [23] and so on. Using fermentation method can not only prolong the storage period of food, and can improve the nutritional value of food, because Chinese Yam has the medicinal action of adjusting the intestinal function, strengthening the stomach, helping digestion and enhancing human immunity. The fermentation processing technology can improve dietary fiber and other nutriment of Chinese Yam, which has great market potential [24]. The present study reports that Chinese Yam had made to Chinese Yam's fermented wine, such as Chinese Yam beer [25], the protecting health wine with Chinese Yam and *Castanea mollissima* [26], and so on. As the application of diet therapy, Chinese Yam has been made into porridge, noodles [27], cakes, steamed bread [28] and other health food. Chinese Yam mashed potato food [29] research and development combining the convenience and nutrition to one, for satisfying the needs of people living consumption quickly. As a kind of food resource with good medical action and the function of protecting

health, the food products of Chinese Yam have a good prospects and considerable social and economic benefits [30].

Conclusions

In summary, due to Chinese Yam as clinical treatment and daily health care in the commonly used Chinese medicine, so people pay more attention to Chinese Yam. The Chinese Medicine master Jin Shiyuan mentioned the clinical dispensing technology of Chinese Yam from nine aspects including Processing technology, that were based on processing technology and medicinal action of Chinese Yam in Li Shizhen's *Compendium of Materia Medica*. Traditional Chinese medicine dispensing technology is the key factor affecting the clinical application of traditional Chinese medicine. The paper through introducing the different medicinal action of Chinese Yam's processing products, prescription payables, and the specifications and grades of Chinese Yam, summarizing Chinese Medicine master Jin Shiyuan developed and improved the clinical dispensing technology of Chinese Yam on the basis of inheriting Li Shizhen's academic thought, to provide scientific pharmaceutical care for the clinical application of Chinese Yam. Chinese Yam is the dual-purpose top grade of preserving one's health and treating diseases. In terms of pharmacological effects, Chinese Yam's study is less associated with clinical application, so it is necessary to increase the relationship between research and practice. Putting Chinese Yam's the application of pharmacological effects into clinic, and promoting the development of related research.

Conflict of Interest

The authors Wang Ningning, Zhai Huaqiang, Dai Ying, Yuan Yiping, Guo Zhaojuan, Wang Yanping, Jin Shiyuan and Wang Yongyan declare that they have no competing interests.

Acknowledgements

We thank Prof Zhai Huai-qiang (Beijing University of Chinese Medicine, Beijing, China) for conducting to writing the paper. This work was supported by the National Standardization Program for Chinese Medicine (Grant numbers ZYBZH-Y-HEN-18) and the Natural Science Foundation of China (Grant numbers 81373887).

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Citation: Ningning W, Huaqiang Z, Ying D, Yiping Y, Zhaojuan G, et al. (2017) In Terms of Compendium of Materia Medica Introducing Chinese Yam's Application and Developing the Traditional Clinical Dispensing Technology of Chinese Medicine Master Jin Shiyuan. *Med Chem (Los Angeles)* 7: 824-827. doi: [10.4172/2161-0444.1000435](https://doi.org/10.4172/2161-0444.1000435)