

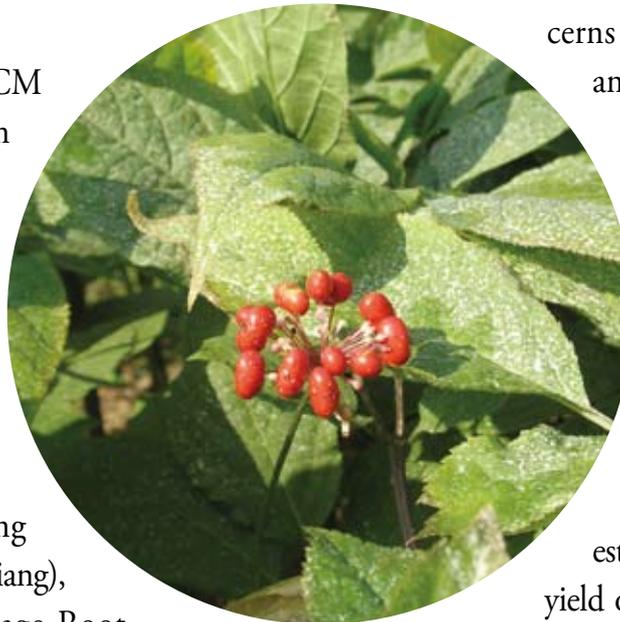


## Exploration of Ginseng Plantation and Processing

By Brion Research Institute

### INTRODUCTION

More than 90% of TCM herbs are originated from China. In Taiwan, the top 10 TCM herbs imported from China are Lycium Fruit (Gou Qi Zi), Astragalus (Huang Qi), Chinese Date (Da Zao), Cinnamon Bark (Rou Gui), Licorice (Gan Cao), Angelica (Dang Gui), Anise Seed (Da Hui Xiang), Ginseng (Ren Shen), Lovage Root (Chuan Qiong), and Rehmannia (Di Huang), total amount over 1,000 tons per annum. Ginseng has the highest value, estimated to be \$23.5 to \$29 millions US dollars, due to its high unit cost.



Ginseng plant

Recent years, there are more and more people are concerned with natural, environment, and well-balanced living. World Health Organization (WHO) is also actively promoting to integrate traditional medicines and modern medicines; as a result, TCM is becoming more and more popular. The global increase in the use of TCM raises con-

cerns regarding the safety, quality and efficacy by health authorities. The safety issue is the most critical, specifically, on pesticide residues, heavy metals, aflatoxins, microbiological contaminations that should be monitored and tested.

China is the world's largest ginseng producer with annual yield of 6,000 to 8,000 tons, which account for 70%-85% of total world ginseng trade. However, high quality ginseng herb are very hard to source, because only 20-30% ginseng herb have low pesticide residues, and more than half of these low pesticide ginseng are contract-purchased by Japanese corporations. To ensure the quality and safety of ginseng herb are used for Sun Ten products, specialists from Brion Research Institute and Sun Ten Herb Sourcing Team have put tremendous efforts in sourcing quality ginsengs by visiting various ginseng farms and herb processing plants throughout Northeastern China, and finally

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Ginseng plantation in Chang Bai Mountain

found a ginseng farmland in Chang Bai Mountain, Jilin province where it is one of the few places not compromised by pesticides. Sun Ten carefully controls the quality of herb materials by periodically visiting herb growing locations and strategically alliance with reliable herb suppliers.

## VARIETY OF GINSENG

### **Panax ginseng C.A. Mey.**

According to Seng Nong Ben Cao Jing (Classic of the Materia Medica), ginseng is a superior herb. Because the appearance of its root resembles the shape of a human body, ginseng is named “Ren Shen” in Chinese, literal English translation means “Man Root”. Ginseng is of the Araliaceae family, and the commonly used species is the dried root of *Panax ginseng* C.A. Mey. It grows mainly in Siberia, Japan, Korea and in Jilin, Liaoning, Heilongjiang provinces of China.

When the ginseng is harvested and dried natu-

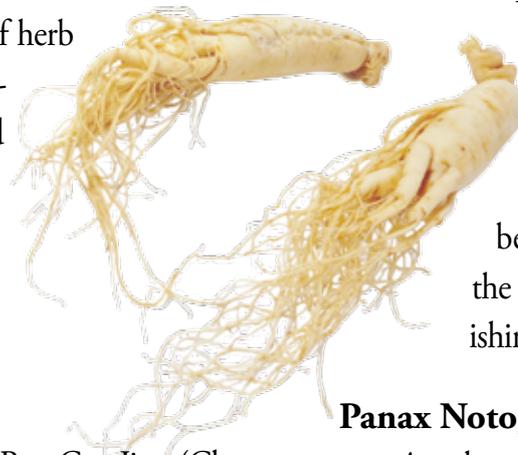
rally, it is called White Ginseng (Bai Shen). If the ginseng is processed by steamed first followed by drying, it is called Red Ginseng (Hong Shen) or Korean Ginseng. Rootlets at the end tip of ginseng root, is called Shen Xu. Traditional functions of ginseng include tonifying the lungs and augmenting qi, generateing fluids, benefiting the Heart qi and calming the spirit for palpitation with anxiety, insomnia, forgetfulness, and restlessness due to qi and blood deficiency.

### **Panax quinquefolium L.**

In the same family of Araliaceae, there is another species, *Panax quinquefolium* L. (*Radix Panacis Quinquefolii*). It is grown in Northern US and Canada, and cultivated in Northern China and

France. Alternate names are Hua Qi Shen or Xi Yang Shen, English name is American Ginseng or literal English translation is “Western Seas Root”. Its functions are:

benefits qi, generates fluids, nurtures the Lung yin and clears fire. It is a nourishing and heat-clearing herb in TCM.



### **Panax Notoginseng (Burk.) F. H. Chen.**

Another Araliaceae family species, *Panax Notoginseng* (Burk.) F.H.Chen, is commonly called “pseudoginseng root” or “notoginseng root”. It is grown in Yunnan, Guangxi, Sichuan, Guizhou, Jiangxi provinces in China. This herb is widely used to stop bleeding and transform blood stasis, reduce swelling and alleviate pain.

### **Acanthopanax senticosus (Rupr. et Maxim.) Harms**

There is another Araliaceae family species, *Acanthopanax senticosus* (Rupr. et Maxim.)

Harms, commonly called Siberian Ginseng, or Ci Wu Jia. Its actions are to reinforce qi, invigorate the function of the spleen and the kidney, soothe the nerve, improve insomnia with a lot of dreams.

### Other Varieties from Different Families

There are other varieties of herbs like Radix Codonopsis Pilosulae (Dang Shen), Radix Salviae Miltiorrhizae (Dan Shen), Radix Scrophulariae (Xuan Shen), Radix Pseudostellariae (Tai Zi Shen), etc. They are not from Araliaceae family, and their actions and indications are quite different from ginseng herbs of Araliaceae family.

## GINSENG CULTIVATION

The main growing regions for ginseng scatter in the mid and high latitude forestry of the eastern part of Asian Continent. Soil type required for ginseng cultivation is brown forest soil under coniferous and broad-leaves mixed forest. Annual precipitation is 600-1,000 mm.

The climate requirement and various elements for ginseng growth are quite delicate and complicated, in which light, oxygen, carbon dioxide, moisture and temperature are important factors. Hence,

in the cultivation of ginseng, sunlight, temperature, water, nutrients, air, soil, and organisms, etc must be in well-balanced status during ginseng growth. Each element plays a vital role and none of the element can be disregarded or replaced during the growth period.

Ginseng cultivations begin from propagating. Seed sources are either collected from the wild or from the cultivation farm. After seed selection, seedling are cultivated for 2-3 years and then selected to remove the bad and disease-contracted ginsengs before transplanting. When planting the 2-3 year ginseng, sufficient space is required to facilitate growth and allow for better absorption of the ginseng root. Another 2-3 years after transplanting, the 4-6 years old ginseng can be harvested.

Ginseng crops greatly consume the soil resources. In recent years, China has been actively promoting the policy of “converting farmland back to forestry”, where crops rotation is applied to restore soil resources. After ginseng is harvested, the soil must plant with other farming crops such as soybeans, beets, corns, or economic trees etc before it is permitted to replant with ginseng on the same soil again. The rotation cycle is about 20-30 years.



Coniferous and broad-leaves mixed forest



Converting to farming crops after ginseng harvest



Ginseng plant

## PROCESSING OF GINSENG

Generally the harvesting time for ginseng is in the early to mid-September of every year. After harvesting, the leaves are removed before the roots are taken to herb processing plants for cleaning and drying processing. Whole ginseng root is cleaned by water to remove the soil residues, the cleaned ginsengs have to be sorted and graded manually in reference to different parts of ginseng. Cleaned and sorted ginsengs are put on the bamboo or wooden shelves according to the sizes and dried under the sun.

When they are dried to a certain level, they are moved indoor and baked under low temperature for further drying, when they are dried to a specific level, the ginsengs are moved outdoor and dried under the sun again. After this process is repeated for 2-3 times, the dried ginseng is referred to as White Ginseng, also called sun dried White Ginseng. The White



Sun-drying process



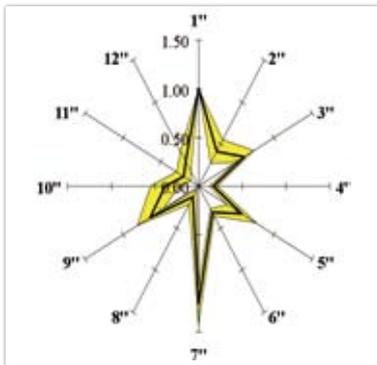
Red ginsengs-before and after processing

Ginseng should be very pale yellow color.

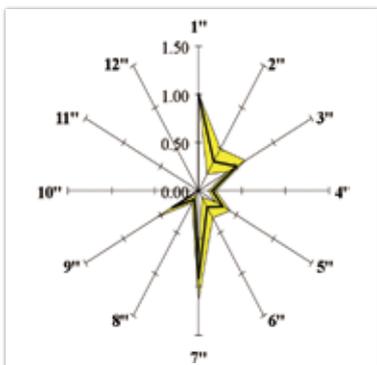
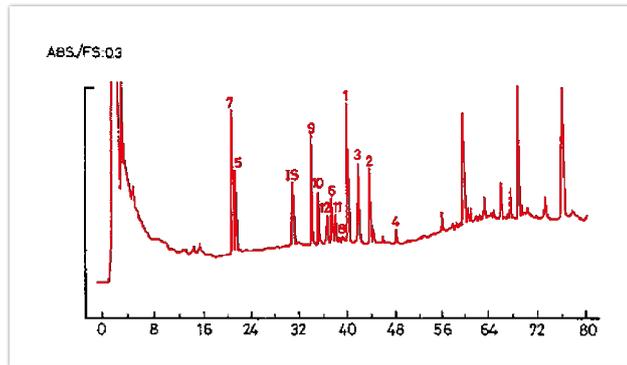
Red Ginseng or Korean Ginseng is processed by placing the cleaned and sorted ginseng on the bamboo or wooden shelves in the closed steam chamber and using steam slowly until they are thoroughly prepared, then transferred outdoor to cool and remove the moisture. Afterward, the ginsengs are moved to the baking room and baked under low temperature until proper dryness is reached. After this processing, the ginseng is called Red Ginseng, its appearance should be reddish-brown and translucent.

## ACTIONS/INDICATIONS OF WHITE GINSENG AND RED GINSENG

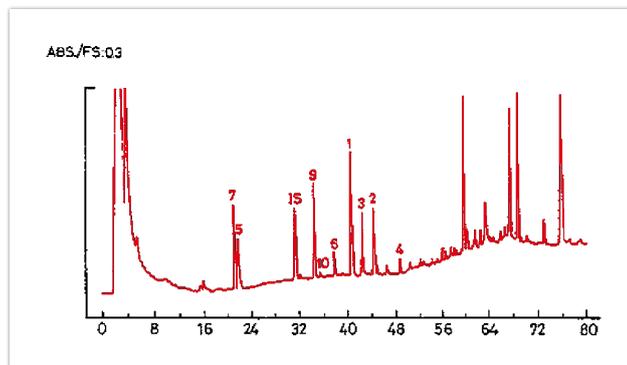
Recent studies indicate that the major known ingredients account for ginseng actions are series of ginsenoside, which are categorized into type A, B, and C according to their molecular structures. Type A is panaxadiol, which include Ra1, Ra2, Rb1, Rb2, Rb3, Rc, Rd, F2, mRb1, mRb2, mRbc. Type B is panaxatriol, Re, Rf, Rg1, Rg2, F1, F3, Rh1. Type C is oleanolic acid, Ro. Type A ginsenoside is known to suppress hemolysis and inhibit central nervous system, whereas Type B and C show hemolytic activity and activate central nervous system. The three types of ginsenoside have dual regulatory functions.



HPLC radar graph of "White Ginseng" herb



HPLC radar graph of "Red Ginseng" herb



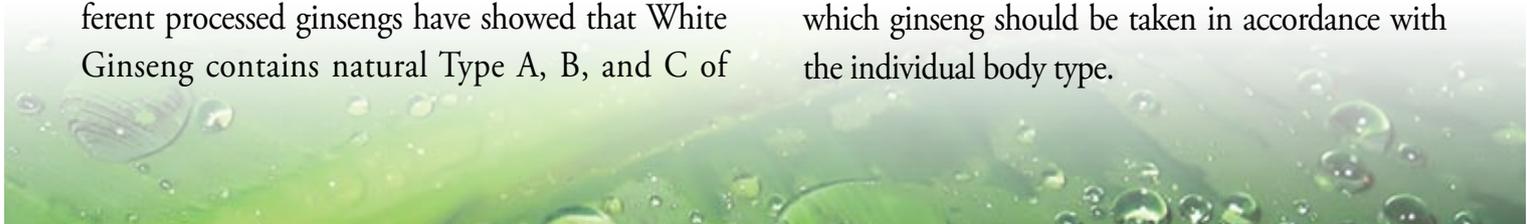
ginsenoside in ratio with optimized dual regulatory functions. The ratio of natural ginsenoside in Red Ginseng is altered because its malonylginsenoside is decomposed due to thermal processing. The radar HPLC graphs showed on the active constituents of White and Red Ginsengs are significantly different (Chuang et. Al., J. Chromatogr. A 685 (1994) 243-251).

Ginseng processing is not just for preserving the herb, different processing methods affect the content of ginseng's active ingredients, therefore, the actions and indications will consequently be different. White Ginseng, sun dried naturally, is mild and not too warm in nature, it is suitable for general body type. Red Ginseng is processed through steaming and baking, although it tonifies the basal qi, it is very warm in nature. In the case of yin deficiency with heat excess body type, over dosage of Red Ginseng can lead to headache, insomnia, palpitation, and a rise in blood pressure.

A study by using HPLC (high performance liquid chromatographic) analysis of ginsenoside Rb1, Rb2, Rc, Rd, Re, Rf, Rg1, Rg2, Ro and malonylginsenoside Rb1, Rb2, Rc content in different processed ginsengs have showed that White Ginseng contains natural Type A, B, and C of

## EVALUATION ON THE QUALITY OF GINSENG

Ginseng is one of the most popular and commonly used TCM herb, the safety and quality issues should be carefully monitored. Safety issue is most important, in which pesticides residues, heavy metals, and microbiological contaminations must be tested to ensure they meet the safety limits. In addition, the ginseng should be identified and authenticated as recorded in the pharmacopoeia, and impose strict control on cultivation locations, the growth years, the harvesting time, and the processing methods. HPLC analysis on the active ingredients can ensure the quality and efficacy of the products are consistent. Last but not the least, proper usage of ginseng is also a critical factor for safety, in which ginseng should be taken in accordance with the individual body type.



# Use Only Premium and Non-contaminated Ginseng

- ▶ 6-year old premium ginseng
- ▶ Heavy metals and pesticide residues tested



**ICP/MS**

Heavy Metals Analysis



**Micro Count**

Microbiological Analysis



**GC/MS**

Pesticide Residues Tested

## Popular Products That Contain Premium Ginseng

1311	Bu Zhong Yi Qi Tang	0903	Chai Hu Jia Long Gu Mu Li Tang
1803	Gui Pi Tang	0915	Xiang Sha Liu Jun Zi Tang
0307	Xiao Chai Hu Tang	0205	Ren Shen Yang Rong Tang
0215	Shi Quan Da Bu Tang	1122	Shen Ling Bai Zhu San
0209	Ba Zhen Tang	1605	Du Huo Ji Sheng Tang

