ginseng {jin'ñseng}

Ginseng is a perennial herb of the genus Panax, in the family Araliceae. Asiatic ginseng, pseudo ginseng, is native to eastern Asia. Wild American ginseng, P. quinquefolius, is native to eastern woodlands. It stands up to 60 cm tall, has leaves up to 15 cm long, and bears greenish white flowers. Dwarf ginseng, P. trifolus, is a smaller American species. The root of the ginseng has for centuries been reputed to be a panacea for cancer, rheumatism, diabetes, sexual debility, and aging. The claims date back to ancient China, and the root was long of great value there; Europe did not hear of it until 1642, when the explorer Alvaro Samedo returned with a report of the restorative properties of Oriental ginseng, which he claimed was being sold for twice its weight in silver. In 1713, Emile Jartoux, a Jesuit cartographer working in northern China, reported ginseng's effectiveness and power among the Chinese. Another Jesuit, Joseph Francois Lafiteau, read the report in Quebec, and after a diligent search found (1718) in the woods near his mission an almost identical species, American ginseng. Demand for the American root grew in China, and many colonists and settlers, including Daniel Boone, hunted it avidly. Millions of pounds were uprooted, dried, and exported in the China trade. Eventually the slow maturing plant was almost extinct.

The usage of Asian and American ginseng is very different according to the famous Chinese pharmaceutical compendium and Chinese traditional medicine of Yin Yang.

American Ginseng possesses "cooling" property to the body, while Asian ginseng possesses "warming". Therefore, people with the "warming" body should only take American ginseng which is "cooling" , but people with "cooling" body should only take Asian ginseng instead. Otherwise, contradictions exist, particularly for people with high blood pressure, other diseases and weakness. It is no wonder that American ginseng is often used to reduce stress and fatigue, but not Asian (Chinese and Korean ) ginseng with more stimulating and depleting effects.

Lu, Okauda and Yoshida, Lewis Muwalla and Abuirmeileh, and Kaku et al reported that American ginseng has insulin-like activity, influences neurologic reactions,reduces total cholesterol level and improves heart and blood circulatory functions. American ginseng is found to balance and tone the biochemistry system of the body, strengthen the immune system, provide enormous energy, eliminate the daily fatigue, enhance the body vitality, and improve physical and mental strength. In addition , American ginseng is effective against high blood pressure and cardiovascular diseases.

The differences between American and Asian ginsengs are well documented not only by Chinese traditional doctors, but also by modern scientists, It is found that the differences in the active, constituents may account for the differing medicinal uses of American and Asian ginseng.

Some other true Ginsengs are Panax notoginseng, Panax pseudo-ginseng, Panax japonicus, Panax trifolius, Panax zingeberinsis, Panax stipuleanatus and Panax vietnamensis.

All true Ginsengs have the genus name of Panax in their Latin (scientific) name.

There are also many varieties of plants which are commonly referred to as "Ginseng", but which are not Ginseng. Some of them are related to Ginseng, but most are not even related to true Ginseng.

The pretenders are : Eleutherococcus senticosis (Siberian Ginseng - related to Ginseng - different chemistry ), Pfaffia paniculata (Brazilian, Suma, or South American Ginseng - not related to Ginseng - no similar chemistry), Rumex hymenosepalus (Wild Red American Ginseng, Tanners Dock, Wild Red Desert Ginseng, Canaigre - not related to Ginseng- no similar chemistry), Echinopanax horridum (Alaskan Ginseng, Devil's Club - related to Ginseng - no similar chemistry, but used medicinally), Aralia nudicaulis (Wild Ginseng, Sarsaparilla - related to Ginseng - no similar chemistry and not used medicinally), Withania somnifera (Ayurvedic Ginseng, Indian Ginseng, Aschwangandha, Winter Cherry - not related to Ginseng - used medicinally in India), and Lepidium meyenii (Walpers, Ginseng of the Andes' - not related to

Ginseng - no similar chemistry).

Ginseng contains several saponin glycosides. Saponins are 4-ring steroid-like chemicals with attached sugar molecules that make a foam when shaken in water. In the early '60's, Russian and Japanese scientists identified specific saponins unique to ginseng, called "ginsenosides" or "panaxosides". There is also 3% volatile oil containing a camphoraceous substance, a resin, arabinose, mucilage, and starch (Spoerke, Jr. 1990).

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| The Ginsenosides and their Pharmacology | | |  |
| **Ginsenoside** | **Aprox. Amount % in ginseng** | **Major Known Effects** |  |
| Ro | 0.2 - 0.4% |  |  |
| Ra1 | 0.02% |  |  |
| Ra2 | 0.03% |  |  |
| Ra3 | trace |  |  |
| Rb | x | stimulation of cholesterol synthesis |  |
| Rb1 | 0.37 - 0.5% | Stimulant action on protein and RNA synthesis in animal serum and liver; hypotensive, anti convulsant, analgesic; anti ulcer (stress induced), nerve regeneration-inducing effect |  |
| Rb3 | trace |  |  |
| Rc | 0.13 - 0.3% |  | Stimulation of serum protein synthesis: potent stimulation of adrenal steroid output |
| Rd | 0.15% | stimulation of adrenal intracellular cAMP |  |
| Re | 0.15 - 0.20% |  |  |
| Rf | 0.05% |  |  |
| Rg | 0.05% |  |  |
| Rg1 | 0.2% | stimulant action on DNA, protein and lipid synthesis in animal bone marrow cells, CNS-stimulating, hypertensive, anti fatigue, increase of initial learning response |  |
| Rg2 | trace | found in red ginseng and ginseng tea only |  |
| Rg3 | trace | found in red ginseng and ginseng tea only |  |
| Rh1 | trace | hepatoprotective, anti tumor activity; found in red ginseng and ginseng tea only |  |
| Rs1 | trace |  |  |
| Rs2 | trace |  |  |
| mRb1 |  | acidic malonates of the dammarane saponins (malonylginsenosides) |  |
| mRb2 |  | acidic malonates of the dammarane saponins (malonylginsenosides) |  |
| mRc |  | acidic malonates of the dammarane saponins (malonylginsenosides) |  |

Ginseng (both Asian Ginseng and American Ginseng) can best be described as "adaptogens". An adaptogen allows the body to adapt to biological stresses.

The following tables have been reproduced from tables contained in ""The Ginsengs" by Christopher Hobbs.

|  |  |
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| Steroid Saponin Content of Ginseng Species | |
| **Species** | **Total Saponins** |
| Panax Ginseng (Asian Ginseng)) | 1.6%-4.4% |
| Panax Quinquefolius (American Ginseng) | 4.3%-4.9% |
| Panax notoginseng | 8.2%-20.6% |
| Panax japonica var. major | ca. 9.34% |
|  |  |
| [Taken from Huang, 1993; Wang et al, 1982] | |
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| To be sure, ginseng contains many other compounds as well, depending on the time of year it is harvested, the soil in which it is growing, and other factors. | |

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| Major Constituents of Ginseng | |
|  |  |
| **Fiber** 59,000-245,000 ppm         Soluble: pectin, starch (80,000-320-000 ppm), polysaccharides         Insoluble: cellulose          Heteropolysaccharieds: panaxans A, B, C, D, E; ginsenan S-1A and          ginsenan S-IIA (stimulates phagocytosis in the reticuloendothelial system)         (Tomoda, 1993) |  |
| **Simple sugars** (about 5%)         Fructose 4,000 ppm         Rhamnose 1,900ppm         Sucrose         D-glucose 5,000-10,000 ppm |  |
| **Lipids** 1.5% - 1.9% (Choi et al, 1985) |  |
| **Vitamins**         Niacin 60 ppm |  |
| **Minerals** (Cho Lee, 1983: Wei An, 1983)         Cadmium 0.4 ppm         Calcium 2,340-11,000 (167.3-6,904.8) ppm         Copper 3.7-24.6ppm         Germanium (amount not available)         Iron 49-407 (74.3-518.9) ppm         Lead 2 ppm         Magnesium 980 (749.9-8,928.9) ppm         Manganese 55-156 (12.9-4,119.8) ppm         Molybdenum 0.1 ppm         Phosphorous 2,700-5,200 ppm         Potassium 6,600 (2,622.2-17,672.0) ppm         Sodium 35.3-6,204.3 ppm         Zinc 15.2-75.2 ppm |  |
| **Proteins**         Peptide glycans (panaxans)         Polypeptides RGPI, RGPII (Wu et al, 1991)         Amino Acids: arginine (11,530 ppm), glutamic acid (4,450 ppm), glycine (1,540 ppm),             serine (1,240 ppm), lysine (2,000 ppm), etc., adenosine, pyro-glutamic acid. |  |
| **Phenolic compounds**         Maltol (Huang, 1993) major phenolic compound, stable antioxidant (Kim et al, 1984)          - same as p-hydroxycinnamic acid (Han et al, 1981) |  |
| **Terpenes**         Acetylenic compounds (panaxynol, panaxydol, panaxytriol): cytotoxic             (Matsunaga et al, 1995)         Essential oil (0.05%) |  |
| **Tritpenes**         Saponin glycosides (ginsenosides, 7,500-10,000 ppm)         Steroid alcohols         Beta-sitosterol (5,000 ppm)         Stigmasterol |  |
| **Miscellaneous compounds**         pyruvic acid, choline, and a number of others (Duke, 1989) |  |

Alleged Ginseng Benefits:

Increase physical stamina and sexual prowess in both men and women

Enhance blood flow

Erection-booster

Helps regulate blood pressure

Slow down degeneration of cells in human body

Calm nerves

Increase metabolism

Strengthen immune system

1. Ginseng is not toxic and has no side effects. It does not cause any discomfort or disorder in the physiological functions of the body.

2. The action of ginseng is neither local nor specific; i.e. it increases the body's strength and ability of resistance to adverse stress or damages (chemical, physical or biological agents)

3. Ginseng is a regulator , exhibiting normalizing effects of the body , e.g the regulating effects of high or low blood pressure

- Ginseng stimulates both physical and mental activity. These effects are found to be more pronounced in tired and weak people.

- Ginseng greatly strengthens and protects the human body from severe or prolonged physical or mental stress

- Ginseng increases physical and mental efficiency, improves accuracy of work, contributes to ones concentration, and prevents fatigue.

- Ginseng stimulates and improves the work of the brain cells. Ginseng is well known to be a powerful regulator of the nervous system

- Ginseng stimulates the function of the endocrine glands.

Probably the best known research about ginseng is this one. The study involved mice put into water and forced to swim for a long period of time. The mice given Asian Ginseng were regularly able to swim twice as long as the control group and also recovered faster. The study was set up to see if the point of exhaustion could be increased by using Ginseng. The results were favorable. (Brekhman, I.I., Zen-shen, State Publishing House for Medical Literature, Leningrad (1957)

Our study is designed to determine if ginseng increases the memory of mice.