

MINI REVIEW

Korean Red Ginseng: Benefits Versus Precautions

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Abstract: Over the years, Korean red ginseng (RG), scientifically known as *Panax ginseng*, has been used to treat several diseases. It is a prominent and ancient medicinal herb in the Orient. Ginseng ginsenoside is the major component of RG which has been presumed to be responsible for the health benefits of RG. Many studies on *P. ginseng* have until now concentrated on the mechanism of action of the individual components of RG. However, despite the numerous research on the molecular basis of *P. ginseng* activities, it is still confusing how several active components can simultaneously interact with several targets to give the diverse effects in different diseases. This overview covered the positive and negative effects of using the Korean RG; it also outlined the major chemical components of the Korean RG.

Keywords: Red ginseng, *Panax ginseng*, ginsenoside, side effects, Araliaceae, adaptogens.

1. INTRODUCTION

1.1. Origin Of Korean Red Ginseng (RG)

One of the globally recognized medicinal herbs is Korean ginseng (RG), which belongs to the family Araliaceae. In Far East Asia, it is traditionally used as herbal medicine to treat several diseases [1]. The Annals of King Jeongjo (1776-1800), an aspect of the Annals of the Joseon Dynasty, has the name “RG” or Hongsam in the Korean language as an entry. RG is made through the primary processing of fresh ginseng, with the modern method of preparation outlined in Samjung-Yolam which is a Bulletin of Ginseng Policy, 1908, published by the Ministry of Strategy and Finance, The Greater Korean Empire. Almost all the approximately 80,000 tons of ginseng in the global ginseng market in the year 2010 were produced by China, Canada, South Korea, and the United States. Today, the ginseng market has expanded to over 35 countries, with sales in excess of \$2 billion and South Korea accounting for almost 50% of the total market ginseng value. Brand Name: Ginseng Root, Japanese Ginseng, Asian Ginseng, Ginseng radix, Chinese Ginseng, Jintsam, RG, Ren She, Korean Ginseng, Ninjin, Radix Ginseng; Generic Name: *Panax ginseng*. Drug Class: Adaptogens, Herbals (Fig. 1). Korea is the highest ginseng

producer in the world while China is the highest ginseng consumer. Most of the ginseng produced in North America is produced in Ontario, British Columbia, and Wisconsin.



Fig. (1). The Ginseng root, which is also called “man root,” represents the splitting image of the human body; the branches in the body develop into limb-like roots, while the rhizome tip represents the head. It also has other lateral roots which have no influence on the plant structure.

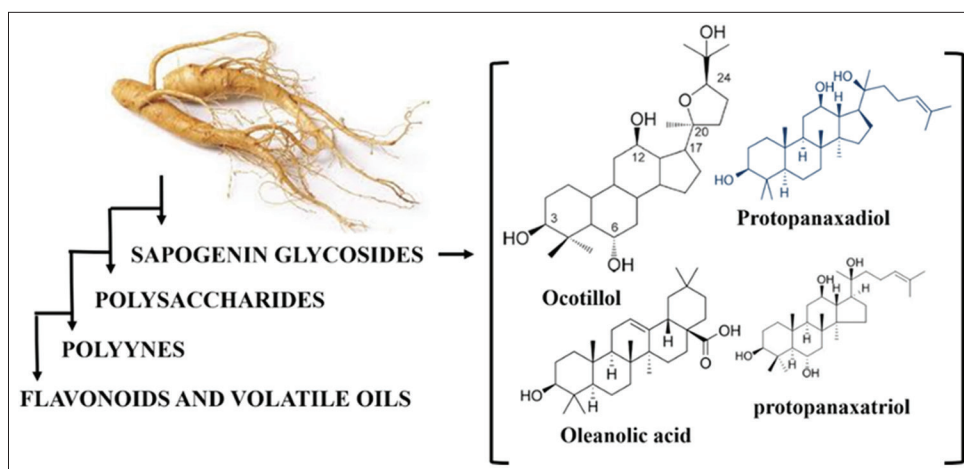


Fig. (2). Ginseng species and the active chemical components.

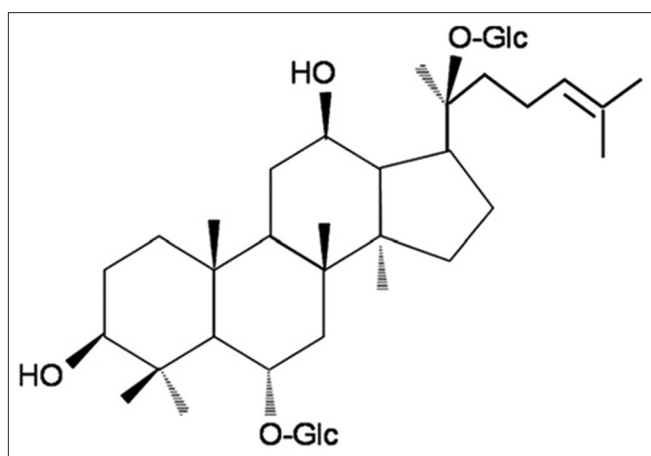


Fig. (3). The chemical structure of ginsenoside-RG1.

2. CHEMICAL CONSTITUENTS

As shown in Fig. 2, all the active or inactive components of ginseng can be categorized into four classes. Ginsenoside is the major active component found in *P. ginseng*; this component is a steroid-like saponin with a unique chemical structure but not anabolic properties. There are more than 100 forms of Ginsenosides [2]. In general, the ginsenosides can be divided into two different groups: (a) Protopanaxadiol (PD) $C_{30}H_{52}O_3$, it is an organic compound dammarane-type tetracyclic terpene sapogenin and its role inside the human body is still unclear; and (b) protopanaxatriol (PT) $C_{30}H_{52}O_4$, it is an organic compound dammarane-type tetracyclic triterpene saponins [3].

Ginsenoside-Rg1, as shown in Fig. 3, is one of the most active components in *P. ginseng*. It is a natural triterpenoid saponin with several biological properties, such as antioxidant and antiaging activities [4]. The major problem to the actual treatment of human malignancy is the acquisition of broad anticancer drug resistance by tumor cells known as multidrug resistance (MDR) which is a major problem in cancer chemotherapy, and it is related with the

overexpression of P-glycoprotein in the plasma membrane of resistant cells [5]. Ginsenoside Rg3, is one of the ginseng components, was shown to have the most potent inhibitory activity on MDR human fibroblast carcinoma KBV20C [6]. Successive reports confirmed that Rg3 was cytotoxic against MDR human fibrocarcinoma KBV20C cells but not against normal WI cells *in vitro*, and Rg3 also stimulated the accumulation of rhodamine 123 in adriamycin-resistant murine leukemia P388 cells *in vivo* [7]. Another report revealed that ginsenoside metabolites Rh2, PD, and PT expressively improved the cytotoxicity of mitoxantrone (MX) to human breast carcinoma and may be potential inhibitors of breast cancer resistance protein in MCF-7/MX cells [8]. The extensive laboratory, epidemiological, and preclinical reports exhibited the therapeutic potential of *P. ginseng* for cancer treatment. Some Korean studies have suggested that *P. ginseng* consumers are correlated with 60-70% decreasing gastric cancer risk, while *P. ginseng* consumers in the Shanghai women's group study revealed no significant effects on gastric cancer risk [9]. Moreover, careful evaluation in Asian group studies may help to clarify ginseng's effect on gastric carcinogenesis and other cancers. More researches are recommended to determine the potential effects of *P. ginseng* on chemoprevention and complementary therapy of cancers.

3. BENEFITS AND PRECAUTIONS

Ginseng extract has a deep restorative, rejuvenating, and strengthening effects on the body, promoting the health status of the body, mind, and spirit. Contrarily, there are mild-to-normal side effects of ginseng extracts to human health; for instance, it can have a stimulatory effect on some people and can cause irritability, insomnia, and nervousness. As such, health experts have discouraged a long-term use of ginseng, with a maximum recommended limit of 3 months at a time. Numerous studies have recommended 200-500 mg of ginseng/day for the maximum positive effects with no health risk (Table 1).

Table 1. Summary of the positive and negative effects of RG

Benefits		Side effects	References
Improves mood and reduces stress	Treatment of stress-induced disorders Improve mental function Ulcer natural Remedy Heal adrenal fatigue.	Common side effects of <i>P. ginseng</i> include: Allergic skin reactions Appetite decreased Breast pain Cerebral arteritis Cholestatic hepatitis Diarrhea Dizziness Euphoria Fast heart rate A headache High blood pressure (hypertension) Insomnia Itching Loss of appetite Low blood pressure (hypotension) Mania Missed menstrual periods/ menstrual problems Mood changes Neonatal death Palpitations Rash Rose spots Spinning sensation (vertigo) Stevens–Johnson syndrome Swelling (edema) Vaginal bleeding Very high fever Uncommon of <i>P. ginseng</i> include: Aserash called Stevens–Johnson syndrome Liver damage Severe allergic reactions This is not a complete list of side effects and other serious side effects may occur [20].	[10]
Improves brain function	Stimulates brain cells Improves concentration and cognitive activities. Improves mental performance Alzheimer's natural treatment.		[11]
Anti-inflammatory properties	Reduces the nasal allergic inflammatory reaction Reduces the extent of inflammation - the root of most diseases.		[12]
Weight loss	Natural appetite suppressant Boosts the metabolism Helps the body burn fat.		[13]
Treats sexual dysfunction	Improves sexual arousal.		[14]
Improves lung function	Decreases lung bacteria Stops the growth of cystic fibrosis.		[15]
Lowers blood sugar levels	Type II Glucoregulatory properties.		[16]
Prevents cancer	Inhibit tumor growth Oxidative stress Apoptosis Angiogenesis.		[17]
Boosts immune system	Influenza HIV Rotavirus		[18]
Relieves menopause symptom	Hot flashes Night sweats Irritability, Anxiety Vaginal dryness Decreased sex drive Weight gain Insomnia.		[19]

HIV: Human immunodeficiency virus

CONCLUSION

Korean Ginseng is taken to improve human health status because it is believed to strengthen the body defense system, reduces stress, and remedies a range of diseases. There are no common side effects of ginseng, but a common problem faced by ginseng consumers is sleeplessness. Other mild problems associated with ginseng consumption are headaches, stomach

upset, and agitation. Females may also experience breast pain, menstrual irregularities, and vaginal bleeding during ginseng therapy. According to MedlinePlus, one of the chemical components of Korean RG can cause birth defects and as such should be avoided by pregnant women. Ginseng should be taken with caution when there are health conditions such as diabetes, blood clotting disorders, hormone-sensitive conditions such as breast cancer, auto-immune diseases, or endometriosis.

Sleeplessness can result from taking high doses of ginseng, and this can result in agitation in schizophrenic patients. Ginseng, just like caffeine, is a nervous system stimulator; hence, a simultaneous consumption of both stimulants can increase heart rate and blood pressure.

CONSENT FOR PUBLICATION

Not applicable.

CONFLICTS OF INTEREST

The author declares no conflict of interest in any kind.

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