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Medicinal & Aromatic Plants

Perspective

Effects of Ginseng on Immune System

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PERSPECTIVE

Ginseng is the root of plants in the genus *Panax*, family Araliaceae, such as Korean ginseng (*P. ginseng*), South China ginseng (*P. notoginseng*), and American ginseng (*P. quinquefolius*), typically characterized by the presence of ginsenosides and gintonin. The herb has a light-coloured, forked-shaped root, a relatively long stalk, and green leaves in an oval shape. *P. ginseng* is one of the most important medicinal herbs in Asia. Its pharmacological activity comes from ginsenosides, and its roots are manufactured commercially for traditional and Oriental medicine. The Panax genus consists of 17 species around the world, ginseng root and its extract as a stimulant to relieve stress and fatigue, strengthen the body and mind, prevent aging, and increase vigour. Modern clinical research is inconclusive about its medical effectiveness. Due to the resemblance between the ginseng root and the human shape, the English name "ginseng" was introduced from the Chinese word "renshen". *Panax ginseng* consisted of a number of active constituents, like ginsenosides, nitrogenous substances, carbohydrates, phytosterol, organic acids, essential oils, amino acids, peptidoglycans, it's repeated, nitrogen-containing compounds, fatty acids, vitamins, minerals and other phenolic compounds. Generally, there are two major groups of ginsenosides: Protoanaxadiols (PPD), including Rb1, Rb2, Rc, Rd, Rg3, Rh2, and Rh3; Protopanaxatriols (PPT), including Re, Rf, Rg1, Rg2, and Rh1; and there is also the nonsteroidal saponin, oleanic acid group, which contained one ginsenoside, Ro.

Ginseng, was also called as "the king of all herbs" which plays a vital role in the pharmacopeia and is valued for its significant and therapeutic properties. Ginseng includes anti-oxidative, anti-inflammatory, anti-allergic, antihypertensive, anti-obesity, sexual potentiation, memory improvement, anti-diabetic, and antitumor properties. The mechanism of ginseng's action remained unidentified until secondary metabolites such as ginsenosides were isolated. Ginseng has many ginsenosides, each of which can have many pharmacological effects. Non-ginsenoside bioactive components in ginseng also have pharmacological properties.

Central Nervous System (CNS) diseases are most widely investigated diseases among all others in respect to the ginseng's therapeutic effects. These include Parkinson's disease, Alzheimer's disease, depression, cerebral ischemia, and many other neurological disorders including neurodevelopmental disorders. Ginseng may help stimulate physical and mental activity in people who feel weak and tired. Ginseng may improve thinking processes and cognition. Based on research studies on human and animal, ginseng components have the potential to treat some cognitive deficits. These studies exposed ginseng could reduce oxidative stress, which could lead to enhancement in cognitive function. Other compounds like gintonin also possessed the ability to improve cognitive functions.

Ginseng has a sweetly aromatic flavour. Ginseng-infused teas and energy drinks are consumed today in China and neighbouring countries as a tonic. Ginseng has been well known as an immune modulator. Roots (mostly), stems, leaves of ginseng, and their extracts have been used for maintaining immune homeostasis and enhancing resistance to illness or microbial attacks through effects on immune system. Immune system is composed of diverse types of cells with their own specialized functions, and each type of the immune cells differentially responds to ginseng treatment. The root is most often available in dried form, either whole or sliced. Ginseng leaf, although not as highly prized, is sometimes also used. Pharmacologically, ginseng is nonspecific in its effects and is capable of a normalizing action irrespective of the pathological situation. Ginseng's effects include improved mental performance, learning, and memory and sensory awareness. The basis of ginseng's action is believed to be due to certain chemical agents in it that increase the brain's Adrenocorticotropic Hormone (ACTH) activity without involving the adrenal glands. A generalized mental arousal is thereby effected.

The risk of interactions between ginseng and prescription medications is believed to be low, but ginseng may have adverse effects when used with the blood thinner warfarin. It also has adverse drug reactions with phenalgine; Risk issues concerning the safety of ginseng at recommended dosages are less prominent and scientifically based. Symptoms of severe overdose with *P. ginseng* may include nausea, fever, irritability, vomiting, restlessness, urinary and bowel incontinence, increased blood pressure, decreased sensitivity, seizures, convulsions, increased respiration, and reaction to light, decreased heart rate, red facial complexion, cyanotic (blue) facial complexion, and delirium. While some epidemiological or clinical studies have reported indications of efficacy for specific health benefits or potential toxicity, there are an equal number of

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studies that provide contradictory evidence. The efficacy and safety of ginseng is provided with the description of biological activity, which includes illustrating mechanisms for anti-oxidant activity without pro-oxidant properties. More clinical studies are necessary to uncover the numerous substances and their effects in ginseng that contribute to public health.