

## Biodiversity report: *Panax Ginseng*



### Summary:

Ginseng is a widely used plant with its history and usage dating back thousands of years ago. *Panax ginseng*, also known as Asian ginseng, is an interesting species to analyse not only for its medicinal properties, also for its chemical composition which is used in pharmaceutical. This report will explore those properties in more depth as well as its life cycle, and habitat, and how it is extracted.

Key words: ginseng, red ginseng, extraction, ginsenosides, fresh ginseng, white ginseng

## **1. History of *Panax ginseng***

Ginseng dates back thousand of years and has been used as a medicinal herb. In fact, because of its healing abilities it was termed *Panax*, a Greek word meaning “cure of all diseases” (Mancuso and Santangelo 2017). This species is mostly cultivated in Korea, China, and Japan, but there are other species dispersed widely, although, they are not as acknowledge. The other widely consumed species are *Panax quinquefolium* L. (American ginseng) and *Panax japonicus*, also know as Japanese ginseng (Anadón 2016).

## **2. Medicinal properties**

*Panax ginseng* is thought it have effect on the following: immune system, nervous system, cancer, an more. In this section will view its effects including studies and research done to determine just that.

### *2.1 Immune system*

Herbal medicine has been used to strengthen the body’s immune system and maintain immune homeostasis when disturbed. Ginseng is an immunostimulants, which simply means that it stimulates immune response (Khan et. al 2015). According to (Khan et. al 2015) some research shows that that “ginseng extract enhance[s] phagocytic activity of macrophages.” In other words, it stimulates macrophages to increasing their kill bacteria and other harmful organisms.

### *2.2 Nervous system*

Ginsenosides are compounds found in *Panax ginseng* which is commonly used for pharmacological purposes (Mancuso and Santangelo 2017). Furthermore, research demonstrate that it impacts the nervous system. It is important to note however, that some of these results are collect through experiments done on rat or mice and more extensive research need to be done. Reports have shown that ginseng has positive effects on the following neurological disorders: Alzheimer’s, Parkinson’s, Lou Gehrig’s, and more (1 Khan et. al 2015).

### *2.3 Cancer prevention*

Studies have also shown that ginseng can prevent he the contraction of cancer and can even inhibit cancerous growths (Choi 2008). A study done in mice indicated that some its components is more effective in killing tumours than killer cells (Choi 2008). Additionally, another study done in mice concluded that certain component (G-Rg<sub>3</sub>) prevented the spread of cancerous cells (Choi 2008)

### *2.3 other pharmacological effects*

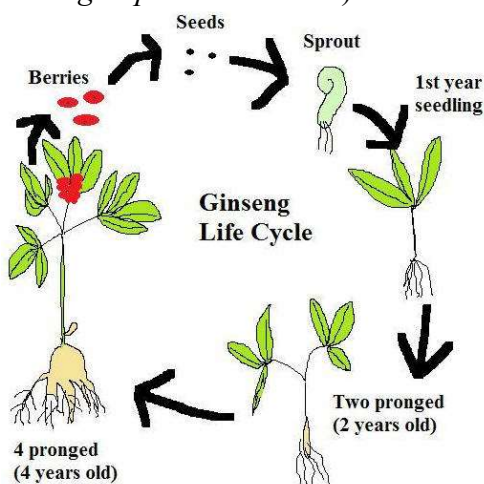
Ginseng has demonstrated efficacy in other areas as well, which include but is not limited to the following: inflammatory related diseases (Khan et. al 2015), improving liver function, anti-stress and anti-fatigue, inhibition of HIV growth, pain relief.

### 3.Habitat

As mentioned previously, *Panax ginseng* Korea, China, Japan, and also Russia and Germany (Zhuravlev et. al 2008).

### 4.Life cycle

Ginseng can self-pollinate which means they reproduce asexually (Choi 2008). The species has no alternation in generation because it only undergoes a diploid asexual stage (website). On its 3<sup>rd</sup> year of growth, it will blossom, but it won't be until its 4<sup>th</sup> year that seeds can be collected from the red berries (Choi 2008). Matured roots are harvested between its 4-6 growth year. As illustrated in figure the number of prongs indicates the age of the plant. For instance, 4 prongs means that it's in its 4 year (*Ginseng Reproduction. n.d.*).



**Figure 1:** life cycle of species *Panax ginseng* (*Ginseng Reproduction n.d.*).

### 5.Cultivation

Due its ancient history there isn't much record of how ginseng was cultivated, or the process of extraction used. It wasn't until much later that a more detailed procedure was recorded (Lee et. al 2015). It is important to note there are various types of ginsengs which is categorized based on the method of cultivation. First, there is fresh ginseng, which does not undergo any process, hence why it's termed "fresh". Secondly, we have white ginseng. In this approach, the roots are peeled and then dried (Yun 2009). And finally, there is the red ginseng which is the most common. This method consists of following steps: thoroughly washing the roots, steaming the fresh ginseng between 90-98°C, drying (15-18°C for mechanical; 45-55°C for sun drying), storing (Lee et. al 2015).

## Bibliography

Anadón, A., Martínez-Larrañaga, M. R., Ares, I., & Martínez, M. A. (2016). Interactions between Nutraceuticals/Nutrients and Therapeutic Drugs. *Nutraceuticals: Efficacy, Safety and Toxicity*, 855–874. <https://doi.org/10.1016/B978-0-12-802147-7.00060-7>

Choi, K. (2008). Botanical characteristics, pharmacological effects and medicinal components of Korean Panax ginseng C A Meyer. *Acta Pharmacologica Sinica* 2008 29:9, 29(9), 1109–1118. <https://doi.org/10.1111/j.1745-7254.2008.00869.x>

Lee, S. M., Bae, B. S., Park, H. W., Ahn, N. G., Cho, B. G., Cho, Y. L., & Kwak, Y. S. (2015). Characterization of Korean Red Ginseng (*Panax ginseng* Meyer): History, preparation method, and chemical composition. *Journal of Ginseng Research*, 39(4), 384–391. <https://doi.org/10.1016/J.JGR.2015.04.009>

Khan, S., Tosun, A., & Kim, Y. S. (2015). Ginsenosides as Food Supplements and Their Potential Role in Immunological and Neurodegenerative Disorders. *Bioactive Nutraceuticals and Dietary Supplements in Neurological and Brain Disease: Prevention and Therapy*, 303–309. <https://doi.org/10.1016/B978-0-12-411462-3.00031-X>

Mancuso, C., & Santangelo, R. (2017). Panax ginseng and Panax quinquefolius: From pharmacology to toxicology. *Food and Chemical Toxicology*, 107, 362–372. <https://doi.org/10.1016/J.FCT.2017.07.019>

Yun, T. K. (2009). Brief Introduction of Panax ginseng C.A. Meyer. *Journal of Korean Medical Science*, 16(Suppl), S3–S5. <https://doi.org/10.3346/JKMS.2001.16.S.S3>

Zhuravlev, Y. N., Koren, O. G., Reunova, G. D., Muzarok, T. I., Gorpenchenko, T. Y., Kats, I. L., & Khrolenko, Y. A. (2008). Panax ginseng natural populations: their past, current state and perspectives. *Acta Pharmacologica Sinica* 2008 29:9, 29(9), 1127–1136. <https://doi.org/10.1111/j.1745-7254.2008.00866.x>

*Ginseng Reproduction*. (n.d.). Retrieved October 13, 2021, from [http://bioweb.uwlax.edu/bio203/2011/zolondek\\_rose/reproduction.htm](http://bioweb.uwlax.edu/bio203/2011/zolondek_rose/reproduction.htm)