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## A Review on Ganoderma (King of herbs): Health benefits as health supplements

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### Abstract

*Ganoderma lucidum* (*G. lucidum*), commonly referred to as Lingzhi in China, is a fungus which has been widely used through the centuries for the general promotion of health and longevity in Asian countries. The Latin word *lucidus* means “shiny” or “brilliant” and refers to the varnished appearance of the surface of the mushroom. In China, *G. lucidum* is called lingzhi, whereas in Japan the name for the Ganodermataceae family is reishi or maitake. The anti-cancer effects of *G. lucidum* have been demonstrated in both *in vitro* and *in vivo* studies. In addition, the observed anti-cancer activities of Ganoderma have prompted its usage by cancer patients alongside chemotherapy. It has been known to have numerous pharmacological effects including immunomodulating, anti-inflammatory, anti-cancer, anti-diabetic, anti-oxidative and radical-scavenging, and anti-aging effects. The main two bioactive components of *G. lucidum* can be broadly grouped into triterpenes and polysaccharides. Despite triterpenes and polysaccharides being widely known as the major active ingredients, the different biological pathways by which they exert their anti-cancer effect remain poorly defined. Several types of *Ganoderma* products are available on the market including ground fruiting bodies or mycelium processed into capsule or tablet form; extracts from fruiting body or mycelium dried and processed into capsule or tablet form, *Ganoderma* beer and *Ganoderma* hair tonics (Jong and Birmingham, 1992). Most mushrooms are 90% water by weight. For *G. lucidum*, the remaining 10% consists of 26–28% carbohydrate, 3–5% crude fat, 59% crude fibre, and 7–8% crude protein. In addition, *G. lucidum* contains a wide variety of bioactive constituents such as terpenoids, steroids, phenols, glycoproteins, and polysaccharides. In this review, we focused on the various health benefits of *G. lucidum*, in particular, the two main active ingredients: triterpenes and polysaccharides.

**Key words:** *Ganoderma lucidum*, cancer, bioactive pathways, triterpene, polysaccharide.

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### Introduction

Reishi mushroom is a fungus that some people describe as “tough” and “woody” with a bitter taste. The fruiting body (above-ground part) and mycelium (filaments connecting a group of mushrooms) are used as medicine. Reishi mushroom is used for boosting the immune system; viral infections such as the flu (influenza), swine flu, and avian flu; lung conditions including asthma and bronchitis; heart disease and contributing conditions such as high blood pressure and high cholesterol; kidney disease; cancer; and liver disease.

It is also used for HIV/AIDS, altitude sickness, chronic fatigue syndrome (CFS), trouble sleeping (insomnia), stomach ulcers, poisoning, and herpes pain. Other uses include reducing stress and preventing fatigue. In combination with other herbs, reishi mushroom is used to treat prostate cancer. [1,2] They are mainly used for purely medicinal purposes and have a number of health benefits [3]. In fact, it is known among practitioners of Chinese medicine as the “king of herbs.” All mushrooms are the “fruit” of fungi as well as the reproductive part. Ganoderma can be found growing up from underground networks called mycelium near organic waste and logs, which are both a good nutrient source [4]. Given the right conditions, ganoderma can actually be cultivated and used in medicine. The Eastern world has been using ganoderma for thousands of years, particularly in China and Japan. Even the ancient kings and emperors drank reishi tea because it was believed that its properties encouraged vigor and long life. They

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also thought that the tea would increase their wisdom and happiness[5] The use of reishi has reached the Western world where these days people are making elixirs from the mushroom for the purpose of promoting vitality and longevity. It is also used to treat certain medical conditions [6,7]

#### How does it work?

Reishi mushroom contains chemicals that seem to have a variety of potentially beneficial effects, including activity against tumors (cancer) and beneficial effects on the immune system.

- Noncancerous tumors in the colon and rectum (colorectal adenomas). Early research suggests that taking reishi mushroom extract daily for 12 months reduces the number of tumors in people with colorectal adenomas.
- Clogged arteries. Early research suggests that taking a specific reishi mushroom product (Ganopoly) reduces symptoms of clogged arteries, including chest pain and shortness of breath.
- Diabetes. Early research suggests that taking a specific reishi mushroom product (Ganopoly) daily for 12 weeks reduces hemoglobin but not blood sugar levels in people with type 2 diabetes.
- Hepatitis B. Early research suggests that taking a specific reishi mushroom product (Ganopoly) for 12 weeks reduces how much of the hepatitis B virus is circulating in the body. This product also seems to improve liver function in people with this condition.
- High cholesterol. Early research suggests that taking reishi mushroom extract daily for 12 weeks does not affect cholesterol levels in people with high blood pressure and/or high cholesterol.
- High blood pressure. There is inconsistent evidence about the effects of reishi mushroom on high blood pressure. Early research suggests that taking reishi mushroom extract daily for 12 weeks does not lower blood pressure in people with slightly high blood pressure. However, other research suggests that taking reishi mushroom lowers blood pressure in people with more severe high blood pressure.
- Lung cancer. Early research suggests that taking reishi mushroom does not shrink lung tumors. However, it does appear to improve immune function and quality of life in people with lung cancer.
- Shingles-related pain. Some people report that hot water extracts of reishimushroom decreases pain when conventional treatment does not

work.

- Boosting the immune system.
- Viral infections.
- Prostate cancer.
- Asthma and bronchitis.
- Stress.
- Kidney disorders.
- Liver disease.
- HIV disease.
- Altitude sickness.
- Fatigue.
- Chronic fatigue syndrome(CFS).
- Trouble sleeping (insomnia).
- Stomach ulcers.
- Poisoning.
- Other conditions.

More evidence is needed to rate the effectiveness of reishi mushroom for these uses[6]. Reishi mushroom extract is POSSIBLY SAFE when taken by mouth appropriately for up to one year. Reishi mushroom is POSSIBLY UNSAFE when taken by mouth in a powdered form for more than one month. Use of powdered reishimushroom has been associated with toxic effects on the liver. Reishimushroom can also cause otherside effects including dryness of the mouth, throat, and nasal area along with itchiness, stomach upset, nosebleed, and bloody stools. Drinking reishi wine can cause a rash. Breathing in reishi spores can trigger allergies[8]

Here is a list of the benefits that Ganoderma have as a daily dietary supplement or in helping to treat certain medical conditions:

**Antioxidant properties:** These mushrooms are very strong antioxidants protect the body from the negative effects of free radicals that are formed inside the body by daily exposure to the sun, chemicals, and pollutants. Ganoderma are proven to boost the immune system, especially when taken with other antioxidant supplements.

**Potential to prevent cancer:** It is believed that Ganoderma can suppress the growth of tumors in people with cancer. It can reinforce the membranes in cancerous cells to keep the tumor from spreading. For this reason, they are often used in efforts to prevent cancers.

**Relieves respiratory conditions:** Gano-derma are also beneficial for people suffering from asthma and other respiratory conditions because it seems to have a healing effect on the lungs. They are good for building respiratory strength and curbing a cough.

**Anti-inflammatory:** Ganoderma have anti-inflammatory properties and are therefore used

sometimes for patients who have Alzheimer's and heart disease. This is based on the idea that inflammation plays a part in each of these conditions. The pain that accompanies other inflammatory conditions like neuralgia and arthritis may also be lessened by ganoderma supplements.

**Lowers cholesterol:** As far as benefits for the heart, ganoderma can improve the flow of blood to the heart and reduce the amount of oxygen the heart consumes. It can help to lower cholesterol and some of the ingredients may help combat high blood pressure[9].

### Warnings and Precautions

Consult with a doctor before beginning any alternative medicine supplement. Reishi mushrooms can interact with certain medications, and for those on blood thinning medication, reishi mushrooms may increase the risk for bleeding. Reishi mushrooms have the potential to interfere with cancer chemotherapy drugs. Women who are pregnant or breastfeeding should speak with a physician before taking any supplements. There are no specific recommendations on the use of reishi mushrooms for medicinal purposes or for the treatment of any condition. More high quality human studies are needed to know if supplementation from reishi mushrooms, and at what dosage, is safe and beneficial for human health[10]

### Cultivation

All mushrooms are the "fruit" of fungi as well as the reproductive part. Ganoderma can be found growing up from underground networks called mycelium near organic waste and logs, which are both a good nutrient source. Given the right conditions, ganoderma can actually be cultivated and used in medicine. The Eastern world has been using ganoderma for thousands of years, particularly in China and Japan. Even the ancient kings and emperors drank reishi tea because it was believed that its properties encouraged vigor and long life. They also thought that the tea would increase their wisdom and happiness. The use of reishi has reached the Western world where these days people are making elixirs from the mushroom for the purpose of promoting vitality and longevity. It is also used to treat certain medical conditions[9].

### Ingredients in Ganoderma

So exactly what is in ganoderma that give it so many health benefits? Scientists have learned one active ingredient is polysaccharides, which contain beta glucan. Beta glucan is known for its ability to enhance the immune system – in fact it is one of the strongest

immune system supplements there is. Another ingredient in ganoderma is triterpenes. The type found in ganoderma is a ganoderic acid that has been proven in studies to ease the symptoms of allergies by stopping the release of histamines. It also can improve the body's use of oxygen and help the liver function better.[11]

### How Much Ganoderma to Take When Using as A Supplement

The recommended dose when using ganoderma as a dietary supplement is 150 to 900 mg if taken in tablet or capsule form or 1.5 to 9 grams of the dried variety. There have rarely been any side effects reported from ganoderma, but some people who take them for a period of several months may experience dry mouth, dizziness, stomach discomfort, or nosebleeds.[9].

### Benefits of Ganoderma and Supplements

The benefits of ganoderma are so well known and proven that you can get them in forms that are much convenient than slicing them up and cooking with them. You can buy them dried, in concentrated tablets, capsules, or even as an extract. In any of these forms ganoderma can be used as a dietary supplement.

### Health Benefits

According to the book "Herbal Medicine: Bimolecular and Clinical Aspects," reishi mushrooms have been studied, with some intriguing results, for their health benefits, including antioxidant properties and improvements to blood sugar, blood pressure, immunity and liver health. Reishi mushrooms have also been studied for their anticancer activity. A 2003 article published in "Integrative Cancer Therapies" reviewed the action of powdered reishi mushrooms on breast and prostate cancer cells, concluding this supplement had anticancer activity, but the precise mechanism of action was not clear. However, human studies are limited. Most of these studies have been completed on animals. In addition, the human studies did not contain a large enough sample size to provide strong results, and the results were not consistent with animal studies.

### Benefits & Side Effects of Reishi Mushrooms

The reishi mushroom, also known as Ganoderma lucidum or lingzhi, is used in traditional Asian medicine to treat a wide variety of health conditions from cancer to hypertension. This mushroom, which has become increasingly popular due to the reported

health benefits, is available in the form of powder, tea and dietary supplement. This particular mushroom is rich in compounds called triterpenes, which are believed to provide the health benefits. Some side effects have been documented, particularly in high doses and with long-term use, so speak with your doctor before starting this supplement. The reishi mushroom, also known as *Ganoderma lucidum* or lingzhi, is used in traditional Asian medicine to treat a wide variety of health conditions from cancer to hypertension. This mushroom, which has become increasingly popular due to the reported health benefits, is available in the form of powder, tea and dietary supplement. This particular mushroom is rich in compounds called triterpenes, which are believed to provide the health benefits. Some side effects have been documented, particularly in high doses and with long-term use, so speak with your doctor before starting this supplement[10].

### Drawbacks

Dietary supplements are not regulated by the U.S. Food and Drug Administration. This means that supplement companies do not need to provide proof a given supplement contains active components or that the dietary supplements provide any benefit at all. The article in "Integrative Cancer Therapies" indicated that some of the supplements tested were low in biologic activity and that consumers should be cautious when choosing a supplement. In addition, the extract of reishi mushrooms is often combined with other herbal compounds, making it difficult to determine which ingredient is responsible for any noted benefits.

### References

1. Chi H.J. Kao , Amalini C. Jesuthasan , Karen S. Bishop , Marcus P. Glucina , and Lynnette R. Ferguson, Anti-cancer activities of *Ganoderma lucidum*: active ingredients and pathways, *Functional Foods in Health and Disease* 2013; 3(2):48-6
2. Sissi Wachtel-Galor, John Yuen, John A. Buswell, and Iris F. F. Benzie. *Herbal Medicine: Biomolecular and Clinical Aspects*. 2nd edition Benzie IFF, Wachtel-Galor S, editors. Boca Raton (FL): CRC Press/Taylor & Francis; 2011.
3. Najeef Khatian, Muhammad Aslam. A Review of *Ganoderma Lucidum* (Reishi): A Miraculous Medicinal Mushroom. *Inventi Rapid Ethnopharmacology*, 2018;4:1-6.
4. Sliva D, *Ganoderma lucidum* (Reishi) in cancer treatment. *Integr Cancer Ther*. 2003 Dec;2(4):358-64.
5. Sanodiya BS, Thakur GS, Baghel RK, Prasad GB, Bisen PS: *Ganoderma lucidum*: a potent pharmacological macrofungus. *Curr Pharm Biotechnol*. 2009, 10(8):717-742.
6. Boh B, Berovic M, Zhang J, Zhi Bin L: *Ganoderma lucidum* and its pharmaceutically active compounds. *Biotechnol Annu Rev*. 2007, 13:265-301.
7. Zhou XW, Lin J, Yin YZ, Zhao JY, Sun XF, Tang KX: *Ganoder mataceae*: Natural products and their related pharmacological functions. *American Journal of Chinese Medicine*. 2007, 35(4):559-574.
8. Yuen JW, Gohel MD: Anticancer effects of *Ganoderma lucidum*: a review of scientific evidence. *Nutr Cancer*. 2005, 53(1):11-17
9. Akihisa T, Nakamura Y, Tagata M, editors. et al. Anti-inflammatory and anti-tumor-promoting effects of triterpene acids and sterols from the fungus *Ganoderma lucidum*. *Chem Biodivers*. 2007;4:224–31.
10. Benzie I. F. F, Wachtel-Galor S. Biomarkers of long-term vegetarian diets. *Adv Clin Chem*. 2009;47:169–220.

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