

## **Ganoderma lucidum: Constituents and Phytochemicals.:**



### **General Analysis:**

Water 6.9% - Protein 26.4% - Fat 4.5% - Food Fiber 0.1% Ash 19.0% - Carbohydrate 43.1%

Inorganic Matter: Calcium 832 mg/100 g, Phosphorus 4,150 mg/100 g, Iron 82.6 mg/100 g, Magnesium 1,030 mg/100 g, Sodium 375 mg/100 g, Potassium 3,590 mg/100 g,

Vitamins: Vitamin B1 3.49 mg/100 g, Vitamin B2 17.10 mg/100 g, Vitamin B6 0.71 mg/100 g, Choline 1,150 mg/100 g, Niacin 61.9 mg/100 g, Inositol 307 mg/100 g, Polysaccharide 11.4%

### **Reishi mushrooms: Phytochemicals**

Red Reishi is primarily composed of complex carbohydrates called water-soluble high molecular weight Polysaccharides, triterpenoids, Organic Germanium, Adenosine, proteins, amino acids and Vitamins:

Polysaccharides: Beta-D-glucan polysaccharides (beta-glucan polysaccharides)

Sterols: Ergosterol

Fungal lysozyme

Proteinase

Triterpenes: Ganoderic acids

Other constituents: Riboflavin, ascorbic acid, and amino acids, Lipids, Alkaloids, Glucosides, Coumarins, Volatile oil.

### **Key Phytochemicals:**

Beta and hetero-Beta-glucans (antitumour, immunostimulating).

Ling Zhi-8 protein (anti-allergenic, immuno-modulating). LZ-8, an immunomodulating protein which significantly reduces but doesn't entirely shut down antibody production.

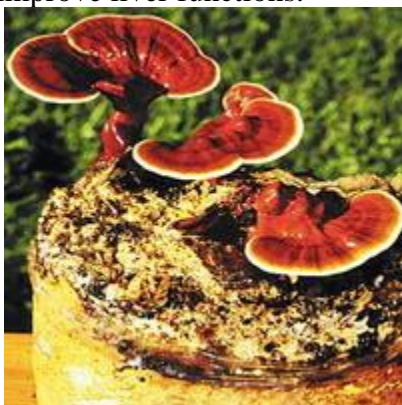
Ganodermic acids:triterpenes (anti-allergenic agents, cholesterol and blood pressure reducing).

Higher level of the RNA which disrupts viral diseases by inducing interferon production.

Oleic Acid, an inhibitor of histamine release

Cyclooctasulfur, a strong inhibitor of histamine release

Researchers have identified that water-soluble polysaccharides are the most active element found in Red Reishi that have anti-tumour, immune modulating and blood pressure lowering effects. Another major active ingredient are triterpenes, called ganoderic acids. Preliminary studies have indicated that ganoderic acids help alleviate common allergies by inhibiting histamine release, improve oxygen utilization and improve liver functions.



Reishi contains several constituents, including sterols, coumarin, mannitol, polysaccharides, and triterpenoids called ganoderic acids. Ganoderic acids seem to help lower blood pressure as well as decrease low density lipoprotein (LDL) and triglyceride levels. These specific triterpenoids also help to reduce blood platelets from sticking together an important factor in lowering the risk for coronary artery disease.

Reishi contains sterols, coumarin, mannitol, alkaloids polysaccharides, mannitol lactones, organic germanium, adenosine, amino acids, and triterpenoids called ganoderic acids. Reishi also contains ergosterols, complete proteins, unsaturated fatty acids, vitamins and minerals. Reishi is the only known source of a group of triterpenes known as ganoderic acids, which have a molecular structure similar to steroid hormones. It has the most active polysaccharides among medicinal plant sources. Ganoderic acids may lower blood pressure and decrease LDL cholesterol.

Ganoderma Spores powder contains 13 kinds of amino acids:arginine,tryptophan,D-asparagic acid,glycin,L-Alanine,L-Threonine,L-Serine,Glutamic acid,Proline and small amount of Methionine,Leucine,Tyrosine,Phenylalanine.Other chemicals including Mannitol,Mannitol-alpha,Alpha-Trehalose,Stearic acid,Palmitic Acid,lignoceric acid( $\text{CH}_3(\text{CH}_2)_{22}\text{COOH}$ ),n-nonadecanoic acid,Behenic acid,Tetracosanol,Hentriacontane and Choline,lycine.Calcium,Magnesium,Sodium,Manganese,Iron,Zinc,Copper and Sulfur.Phosphatidylethanol-amines,phosphatidylcholine.



### **Polysaccharides from Reishi Mushroom:**

One focus for future research is on Reishi spore extracts. In China, it has been used in injectable form in clinical treatments of various ailments with success. One of the things it has successfully treated is low energy, and debilitation following long illness.

Ganoderma contains several kinds of polysaccharides: one water soluble polysaccharides with anti-tumore properties GL-1, composed of Glucose, xylose and Arabinose at mol ratio of 18.8:1.5:1.0, comparative molecular weight about 40000. Also contains other polysaccharides with property of blood sugar lowering, Polysaccharides A, Polysaccharides B, Polysaccharides C, with comparative molecular weight 23000, 74000 and 58000 accordingly, all of them contains one peptide, peptide of Polysaccharides A shares about 2.6%, part of polysaccharides composed of Rhamnose, d-galactose and glucose at mol ratio of 0.4:1.0:0.7. peptide of Polysaccharides C shares about 25.5%, part of polysaccharides 72.5% composed of glucose (69.6%) and d-galactose (2.9%), the amino acid composition of the peptide as: Glycine 12.7%, Alanine 12.5%, Serine 11.5%, Threonine 11.1%, D-asparagic acid 9.2%, Glutamic acid 7.6%, Valine 6.6%, Tyrosine 5.5%, Proline 5.2%, Leucine 4.0% and trace amount of other amino acids.

Another kind of polysaccharides has property of boost the synthesis and metabolism of nucleic acid protein, named Polysaccharides BN3C, 4 homogeneous body derived from this, from identification, proved that BN3C1 is Dextran (Glucose polymer); BN3C3 is a kind of peptide polysaccharides composed of glucose, arabinose at mol ratio 4:1, peptide ratio 5.4% and composed of Cystine, Leucine, Tyrosine, Alanine, Phenylalanine, Valine, Glutamic acid, gamma-aminobutyric acid (GABA) and trace amount of arginine, lysine, Methionine and histidine.

Researchers have identified that water-soluble polysaccharides are the most active element found in Red Reishi that have anti-tumour, immune modulating and blood pressure lowering effects. Recent reishi studies have used the amount of water-soluble

polysaccharide content in a reishi product to evaluate its potency. The higher the amount of water-soluble polysaccharide content the product contains, the more potent it is.

If you have visited our Echinacea page, then you are already aware of some of the powerful properties of polysaccharides (basically large sugar molecules).

Extract of reishi contains about 10% polysaccharides and 5% protein. Some of these polysaccharides have demonstrated anti-tumor activity.

The polysaccharides, G-I (Beta-D-glucan) and GL-1, for example, have both been shown to inhibit sarcoma. Evidence also suggests polysaccharide ability to stimulate macrophage production of interleukins. Interleukins regulate blood cell production and interleukin-2 (there are at least 12 interleukins) stimulates T-lymphocytes and is being investigated in the treatment of cancer. Which polysaccharide, or combination thereof, is responsible for this action is not clear. The protein portion of the extract contains 17 amino acids.



### **Triterpenes from Reishi:**

Another major active constituent found in Red Reishi are triterpenoids, called Ganoderic acids. Preliminary studies indicated that ganoderic acids help alleviate common allergies by inhibiting histamine release, improve oxygen utilization and improve liver functions. Triterpenoids are bitter in taste and the level of the triterpenoid content contained in a product can be determined by the bitterness. Users of Ginkgo Biloba, Horse Chestnut and Valerian will recognize the potential benefits of terpenes.

The potency of Reishi mushrooms is usually based on its level of triterpenoids. One can determine the level of this by tasting it. The more bitter it is, the higher the level of triterpenoids. Because Reishi is a polypore, (a group of hard, woody, bracket-like mushrooms) it is not eaten, but cut into pieces and made into a tea. In China, the average dose is 3 to 5 grams a day. Other popular forms of delivery are the water/alcohol extracts and powders.

For these people it should come as little surprise that the triterpene-rich reishi mushroom is reputed to reduce hypertension. What may be news, however, is that the same compounds may also be adaptogenic and anti-allergic. The Ganoderic acids, C, A and D--in that order--appear to have the greatest anti-allergic activity, inhibiting

histamine release. Ganoderic acids B and D may reduce hypertension. Studies done on a combination formula of reishi and other ganoderma species have shown these anti-allergic effects to be perhaps this medicinal's most promising property. The combination formula has been observed to have a modulating and stabilizing effect on immunoglobulin levels. Patients with bronchitis, bronchial asthma, and allergies have all done well on reishi extract. Triterpene content may explain reishi's ability to alleviate altitude sickness, as reported by Chinese mountain climbers ascending as high as 17,000 ft.



Reishi mushrooms and mushroom extracts are generally analyzed for specific triterpenoids called Ganoderic acids. When buying a Reishi mushroom product, check for the analysis of how much triterpenoids is in the extract or powder.

"There is no standardization yet, either here or in Asia for Reishi. You have to look for high ganoderic acid-A levels, which indicates high levels of other ganoderic acids," said Kenneth Jones, a researcher/writer specializing in the ethnopharmacology of medicinal plants.

**Reference:**

- 1.Reishi mushroom *Ganoderma lucidum*,Marvelous Lucky Fungus from Orient World.

This article written and edited via [herbalist](#) of [MDidea Extracts Professional](#). They run a range of online descriptions about this herb,including general information related and summarized updating discoveries from findings of professional scientists in this field related.Describe style aimed to form a useful detecting literature space where the intertwined threshold and related questions raise out and visualize themselves.

♣ last edit date:13th,Oct.2010.