

Supplement based on a pure, high strength extract (8:1) of the medicinal fungus *Ganoderma lucidum*, very valued for its activity on the immune system, its anti-tumour action and its capacity to improve nervous balance and increase longevity. It supplies a great variety of bioactive compounds, but those mainly responsible for its therapeutic properties are polysaccharides, specifically beta-glucans, triterpenes and ergosterols. It also provides minerals (zinc, copper, iodine and iron, among others), amino acids and adenosine analogues.

The method of polysaccharide extraction is a critical point that determines the concentration and efficacy of the product. Our extract is obtained through a validated extraction process in hot water which concentrates, guarantees and preserves the active compounds, leading to a higher final concentration of polysaccharides. Mycelium contains polysaccharides that are bound to the cell walls of chitin, which is indigestible in the gastrointestinal tract. Chitin must be dissolved in hot water in order to release the polysaccharides and guarantee a high polysaccharide content as well as greater bioavailability. The extract is standardized to 40% polysaccharide content.

The mushrooms used for our formulation have been cultivated in greenhouses under climate controlled conditions and are free of heavy metals, herbicides and pesticides in order to guarantee the purity and strength of the extract.

**Ingredients:** Reishi extract (*Ganoderma lucidum*), anticaking agent: vegetable magnesium stearate, vegetable capsule (glazing agent: hydroxypropylmethylcellulose, purified water).

<b>Nutritional Information:</b>	<b>1 capsule (628 mg)</b>	<b>Size and format:</b> 60 vegetable capsules.
Reishi extract 8:1 (40% polysaccharides)	500 mg	
Hot-water extraction		<b>Recommended daily dose:</b> 1 capsule daily. Do not exceed the stated recommended daily dose.

#### Indications and uses:

- It has anti-tumour properties and is recognized as a coadjuvant for chemotherapy and radiotherapy as well as for fatigue related to breast cancer.
- It helps treat allergies because of its immune-modulating and anti-inflammatory properties.
- It has hepatoprotective properties in patients with chronic hepatitis B.
- It offers cardiovascular protection (cholesterol, diabetes, hypertension and coronary disease).
- States of convalescence and feeling run-down, and in situations requiring greater resistance to different types of stress (anxiety, depression, insomnia, neurasthenia).
- Autoimmune diseases (rheumatoid arthritis, systemic lupus erythematosus, polymyalgia, etc.).
- Neuroprotection (Alzheimer's, Parkinson's), anti-ageing therapies.
- It reduces glucose levels in patients with diabetes mellitus type II.
- It inhibits the activity of 5-alpha-reductase, making it potentially useful for benign prostatic hyperplasia.

**Cautions:** Consult a health-care practitioner before use if you are pregnant or breast-feeding, if you are treated with medication (immunosuppressants), or if you have a special medical condition (immune system disorder).

**REISHI (*Ganoderma lucidum*):** Used and known as Lingzhi in Traditional Chinese Medicine for thousands of years, today it is still one of the most widely used medicinal fungi because of its great variety of properties. Reishi is its name in Japanese, which translates as “the mushroom of immortality” and “the elixir of life”, as it is known for increasing longevity and as an adaptogen, improving the body’s ability to adapt to changes and diverse stressors (physical, mental or emotional).

The use of its extract allows for a synergic effect between the different active principles that make it up; the triterpenes suppress the growth and invasive behaviour of cancer cells, while the polysaccharides stimulate the immune system, increasing the cytokine production and anti-tumour activity of the immune cells, as well as exerting an antioxidant action.

This fungus also exerts antiangiogenic activity, suppressing the creation of new blood vessels which supply nutrients to tumour cells and allow for their invasion.

This fungus has been used in different clinical trials for its benefits on strengthening the defences of cancer patients (lung, breast, colon and prostate cancer), above all in combination with chemotherapy and/or radiotherapy. It significantly increases immune response in patients with advanced stages of cancer <sup>(1-3)</sup>. In several studies, *G. lucidum* interferes with different points of the cell cycle, detaining the growth of tumour cells and reducing fatigue related to breast cancer <sup>(4)</sup>.

Its activity against allergies and asthma is due to its immune-modulating and anti-inflammatory properties, which inhibit the release of histamine and other chemical mediators of mastocytes, neutrophils and macrophages <sup>(5-7)</sup>.

Triterpenes are attributed other properties as well, such as their hepatoprotective effect, for which they have been used in the treatment of hepatic diseases (8-10). Clinical studies show that its extracts are effective in patients with chronic hepatitis B <sup>(11-12)</sup>.

Some of the triterpenes in *G. lucidum* have been studied in cardiovascular disease with very good results, showing beneficial effects on blood pressure and serum lipids in patients with coronary disease <sup>(13-14)</sup>.

It is also highly considered for certain states such as anxiety, insomnia and stress because of its hypnotic and calming effect on the nervous system, significantly decreasing time to sleep onset and increasing total sleep time <sup>(15-16)</sup>.

Its anti-inflammatory properties explain its effect on chronic pathologies such as arthritis, or its modulating effect on chronic inflammatory response. "In vitro", it inhibits the production of synovial fibroblasts of rheumatoid arthritis, suggesting its possible application in treating autoimmune conditions such as rheumatoid arthritis <sup>(17)</sup>.

It inhibits the toxicity of synaptic beta-amyloid, making it a potential treatment for Alzheimer's disease <sup>(18)</sup>.

It also affects cardiovascular health <sup>(13-14)</sup>, the immune system <sup>(1)</sup> and the control of glucose <sup>(19)</sup> and cholesterol levels <sup>(20)</sup>.

It improves the symptoms of neurasthenia <sup>(21)</sup>.

It also has an effect on glucose control in patients with diabetes mellitus type II <sup>(22)</sup>.

The synergy between polysaccharides and triterpenes has also been seen in benign prostatic hyperplasia upon inhibiting the activity of 5-alpha-reductase <sup>(23)</sup> and improving its related symptoms <sup>(24)</sup>.

Many studies have been carried out in order to quantify this antioxidant action using biomarkers, the assessment of antioxidant enzymes and the activity of the mitochondrial complex in cardiac cells. The results indicate a potent antioxidant action in *G. lucidum* that has been linked to a lower risk of coronary disease and a decrease in cell energy loss associated with age <sup>(25)</sup>.

It also exerts an antiviral effect by inhibiting replication, which has been shown in herpes simplex I and II, HIV and Hepatitis B <sup>(11, 26, 27)</sup>. As an antibacterial agent, it has shown efficacy against Gram + bacteria (*B. subtilis*, *Staphylococcus aureus*, *E. faecalis*) and Gram – bacteria (*E.coli*, *Pseudomonas aeruginosa*) <sup>(28)</sup>.

## References:

- 1) Gao, Yihuai, et al. "Effects of Ganopoly® (A Ganoderma lucidum polysaccharide extract) on the immune functions in Advanced-Stage cancer patients." *Immunological investigations* 32.3 (2003): 201-215.
- 2) Gao, Yihuai, et al. "A randomized, placebo-controlled, multicenter study of Ganoderma lucidum (W. Curt.: Fr.) Lloyd (Aphyllophoromycetideae) polysaccharides (Ganopoly®) in patients with advanced lung cancer." *International Journal of Medicinal Mushrooms* 5.4 (2003).
- 3) Gao, Yihuai, et al. "Effects of water-soluble Ganoderma lucidum polysaccharides on the immune functions of patients with advanced lung cancer." *Journal of medicinal food* 8.2 (2005): 159-168.
- 4) Zhao, Hong, et al. "Spore powder of Ganoderma lucidum improves cancer-related fatigue in breast cancer patients undergoing endocrine therapy: a pilot clinical trial." *Evidence-Based Complementary and Alternative Medicine* 2012 (2011).
- 5) Tasaka, K., et al. "Anti-allergic constituents in the culture medium of Ganoderma lucidum.(I) Inhibitory effect of oleic acid on histamine release." *Inflammation Research* 23.3 (1988): 153-156.
- 6) Tasaka, K., et al. "Anti-allergic constituents in the culture medium of Ganoderma lucidum.(II) The inhibitory effect of cyclooctasulfur on histamine release." *Agents and Actions* 23.3-4 (1988): 157-160.
- 7) Powell, Martin. "The use of Ganoderma lucidum (Reishi) in the management of histamine-mediated allergic responses." *Townsend Letter: The Examiner of Alternative Medicine* 274 (2006): 78-82.
- 8) Shi, Yanling, et al. "Hepatoprotective effects of Ganoderma lucidum peptides against D-galactosamine-induced liver injury in mice." *Journal of Ethnopharmacology* 117.3 (2008): 415-419.
- 9) Lakshmi, B., et al. "Antimutagenic activity of methanolic extract of Ganoderma lucidum and its effect on hepatic damage caused by benzo [a] pyrene." *Journal of ethnopharmacology* 107.2 (2006): 297-303.
- 10) Wang, Xin, et al. "Effects of Ganoderma lucidum polysaccharide on CYP2E1, CYP1A2 and CYP3A activities in BCG-immune hepatic injury in rats." *Biological and Pharmaceutical Bulletin* 30.9 (2007): 1702-1706.
- 11) Gao, Yihuai, et al. "A Phase I/II Study of a Ganoderma lucidum (Curt.: Fr.) P. Karst.(Ling Zhi, Reishi Mushroom) extract in patients with chronic hepatitis B." *International Journal of Medicinal Mushrooms* 4.4 (2002).
- 12) Yan, R., Y. X. Zhou, and J. B. Liu. "Treatment of chronic hepatitis B with Wulingdan pill." *J Fourth Milit Med Coll* 8 (1987): 380-3.
- 13) Gao, Yihuai, et al. "A phase I/II study of ling zhi mushroom Ganoderma lucidum (W. Curt.: Fr.) Lloyd (Aphyllophoromycetideae) extract in patients with coronary heart disease." *International Journal of Medicinal Mushrooms* 6.4 (2004).
- 14) Chu, Tanya TW, et al. "Study of potential cardioprotective effects of Ganoderma lucidum (Lingzhi): results of a controlled human intervention trial." *British journal of nutrition* 107.7 (2012): 1017-1027.
- 15) Chu, Qing-Ping, et al. "Extract of Ganoderma lucidum potentiates pentobarbital-induced sleep via a GABAergic mechanism." *Pharmacology Biochemistry and Behavior* 86.4 (2007): 693-698.
- 16) Cui, Xiang-Yu, et al. "Extract of Ganoderma lucidum prolongs sleep time in rats." *Journal of ethnopharmacology* 139.3 (2012): 796-800.
- 17) Ho, Y. W., et al. "Ganoderma lucidum polysaccharide peptide reduced the production of proinflammatory cytokines in activated rheumatoid synovial fibroblast." *Molecular and cellular biochemistry* 301.1-2 (2007): 173-179.
- 18) Lai, Cora Sau-Wan, et al. "Antagonizing  $\beta$ -amyloid peptide neurotoxicity of the anti-aging fungus Ganoderma lucidum." *Brain research* 1190 (2008): 215-224.
- 19) Seto, S. W., et al. "Novel hypoglycemic effects of Ganoderma lucidum water-extract in obese/diabetic (+ db/+ db) mice." *Phytomedicine* 16.5 (2009): 426-436.
- 20) Berger, A., et al. "Cholesterol-lowering properties of Ganoderma lucidum in vitro, ex vivo, and in hamsters and minipigs." *Lipids in health and disease* 3.1 (2004): 2.
- 21) Tang, Wenbo, et al. "A randomized, double-blind and placebo-controlled study of a Ganoderma lucidum polysaccharide extract in neurasthenia." *Journal of medicinal food* 8.1 (2005): 53-58.
- 22) Gao, Yihuai, et al. "A phase I/II study of Ling Zhi mushroom Ganoderma lucidum (W. Curt.: Fr.) Lloyd (Aphyllophoromycetideae) extract in patients with type II diabetes mellitus." *International Journal of Medicinal Mushrooms* 6.1 (2004).
- 23) Liu, Jie, et al. "5 $\alpha$ -Reductase inhibitory effect of triterpenoids isolated from Ganoderma lucidum." *Biological and Pharmaceutical Bulletin* 29.2 (2006): 392-395.
- 24) Noguchi, Masanori, et al. "Randomized clinical trial of an ethanol extract of Ganoderma lucidum in men with lower urinary tract symptoms." *Asian journal of andrology* 10.5 (2008): 777-785.
- 25) Wachtel-Galor, Sissi, et al. "Ganoderma lucidum ('Lingzhi'); acute and short-term biomarker response to supplementation." *International journal of food sciences and nutrition* 55.1 (2004): 75-83.
- 26) Avtonomova, A. V., and L. M. Krasnopolskaya. "Antiviral properties of basidiomycetes metabolites." *Antibiotiki i khimioterapiia= Antibiotics and chemotherapy [sic]* 59.7-8 (2014): 41-48.
- 27) Hijikata, Yasuyo, Seika Yamada, and Akihiro Yasuhara. "Herbal mixtures containing the mushroom Ganoderma lucidum improve recovery time in patients with herpes genitalis and labialis." *The Journal of Alternative and Complementary Medicine* 13.9 (2007): 985-987.
- 28) Vazirian, Mahdi, et al. "Antimicrobial effect of the Lingzhi or Reishi medicinal mushroom, Ganoderma lucidum (higher Basidiomycetes) and its main compounds." *International journal of medicinal mushrooms* 16.1 (2014):77-84.