



Ganoderma lucidum – Reishi

Ganoderma lucidum 1:2 Fluid extract 25%

Common Names: Lingzhi, Reishi

Botanical family: Reishitaceae

Part Used: Fruiting body

Dosage: 30-60ml per week

Primary Active Constituents: Polysaccharides especially b-glucans, peptidoglycans, protein 7–8% dried weight, including leucine and lysine, triterpenes (including ganoderic acids, meroterpenoids and sesquiterpenoids), steroids, alkaloids, benzopyran and benzoic acid derivatives, phosphorus, silica, sulphur, potassium, calcium, and magnesium, lectins, glycoproteins and polyunsaturated fatty acids^{1,2,3,4}.

Cautions & contraindications: Reishi is considered safe for long term use. No data is available as to safety in pregnancy.

Actions: Cancer-protective, antioxidant, immunomodulatory, anti-inflammatory, systemic tonic.

Main Indications: Support for healthy aging, chronic inflammatory conditions, cancer (as adjunct).

Historical Use

Recognized as a medicinal mushroom for over 2000 years, Lingzhi is included in the *Shen Nong Ben Cao Jing*, written in the Eastern Han dynasty of China (25-220 AD). Considered the foremost of the Superior herbs, the listed properties included tonifying effects, enhancing vital energy, strengthening cardiac function, increasing memory, and antiaging effects.

In Modern use, according to the *State Pharmacopoeia of the People's Republic of China*, *G. lucidum* acts to replenish Qi, ease the mind, and relieve cough and asthma¹. Originally a rare wild mushroom in China, it is now commercially cultivated⁵. It's Japanese name, Reishi, has become most prevalent outside of China.

Research Summary

There are currently 217 Reishi species recognised throughout the world, differing greatly in morphology and appearance. However, traditional use and research focuses on *Ganoderma lucidum* and *G. sinense*⁶. In Southern China, the black *C. sinense* is preferred, while in Japan, the red *G. lucidum* is more popular¹. The traditional approach of a double extraction using both water and ethanol, to some extent replicated by the use of hydro-ethanolic extraction in modern tinctures, seems to best leverage the full spectrum of action demonstrated by a synergy of polysaccharides and triterpenes.

Anti-inflammatory and antioxidant activity

Several studies note that Reishi extracts increase the activity of superoxide dismutase, glutathione peroxidase and catalase, thus protecting against oxidative stress and providing support in many conditions². This may be the foundation of its traditional reputation as beneficial for cardiac conditions and as an anti-aging elixir⁷.

A 2017 review evaluated numerous Reishi extracts. All demonstrated antioxidant activity regardless of the solvent used. Although ethanolic extracts demonstrated the greatest activity, water extracts, via the polysaccharide fraction, were also effective⁸.

An *in vitro* study determined that a hydro-ethanolic Reishi extract decreased the levels of several pro-inflammatory cytokines, including IL-6, IL-8, MMP-2 and MMP-9⁹.

Immunomodulation

Reishi extracts have been demonstrated to activate T and B lymphocytes, macrophages, dendritic cells (DCs) and natural killer (NK) cells. This, by promoting lymphocyte proliferation and phagocytosis, increasing cytokine production and supporting NK cell-mediated cytotoxicity, creates wide-ranging effects across the immune system.

For example, an *in vivo* treatment with Reishi extract activated bone marrow-derived macrophages from sarcoma S180-bearing mice, resulting in production of immunomodulatory substances, such as IL-1 β , TNF- α and nitric oxide (NO).

Reishi extracts increased the population of CD14⁺CD26⁺ monocyte/macrophage, CD83⁺CD1a⁺ DCs, and CD16⁺CD56⁺ NK cells by 2.9, 2.3, and 1.5 fold, respectively, in human umbilical cord blood mononuclear cells, while oral administration of *G. lucidum* extract enhanced NK cell activities and phagocytosis in mice³. NK cells can create a rapid immune response, as they recognize stressed cells in the absence of antibodies and major histocompatibility complex, making them fundamental to innate immunity.

Antimicrobial

Although *in vitro* research regarding the antimicrobial potential of Reishi has been undertaken for over 2 decades, clinical evidence is lacking.

However, Reishi contains two key classes of constituents that have antimicrobial activity.

Terpenoids play an accepted role in microbicide, and the more than 150 triterpenes in Reishi exhibit significant antibacterial activity¹⁰, while isolated terpenoids from Reishi have demonstrated anti-HIV activity *in vitro*¹¹.

A water extract of Reishi was found to be inhibitory against *Pseudomonas aeruginosa*, *Proteus vulgaris* and *Enterococcus faecalis*¹⁵, which supports other research demonstrating the polysaccharides, containing β -1,3-glucans or α -1,4-linked polymannose, from fruiting bodies, as also having significant antimicrobial impact².

Cancer

Older clinical studies suggest positive benefits from adjunct use of Reishi during cancer treatments, including improvement of quality of life¹².

A 2016 Cochrane review supported this, noting that it may prove beneficial as an adjunct, considering the potential to enhance tumour response and ability to modulate host immunity¹⁴. Chemo-protective effects occur via supportive immunomodulatory, anti-inflammatory, antioxidant actions, affecting cell motility and proliferation, slowing angiogenesis and promoting healthy apoptosis¹⁶.

However, recent studies suggest that Reishi also exerts direct cytostatic and cytotoxic effects on tumour cells.

In *in vitro* research using human breast cancer cell lines and murine melanoma cell lines, cell migration and tumour proliferation were inhibited at 2mg/mL⁹.

A 2018 review identified several *in vitro* and animal studies that evaluated anti-cancer action.

Reishi extracts antagonized the inhibitory effects of melanoma B16F10 cell culture supernatant on lymphocytes, and prevented B16F10 cells from reducing the expression of CD71 and Fas ligand in lymphocytes. Reishi extract partially reversed abnormal lymphocyte activity (such as inhibited proliferation and perforin production) in plasma taken from patients with lung cancer patients inhibited proliferation, CD69 expression, and perforin and granzyme B production in lymphocytes, which was partially reversed by Reishi extract³.

Oral administration of *G. lucidum* extract (at a dose of 28 mg/kg/day) for 13 weeks inhibited breast SUM-149 xenograft volume and tumour weight by 58% and 45%, respectively, while another mouse study found that large doses (200 and 400mg/kg) of an aqueous extract of *G. lucidum* reduced tumour weight in a dose dependent manner³.

Methanol extracts from fruiting bodies reduced colorectal cell line tumour growth via inhibition of cell proliferation and apoptosis induction¹².

The form of extract has some bearing here. While water-extracted polysaccharides have a greater antioxidant effect that ethanol-extracted triterpenes, in *in vitro* studies, it is the alcohol extracts that, overall, demonstrate greater tumour inhibition.

Summary

Reishi, by virtue of its deep systemic support, can be a foundational addition particularly for clients beginning to transition from middle-age. As with all vitality and longevity herbs, long term, sustained use is the traditional, time-tested approach.

Reishi is safe and nourishing for long-term consumption, and it should be considered a tonic rather than an acute dosing option.

References available on request

Reishi

Suggested Combinations

Cancer adjunct

- Green Tea
- Pomegranate
- Baical skullcap
- Withania
- Astragalus

Aging support

- Ginkgo
- Crataegus spp.
- Withania
- Green Tea

Immune support

- Echinacea
- Astragalus
- Lomatium