

Chaga SAP

Science-based hot-water mushroom extract for optimal health and immune support

Chaga SAP is a hot water-extract medicinal mushroom, known by its scientific classification as *Inonotus obliquus*. Chaga is parasitic on birch and other trees, and the conk presents as a mass of mycelium with the appearance of burnt charcoal, due to large amounts of melanin. Chaga is nutrient-dense, concentrated with polysaccharides, flavonoids, betulinic acid, polyphenols, minerals, enzymes, and several B vitamins, including pantothenic acid, riboflavin, and niacin. In vitro studies on chaga mushroom extract demonstrate antitumour, immunomodulating, gene-protective, and antiseptic activities.

ACTIVE INGREDIENTS

Each vegetable capsule contains:

Chaga (*Inonotus obliquus* fruiting body)
8:1 extract, 40% polysaccharides..... 350 mg

Other ingredients: Vegetable magnesium stearate and silicon dioxide in a vegetable capsule composed of vegetable carbohydrate gum and purified water.

This product is non-GMO.

Contains no: Gluten, soy, wheat, corn, eggs, dairy, yeast, citrus, preservatives, artificial flavour or colour, starch, or sugar.

Chaga SAP contains 60 capsules per bottle.

DIRECTIONS FOR USE

Adults: Take 1 capsule daily or as directed by your healthcare practitioner.

INDICATIONS

Chaga SAP may be used to promote antiviral activity, and can be used:

- To support healthy immunomodulation.
- To promote antioxidant activity.
- To support glucose and lipid metabolism and cardiovascular health.

CAUTIONS AND WARNINGS

Consult a healthcare practitioner prior to use if you have diabetes, a medical condition, or an autoimmune condition; or if you are taking prescription medication, anticoagulant medications, or immunosuppressants.

Contraindications: Do not use if you are pregnant or breast-feeding.

Known adverse reactions: Discontinue use and consult a healthcare practitioner if adverse reactions occur.

PURITY, CLEANLINESS, AND STABILITY

All ingredients listed for all **Chaga SAP** lot numbers have been tested by a third-party laboratory for identity, potency, and purity.



Scientific Advisory Panel (SAP):
adding nutraceutical research
to achieve optimum health



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Chaga, scientifically known as *Inonotus obliquus*, has been widely used as a folk medicine for stomach disease, cardiovascular health, and cancer therapy since the 16th century in Russia, Poland, and most of the Baltic countries.^[1,2] *I. obliquus* is a parasitic fungus that belongs to the family Hymenochaetaceae of the division Basidiomycetes. It presents as a sterile conk (*sclerotium*, plural *sclerotia*) growing on birch, alder, beech, and other hardwood trees throughout Russia, North America, Eastern Europe, and Japan. The sclerotia of *I. obliquus* contain many steroids and phenolic compounds with biological activities, including triterpenoids, lanosterol, inotodiol, and trametenolic acids.^[3] While no human clinical trials have been conducted on *I. obliquus* to date, in vitro and animal studies demonstrate that extracts of *I. obliquus* possess antitumour, immunomodulating, anti-inflammatory, antioxidant, antibacterial, antiviral, and hepatoprotective properties.^[1,2]

CHAGA AND ANTITUMOUR ACTIVITY

Cell studies have demonstrated the anticancer effects of *I. obliquus* extracts in hepatoma, leukemia, colon, and cervical carcinomas.^[2] Nakajima et al. revealed that the phenolic compounds of *I. obliquus* extract possess a target toxicity against several lines of cancer cells, without having cytotoxic effects against normal, healthy cells.^[4] In addition, the glucan and polysaccharide-triterpenoid complexes of *I. obliquus* are considered direct antitumour agents and exhibit oncostatic activities, inhibiting the proliferation of cancer cells,^[5] and suppressing the growth of melanoma.^[6] Kim et al. observed different mechanistic effects of *I. obliquus* polysaccharides from mycelia and sclerotia.^[3] More specifically, the anticancer effects of sclerotia polysaccharides were due to direct inhibition of protein synthesis of tumour cells, whereas mycelia polysaccharides produced an indirect effect through activation of immune cells.

Oxidative stress and mutagenic activity contribute to the progression of cancer.^[7] Chung et al. identified that bioactive subfractions of *I. obliquus*, including 3 β -hydroxy-lanosta-8,24-dien-21-al, inotodiol, and lanosterol, have antimutagenic and antioxidative activities, contributing to anticancer effects in vitro against the proliferation of human cancer cells, including lung, stomach, breast, and cervical carcinoma cell lines, and in vivo against sarcoma tumour growth in a mouse model.^[7] More specifically, the subfraction 3 β -hydroxy-lanosta-8,24-dien-21-al isolated from *I. obliquus* was most effective and, at concentrations of 0.1 and 0.2 mg/mouse per day, significantly decreased tumour volume by ~24% and 34%, respectively, compared to control in a mouse model.

CHAGA AND IMMUNOMODULATION

Mushroom polysaccharides activate the immune system via stimulation of T cells, B cells, natural killer cells, and macrophages.^[8] The polysaccharides isolated from *I. obliquus* sclerotia and submerged mycelium cultures have immune-boosting activity, ideal as a biological response modifier (BRM) that induces cellular and humoral immunities. Kim investigated the immunomodulatory effect of *I. obliquus* water extract administered daily for 24 days on bone marrow cells from chemically immunosuppressed mice.^[9] After only eight days of treatment, *I. obliquus* extract increased the number of colony-forming units of granulocytes/macrophages and erythroid burst-forming units to near normal levels, and induced the proliferation of cells committed to splenocyte formation. In addition, *I. obliquus* increased the serum levels of IL-6 and effectively suppressed TNF- α . These cytokines were found to stimulate stem-cell recovery and hematopoietic regeneration after bone-marrow damage. Kim concluded that *I. obliquus* water extract is an effective BRM with very potent immunomodulatory activity that recovers bone marrow systems damaged by chemotherapy. Thus, Kim suggests *I. obliquus* water extract use as an immune enhancer in immunocompromised and immunosuppressed patients, particularly during chemotherapy.

CHAGA AND HYPOGLYCEMIC EFFECTS

Hyperglycemia and hyperlipidemia play a key role in the development of cardiovascular complications associated with diabetes. Research using a diabetic mouse model revealed that polysaccharides of *I. obliquus* are effective in the reduction of blood glucose, triglycerides, fatty acids, and cholesterol levels.^[10] The main mechanism of action of *I. obliquus* hypoglycemic effect may be mediated through the interaction between insulin and gluconeogenesis, which further affects and normalizes glucose metabolism in the liver and other tissues in the body.^[10] In addition, polysaccharides found in *I. obliquus* were shown to have potent antioxidant defense mechanisms in these diabetic mice and histological morphology examination showed the ability of *I. obliquus* to regenerate pancreatic tissue.^[10]

CHAGA AND ANTIOXIDANT ACTIVITY

Polyphenols are known to have antioxidant activity due to their ability to scavenge free radicals by single-electron transfer. *I. obliquus* contains a wide variety of free radical-scavenging molecules that contribute to their antioxidant activity.^[11] Cui et al. investigated the antioxidant activity of different extracts from *I. obliquus*, as assessed by their ability to scavenge free radicals and protect human keratinocyte cells from oxidative stress.^[11] The polyphenolic extract had the strongest antioxidant activity, the triterpenoid and steroid extracts had a relatively strong antioxidant effect, whereas the polysaccharide extract had no effect. In addition, the polyphenolic extract protected human keratinocytes against hydrogen peroxide-induced oxidative stress, whereas the triterpenoid, steroid, and polysaccharide extracts were ineffective. It is suggested that the antioxidant activities of *I. obliquus* are responsible for its therapeutic effects against cancer, cardiovascular disease, and diabetes.

CHAGA AND ANTIVIRAL ACTIVITY

Used in traditional folk remedy, *I. obliquus* has shown its ability to treat virus-induced diseases. Early in vitro studies demonstrated that lignin-like polyphenol extracts of *I. obliquus* inhibit the proteases of human immune-deficiency type 1 (HIV-1) viruses,^[12] whereas the triterpenoids and mycosterols obtained from the charcoal-like surface layer of *I. obliquus* inhibited human and horse type A and B influenza viruses.^[13] Recently, Pan et al. demonstrated that aqueous extract from *I. obliquus* decreased the early stages of herpes simplex virus infection by acting on viral glycoproteins and inhibiting viral-induced membrane fusion in vitro.^[14] The active compounds and antiviral activity of *I. obliquus* continue to be investigated.

REFERENCES

- Lemieszek, M.K., et al. "Anticancer effects of fraction isolated from fruiting bodies of Chaga medicinal mushroom, *Inonotus obliquus* (Pers.Fr.) Pilát (Aphyllorphomycetidae): In vitro studies." *International Journal of Medicinal Mushrooms* Vol. 13, No. 2 (2011): 131-143.
- Balandaykin, M.E. and I.V. Zmitrovich. "Review on chaga medicinal mushroom, *Inonotus obliquus* (higher basidiomycetes): Realm of medicinal applications and approaches on estimating its resource potential." *International Journal of Medicinal Mushrooms* Vol. 17, No. 2 (2015): 95-104.
- Kim, Y.O., et al. "Immuno-stimulating effect of the endo-polysaccharide produced by submerged culture of *Inonotus obliquus*." *Life Sciences* Vol. 77, No. 19 (2005): 2438-2456.
- Nakajima, Y., et al. "Cancer cell cytotoxicity of extracts and small phenolic compounds from Chaga [*Inonotus obliquus* (Persoon) Pilát]." *Journal of Medicinal Food* Vol. 12, No. 3 (2009): 501-507.
- Song, Y., et al. "Identification of *Inonotus obliquus* and analysis of antioxidation and antitumor activities of polysaccharides." *Current Microbiology* Vol. 57, No. 5 (2008): 454-462.
- Won, D.P., et al. "Immunostimulating activity by polysaccharides isolated from fruiting body of *Inonotus obliquus*." *Molecules and Cells* Vol. 31, No. 2 (2011): 165-173.
- Chung, M.J., et al. "Anticancer activity of subfractions containing pure compounds of Chaga mushroom (*Inonotus obliquus*) extract in human cancer cells and in Balb/c mice bearing Sarcoma-180 cells." *Nutrition Research and Practice* Vol. 4, No. 3 (2010): 177-182.
- Wasser, S.P. "Medicinal mushrooms as a source of antitumor and immunomodulating polysaccharides." *Applied Microbiology and Biotechnology* Vol. 60, No. 3 (2002): 258-274.
- Kim, Y.R. "Immunomodulatory activity of the water extract from medicinal mushroom *Inonotus obliquus*." *Mycobiology* Vol. 33, No. 3 (2005): 158-162.
- Sun, J.E., et al. "Antihyperglycemic and antilipidperoxidative effects of dry matter of culture broth of *Inonotus obliquus* in submerged culture on normal and alloxan-diabetic mice." *Journal of Ethnopharmacology* Vol. 118, No. 1 (2008): 7-13.
- Cui, Y., et al. "Antioxidant effect of *Inonotus obliquus*." *Journal of Ethnopharmacology* Vol. 96, No. 1-2 (2005): 79-85.
- Ichimura, T., et al. "HIV-1 protease inhibition and anti-HIV effect of natural and synthetic water-soluble lignin-like substance." *Bioscience, Biotechnology, and Biochemistry* Vol. 63, No. 12 (1999): 2202-2204.
- Kahlos, K. "Preliminary test of antiviral activity of two *Inonotus obliquus* strains." *Fitoterapia* Vol. 67, No. 4 (1996): 344-347.
- Pan, H.H., et al. "Aqueous extract from a chaga medicinal mushroom, *Inonotus obliquus* (higher Basidiomycetes), prevents herpes simplex virus entry through inhibition of viral-induced membrane fusion." *International Journal of Medicinal Mushrooms* Vol. 15, No. 1 (2013): 29-38.