

Wild crafted Siberian Chaga Extract

Inonotus obliquus

The Premier Medicinal Mushroom

A Dynamic Anti-Aging Longevity Food Supplement

Definition: Adaptogen**. Contains:** 215 phyto-nutrients including 29 polysaccharide and beta glucan derivatives.

The primary active compounds discovered in Siberian Chaga are a variety of triterpenes and sterols including Lanosterol, Ergosterol, Inotodiols, Saponins, and Polysaccharides.

Siberian Chaga, unlike the other medicinal mushrooms has an exceptional amount of Betulinic acid and SOD (Super Oxide Dismutase) content. SOD is an extremely potent antioxidant enzyme that fights cellular damage from reactive singlet oxygen molecules, also known as free radicals. Research suggests that SOD may be the most important enzyme in our body for the control of free radicals, keeping our cell membranes young, supple, and healthy. SOD is one of the most important anti oxidants in our body. Chaga has far more SOD than Vitamins C, E and foods like barley grass, seaweed prunes, fish oils and many aromatherapy essential oils.

The Chaga mushroom is claimed to have beneficial properties for human health, such as anti-bacterial, anti-allergic, anti-inflammatory and antioxidant activities. The antioxidant effects of the mushroom may be partly explained by protection of cell components against free radicals.

The anti-cancer properties of betulin or betulinic acid, a chemical isolated from birch trees is now being studied for use as a chemotherapeutic agent. Chaga contains large amounts of betulinic acid in a form that can be ingested orally, and it also contains the full spectrum of immune-stimulating phyto-chemicals found in other medicinal mushrooms such as maitake mushroom and shiitake mushroom. Chaga also has melanin compounds that nourish the skin and hair.

Chaga has even been classified as a medicinal mushroom under World Trade Organization (WTO) codes and has been granted *GRAS (Generally Recognized As Safe)* status from the *WHO (World Health Organization).*

FDA Classification: Food Safety Issues**:** none known Toxicity: none known Drug Contradictions: none known Taste: none Odor: none Refrigeration: none Shelf Life: Indefinite

Scientific Classification: Kingdom: Fungi Subkingdom: Dikarya Phylum: Basidiomycota

SubPhylum: Agaricomycotina Class: Agaricomycetes Order: Hymenochaetales

Family: Hymenohcaetaceae Genus: Inonotus Species: I. Obliquus

Expectations: Almost every person who uses Chaga for any extended period of time will experience benefits. In some cases the benefits may be almost instantaneous and profound, while others the influence may be subtle at first, with cumulative effects developing over time.

Duration of Usage: Chaga by its very nature is safe and may be used for a lifetime to reinforce our health.

Other known Chaga forms: Powder, tea and alcohol based tincture, both inferior and with respective problems. Powder form can contain harmful molds. Alcohol damages the life energy of Chaga. These forms do not yield as satisfactory results.

Major Publications: PubMed.com, Medscape.com, Life Science.

1. In 1960, the **U.S. National Cancer Institute** noted a report that a decoction of Chaga had been used successfully to treat cancer in Australia. Well known for stimulating the immune system, Chaga was approved for public use against cancer by the Medical Academy of Science in Moscow in 1955.

2. John Pezzuto of the **University of Chicago** is quoted as "the activity of the Betulinic acid is one of the most promising discoveries amongst 2500 plant extracts studied." The Betulinic acid contained in Chaga covers the full spectrum of immune stimulating effects found in similar medicinal mushrooms such as Maitake and Shiitake mushrooms.

3. Russian and Japanese medical professionals both contend Chaga is many times more effective than Ganoderma Lucidum or Phellinus Linteus. The International Agriculture Development Institute in Korea confirms such claims.

4. The Japanese Cancer Society claims Chaga plays an important role in combating cancer and it jointly used with pharmacology drugs and chemotherapy diminishes their side effects.

5. "It is a fact that Chaga, placed into a birch bark casket, acquires more expressed therapeutic properties. Bioactive substances of the white part of birch bark having triterpenic bonds - betulin, lupeol, betulinic acid, etc. - possess anti-cancerous activity, causing apoptosis (programmed cell death) of cancerous cells and this is transferred to Chaga, thus strengthening its properties..", says **Galina Mikhaylovna Fedoseeva the Chairman of the Department of Pharmacognosy and Botany of Irkutsk State Medical University, professor, Doctor of the pharmaceutical sciences.**

6. Numerous studies also indicate a 50% reduction in glycemic peaks are achieved due to the Beta Glucan effects on blood sugar levels. There are over 1000 research papers on Beta Glucan activity including studies from **Harvard Medical School, National Cancer Institute, the Department of Agriculture** and others. These studies prove Beta Glucan are external immunomodulators to keep one's immune system in a highly prepared state.

Siberian Chaga ongoing studies include:

- Tumor research in various cell lines
- HIV and Immune compromised diseases
- Gastrointestinal imbalances
- Cardiovascular Diseases
- Lung Disorders
- Natural Antioxidant levels and Diabetes

Why Take Medicinal Mushrooms?

- They provide support to nearly all the body's systems and regulatory functions
- They are veritable powerhouses of pharmaceutical compounds, including an array of water-Soluble polysaccharides (complex sugars) that have shown remarkable anti-cancer, Immuno- enhancing and overall healing properties.
- They assist the body in adapting to internal and external stress.
- They have a very long history of use in Eastern and Western medical traditions.
- Their medical use has the backing of current, peer-reviewed scientific research.
- They produce no negative side effects and are proven to be non-toxic.

Chaga (Inonotus obliquus)

- Extracts of Chaga were approved as an anticancer drug (befungin) in Russia as early as 1955, and have been reported to be successful in treating breast, lung, cervical, and stomach cancers.

- Chaga concentrates betulin from the bark of birch trees, which has shown promise in treating malignant melanoma, completely inhibiting tumors implanted in mice and causing apoptosis of cancerous cells.

- Chaga extracts also show antibacterial, antiviral, and anti-inflammatory activity, and is known to be a liver tonic and an immune enhancer.

- Chaga has recently shown to be a powerful antioxidant.

- Chaga is dark and rich, almost like molasses.

- Anti-microbial properties and herbal support for the immune system.

- Traditionally used for liver support and as a blood-purifying tonic.

- Only common herb used in both the Essiac and Hoxsey anti-cancer formulas.

Polysaccharides to enhance the immune system, combat cancer, HIV virus, and other anti-bacterial and viral infections.

Betulinic acid to counter viral infections and tumors.

Triterpenes to lower cholesterol, improve digestion, detoxify the liver, treat hepatitis, chronic bronchitis, coughs and asthma.

Germanium to cleanse the blood, normalize blood pressure and prevent tumors.

Other nucleosides, phyto-nutrients, minerals and amino acids such as Saponin, Iron, Magnesium, Chromium, Beta-glucans, Inotodiol, Isoprenoid and others.

Siberian Chaga contains an extraordinary amount of SOD (Super oxide dismutase) antioxidants that absorb free radicals and neutralize them before they can damage body tissue cells. Chaga contains 25-50 times more SOD antioxidants than other medicinal mushrooms.

SOD (Super oxide dismutase) units per gram:

Chaga – Know culturally as A Gift from the Gods and The King of Herbs

Documented as early as 4600 years ago, ancient Asian folk medicine practitioners relied upon Chaga, a medicinal mushroom, to maintain a healthy life energy balance (*"Chi"*), preserve youth, promote longevity, and boost the body's immune system to fight viral, bacterial, fungal and parasitic maladies. As a folk medicine, Chaga was ingested by the local people of the Siberian mountain regions in tea or powder form, inhaled from smoke, and applied to the skin for healing of injury or rash. Indigenous people from that area have been documented to live beyond 100 years of age.

The Chinese Monk Shen Nong, in his work *Shen Nong Ben Cao Jin,* the first of the three ancient medical books that serve as the foundation of Traditional Chinese Medicine, proclaimed Chaga as a superior class medicinal herb, for its diverse and complete homeopathic properties . Since then, Traditional Chinese Medicine practitioners have applied Chaga as a remedy for serious human virus and disease, including anti-viral applications such as influenza, anti-inflammatory treatment of stomach ulcers, the arrest and reversal of tumor growth, balancing the endocrine system in the treatment of diabetes, anti-oxidant uses in detoxifying the body, and as a daily supplement for the overall balancing of the body's immune system and genoprotective properties increasing longevity.

Siberian Chaga, *Inonotus Obliquus*, naturally found in the black birch forests of the Siberian mountain regions is the most potent of all the varieties of Chaga mushrooms. Chaga is a parasitic carpophore that enters a wound on a mature tree then grows under the bark until it blisters through the bark forming a grotesque black charcoal-like conk on the tree trunk, hence the Latin epithet "*Obliquus*". The Chaga conk grows with the tree over a 5 to 7 year period, thriving in the harsh Siberian winter environment, absorbing life-sustaining nutrients from the black birch tree, until the conk flower fully ripens, falling to the forest floor, followed shortly by the death of the host tree, completing a 20 year micro-ecological cycle.

Russian culture has embraced the medicinal uses of Siberian Chaga, and its uses have spread westward to the Urals and Baltic regions of the European continent. In the 12th Century Tsar Vladimir Monamah was treated with Chaga (for symptoms most probably of lip cancer). Nobel Laureate Alexander Solzhenitsyn was awed by the healing powers of Chaga to treat cancer during the 1950s in his investigative research of patient treatment in provincial Siberian hospitals in his famous work, *The Cancer Ward*. Today, Chaga tea is commonly used in Russian cultures as a family cupboard remedy to support a healthy immune system and as a powerful antioxidant.

The post-antibiotic world of Western Medicine is now beginning to study, evaluate, and test Chaga for the active compounds underlying its historically understood homeopathic benefits. As with many other natural medicinal foods and herbs, the modern medical and scientific community is coming to understand that whole supplements like Chaga, offer a complex balance of active compounds, delivery mineral structures, and co-agents, more effective to sustaining a healthy immune balance than isolated compounds synthesized from these natural products.

The primary active compounds discovered in Siberian Chaga are a variety of triterpenes and sterols, including Lanosterol, Ergosterol Inotodials, Saponins, and Polysaccharides. Modern research is now beginning to demonstrate that these compounds are effective for human maladies treated by folk medicine practitioners with natural products, without toxic side-effect, for millennia.

After being ignored for hundreds of years by western pharmacologists, Chaga is currently enjoying a resurgence as a possible treatment for a wide variety of diseases and health problems, including chronic fatigue syndrome, the flu, stomach problems, and even HIV and certain types of cancer. Recent studies in the U.S., Russia, and other countries have shown Chaga to have anti-tumor benefits related to the mammary glands and female sex organs; studies in Finland have demonstrated that inotodial, one of the most active ingredients in Chaga, was effective against influenza virus and various cancer cells; and Japanese research not only found similar antiviral activity, but also discovered that Chaga shows activity against HIV (protease inhibition).

Chaga has even been classified as a medicinal mushroom under World Trade Organization (WTO) codes.

Arguably, the most well known western research conducted on the use of Chaga has been performed by Dr. Kirsti Kahlos and her team at School of Pharmacology, at the University of Helsinki, Finland. Dr. Kahlos' team conducted studies validating the immuno-modulating impact of Lanosterol-linked triterpenes effective as a flu-vaccination and for anti-tumor applications.

Institutional studies at the University of Tokyo, Japan have determined effectiveness of Inotodials in the destruction of certain carcinosarcomas and mammary adenocarcinomas. The Melanin complex produced by the Chaga mushroom demonstrates high antioxidant and genoprotective effects (Melanin Complex from Medicinal Mushroom Inonotus Obliquus, Journal of Medical Mushrooms, 2002, vol. 4) . The polysaccharide beta-glucan, also present in Chaga, is proven to be effective at inhibiting mutagenic and immuno-modulating effects of cancerous tumors by triggering immune system response (SP Wasser, 2002, Institute of Evolution, University of Haifa, Israel).

The following article was published by the NCBI - National Center for Biotechnology Information a joint venture by the National Library of Medicine and the National Institutes of Health.

Established in 1988 as a national resource for molecular biology information, NCBI creates public databases, conducts research in computational biology, develops software tools for analyzing genome data, and disseminates biomedical information - all for the better understanding of molecular processes affecting human health and disease

Chaga mushroom extract inhibits oxidative DNA damage in human lymphocytes as assessed by comet assay.

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The Chaga mushroom (Inonotus obliquus) is claimed to have beneficial properties for human health, such as anti-bacterial, anti-allergic, anti-inflammatory and antioxidant activities. The antioxidant effects of the mushroom may be partly explained by protection of cell components against free radicals.

We evaluated the effect of aqueous Chaga mushroom extracts for their potential for protecting against oxidative damage to DNA in human lymphocytes. Cells were pretreated with various concentrations (10, 50, 100 and 500 microg/mL) of the extract for 1 h at 37 degrees C. Cells were then treated with 100 microM of H2O2 (Hydrogen Peroxide) for 5 min as an oxidative stress. Evaluation of oxidative damage was performed using single-cell gel electrophoresis for DNA fragmentation (Comet assay). Using image analysis, the degree of DNA damage was evaluated as the DNA tail moment.

Cells pretreated with Chaga extract showed over 40% reduction in DNA fragmentation compared with the positive control (100 micromol H2O2 treatment). Thus, Chaga mushroom treatment affords cellular protection against endogenous DNA damage.

Why does Chaga aid in the relief of:

Cancer MS (multiple sclerosis) and Arthritis

Answer: SOD - SUPEROXIDE DISMUTASE which is an Enzyme found in CHAGA in abundance.

SUPEROXIDE DISMUTASE
What is the Superoxide Dismutase (SOD)?

Siberian Chaga Mushroom has 25 to 50 times more SOD antioxidants than Agarigus, Reishi, Truffles or any other medicinal mushrooms. Chaga Mushroom has more SOD than

CoEnzyme 10 (CoQ10), Vitamins C, E, barley grass, seaweed, prunes, fish oils and essential oils.

SOD (Superoxide Dismutase) is an enzyme associated with copper, zinc, manganese and iron by body cells, and breaks down the super oxide free radicals. Manganese and zinc, in particular, stimulate production of SOD. SOD is an antioxidant produced by the human body that absorbs free radicals and neutralizes them before they can damage tissue cells. SOD should be supplemented to encourage new tissue to grow, to enhance collagen, and to reduce swelling. SOD is found in both the dermis and the epidermis, and is key to the production of healthy fibroblasts (skin-building cells).

SOD plays an extremely important role in the protection of all aerobic life-systems against oxygen toxicity (and the free radicals derived from oxygen). SOD provides enzymatic detoxification of aging hydrogen peroxides produced by skin's metabolism. SOD is responsible for keeping cell membranes healthy. SOD naturally decreases inside the body as we age.

The following are a handful of papers found on Medscape.com and PubMed.com on Chaga:

Antioxidant effect of Inonotus obliquus.

J Ethnopharmacol. 2005; 96(1-2):79-85 (ISSN: 0378-8741)

Cui Y ; Kim DS ; Park KC
Department of Dermatology, Seoul National University, Bundang Hospital, 300 Gumi-Dong, Bundang-Gu, Seongnam-Si, Kyoungki-Do 463-707, Republic of Korea.

The mushroom Inonotus obliquus (Fr.) Pilát (Hymenochaetaceae), has been widely used as a folk medicine in Russia, Poland and most of the Baltic countries. The purpose of this study was to elucidate the antioxidant capacities of Inonotus obliquus. Four extracts from the fungus were evaluated for antioxidant activity against the 1,1-diphenyl-2-picrylhydrazyl (DPPH), superoxide, and peroxyl radicals. The polyphenolic extract had a strong antioxidant activity, and the extract containing triterpenoids and steroids presented a relatively strong antioxidant effect. The polysaccharide extract, however, was inactive. The protective effects of these four extracts were assessed against hydrogen peroxide-induced oxidative stress using a human keratinocyte cell line, HaCaT. Our results show that the polyphenolic extract protected these cells against hydrogen peroxide-induced oxidative stress, while the polysaccharide, triterpenoid and steroid extracts were ineffective. Additionally, the remnant polyphenolic and low molecular weight polysaccharide extracts showed a weakly protective effect at a concentration of 50 microg/ml. Our results indicate that Inonotus obliquus has the capacity to scavenge free radicals at concentrations higher than 5 microg/ml and that the polyphenolic extract can protect cells against oxidative stress.

- PreMedline Identifier: 15588653

Immuno-stimulating effect of the endo-polysaccharide produced by submerged culture of Inonotus obliquus.

Life Sci. 2005; 77(19):2438-56 (ISSN: 0024-3205)

Kim YO ; Han SB ; Lee HW ; Ahn HJ ; Yoon YD ; Jung JK ; Kim HM ; Shin CS
Department of Biotechnology, College of Engineering, Yonsei University, Shinchon-dong, Seodaemoon-gu, Seoul 120-749, South Korea.

Inonotus obliquus BELYU1102 was selected from 12 different strains of Inonotus as a producer of immuno-stimulating polysaccharide. After a batch fermentation of I. obliquus BELYU1102 was carried out in a 300 l pilot vessel, endo-polysaccharide and exo-polysaccharide were both obtained. The proliferation activity of endo-polysaccharide for splenic cells was much higher than the activity of exo-polysaccharide. The active endo-polysaccharide was produced primarily during the late stationary phase. Enhanced proliferation and polyclonal IgM antibody production were observed in B cells by purified water-soluble endo-polysaccharide. Nitrite production and expression of IL-1beta, IL-6, TNF-alpha, and iNOS in macrophages were also enhanced. However, the endo-polysaccharide did not affect the proliferation of T cells, the IL-2 expression of Th1 cells, or the IL-4 expression of Th2 cells. The endo-polysaccharide showed activities similar to lipopolysaccharide (LPS) for B cells and macrophages, but there was a large difference between the two polysaccharides because cellular activations induced by endo-polysaccharide were not affected by polymyxin B, a specific inhibitor of LPS. The endo-polysaccharide appeared to have other cellular binding sites with TLR-4 and did not show a direct toxicity against tumor cells. However, indirect anti-cancer effects via immuno-stimulation were observed. The mycelial endo-polysaccharide of I. obliquus is a candidate for use as an immune response modifier. Submerged mycelial cultures are advantageous for industrial production of polysaccharides.

- PreMedline Identifier: 15970296

Anti-cancer effect and structural characterization of endo-polysaccharide from cultivated mycelia of Inonotus obliquus.

Life Sci. 2006; 79(1):72-80 (ISSN: 0024-3205)

Kim YO ; Park HW ; Kim JH ; Lee JY ; Moon SH ; Shin CS
Department of Biotechnology, College of Engineering, Yonsei University, Shinchon-dong, Seodaemoon-gu, Seoul 120-749, South Korea.

The endo-polysaccharide extracted from mycelia of Inonotus obliquus (Pers.:Fr.) Pil. (Hymenochaetaceae) is a specific activator of B cells and macrophages. However, the in vivo anti-cancer effects and the chemical structure of the endo-polysaccharide are unknown. We purified the endo-polysaccharide, investigated its anti-cancer effects via in vitro and in vivo assays, and performed a structural characterization. The endo-polysaccharide was extracted from I. obliquus mycelia cultivated in a 300-l pilot fermenter, followed by hot water extraction and ethanol precipitation. Purification was achieved by DEAE-cellulose ion-exchange chromatography and gel-permeation chromatography. Chemical analysis revealed that the purified endo-polysaccharide is an alpha-linked fucoglucomannan with a molecular weight of approximately 1,000 kDa. The anti-cancer activities of the endo-polysaccharide against various types of tumor cells were determined. No direct toxicity against either cancer or normal cells was observed. Intraperitoneal administration of the endo-polysaccharide significantly prolonged the survival rate of B16F10-implanted mice, resulting in a 4.07-fold increase in the survival rate at a dose of 30 mg/kg/day. After 60 days of feeding, approximately 67% of the initial number of mice survived with no tumor incidence based on macroscopic examination. These results indicate that the anti-cancer effect of endo-polysaccharide is not directly tumorcidal but rather is immuno-stimulating.

- PreMedline Identifier: 16458328

In vivo and in vitro anti-inflammatory and anti-nociceptive effects of the methanol extract of Inonotus obliquus.

J Ethnopharmacol. 2005; 101(1-3):120-8 (ISSN: 0378-8741)

Park YM ; Won JH ; Kim YH ; Choi JW ; Park HJ ; Lee KT
Department of Biochemistry, College of Pharmacy, Kyung-Hee University, Dongdaemun-Ku, Hoegi-Dong, Seoul 130-701, South Korea.

The mushroom Inonotus obliquus (Fr.) Pilát (Hymenochaetaceae), has been traditionally used for the treatment of gastrointestinal cancer, cardiovascular disease and diabetes in Russia, Poland and most of Baltic countries. This study was designed to investigate the anti-inflammatory and anti-nociceptive effects of the methanol extract from Inonotus obliquus (MEIO) in vivo and in vitro. MEIO (100 or 200 mg/(kgday), p.o.) reduced acute paw edema induced by carrageenin in rats, and showed analgesic activity, as determined by an acetic acid-induced abdominal constriction test and a hot plate test in mice. To reveal the mechanism of the anti-inflammatory effect of MEIO, we examined its effect on lipopolysaccharide (LPS)-induced responses in a murine macrophage cell line RAW 264.7. MEIO was found to significantly inhibit the productions of nitric oxide (NO), prostaglandin E2 (PGE2) and tumor necrosis factor-alpha (TNF-alpha) in LPS-stimulated RAW 264.7 macrophages. Consistent with these observations, MEIO potently inhibited the protein and mRNA expressions of inducible nitric oxide synthase (iNOS) and cyclooxygenase-2 (COX-2). Furthermore, MEIO inhibited the LPS-induced DNA binding activity of nuclear factor-kappaB (NF-kappaB), and this was associated with the prevention of inhibitor kappaB degradation and a reduction in nuclear p65 protein levels. Taken together, our data indicate that the anti-inflammatory and anti-nociceptive properties of MEIO may be due to the inhibition of iNOS and COX-2 expression via the down-regulation of NF-kappaB binding activity.

- PreMedline Identifier: 15905055

From Pubmed.com:

Chaga mushroom (Inonotus obliquus) induces G0/G1 arrest and apoptosis in human hepatoma HepG2 cells.

Youn MJ, **Kim JK**, **Park SY**, **Kim Y**, **Kim SJ**, **Lee JS**, **Chai KY**, **Kim HJ**, **Cui MX**, **So HS**, **Kim KY**, **Park R**.

Vestibulocochlear Research Center, Wonkwang University School of Medicine, #344-2, Shinyoung-dong, Iksan, Jeonbuk 570-749, Korea.

AIM: To investigate the anti-proliferative and apoptotic effects of Chaga mushroom (Inonotus obliquus) water extract on human hepatoma cell lines, HepG2 and Hep3B cells. METHODS: The cytotoxicity of Chaga extract was screened by 3-[4,5-dimethylthiazol-2-yl]-2, 5-diphenyltetrazolium bromide (MTT) assay. Morphological observation, flow cytometry analysis, Western blot were employed to elucidate the cytotoxic mechanism of Chaga extract. RESULTS: HepG2 cells were more sensitive to Chaga extract than Hep3B cells, as demonstrated by markedly reduced cell viability. Chaga extract inhibited the cell growth in a dose-dependent manner, which was accompanied with G0/G1-phase arrest and apoptotic cell death. In addition, G0/G1 arrest in the cell cycle was closely associated with down-regulation of p53, pRb, p27, cyclins D1, D2, E, cyclin-dependent kinase (Cdk) 2, Cdk4, and Cdk6 expression. CONCLUSION: Chaga mushroom may provide a new therapeutic option, as a potential anticancer agent, in the treatment of hepatoma.

PMID: 18203281 [PubMed - indexed for MEDLINE]

Identification of a novel blocker of IkappaBalpha kinase activation that enhances apoptosis and inhibits proliferation and invasion by suppressing nuclear factor-kappaB.

Sung B, **Pandey MK**, **Nakajima Y**, **Nishida H**, **Konishi T**, **Chaturvedi MM**, **Aggarwal BB**.

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3,4-dihydroxybenzalacetone (DBL) is a polyphenol derived from the medicinal plant Chaga [Inonotus obliquus (persoon) Pilat]. Although Chaga is used in Russia folk medicine to treat tumors, very little is known about its mechanism of action. Because most genes involved in inflammation, antiapoptosis, and cell proliferation are regulated by the transcription factor nuclear factor-kappaB (NF-kappaB), we postulated that DBL activity is mediated via modulation of the NF-kappaB activation pathway. We investigated the effects of DBL on NF-kappaB activation by electrophoretic mobility shift assay and on NF-kappaB-regulated gene expression by Western blot analysis. We found that DBL suppressed NF-kappaB activation by a wide variety of inflammatory agents, including tumor necrosis factor (TNF), interleukin-1beta, epidermal growth factor, okadaic acid, phorbol 12-myristate 13-acetate, and lipopolysaccharide. The suppression was not cell type specific and inhibited both inducible and constitutive NF-kappaB activation. DBL did not interfere with the binding of NF-kappaB to DNA but rather inhibited IkappaBalpha kinase activity, IkappaBalpha phosphorylation and degradation, p65 phosphorylation, and translocation. DBL also suppressed the expression of TNF-induced and NF-kappaB-regulated proliferative, antiapoptotic, and metastatic gene products. These effects correlated with enhancement of TNF-induced apoptosis and suppression of TNF-induced invasion. Together, our results indicate that DBL inhibits NF-kappaB activation and NF-kappaB-regulated gene expression, which may explain the ability of DBL to enhance apoptosis and inhibit invasion.

PMID: 18202022 [PubMed - indexed for MEDLINE]

New antioxidant polyphenols from the medicinal mushroom Inonotus obliquus.

Lee IK, **Kim YS**, **Jang YW**, **Jung JY**, **Yun BS**.

Functional Metabolites Research Center, KRIBB, 111 Gwahangno, Yuseong-gu, Daejeon 305-806, Republic of Korea.

The fruiting body of Inonotus obliquus, a medicinal mushroom called chaga, has been used as a traditional medicine for cancer treatment. Although this mushroom has been known to exhibit potent antioxidant activity, the mechanisms responsible for this activity remain unknown. In our investigation for free radical scavengers from the methanolic extract of this mushroom, inonoblins A (1), B (2), and C (3) were isolated along with the known compounds, phelligridins D (4), E (5), and G (6). Their structures were established by extensive spectroscopic analyses. These compounds exhibited significant scavenging activity against the ABTS radical cation and DPPH radical, and showed moderate activity against the superoxide radical anion.

PMID: 17980585 [PubMed - indexed for MEDLINE]

Antioxidant small phenolic ingredients in Inonotus obliquus (persoon) Pilat (Chaga).

Nakajima Y, **Sato Y**, **Konishi T**.

Niigata University of Pharmacy and Applied Life Science, Niigata, Japan.

Inonotus obliquus (persoon) Pilat (Chaga, in Russia, kabanoanatake in Japan) is a fungus having been used as a folk medicine in Russia and said to have many health beneficial functions such as immune modulating and anti-cancer activities. In the present study, the antioxidant activity of hot water extract (decoction) of Chaga was precisely compared with those of other medicinal fungi (Agaricus blazei Mycelia, Ganoderma lucidum and Phellinus linteus) showing Chaga had the strongest antioxidant activity among fungi examined in terms of both superoxide and hydroxyl radicals scavenging activities. Further determination of the antioxidant potential of isolated fruiting body (brown part) and Sclerotium (black part) revealed the 80% MeOH extract of fruiting body had the highest potential as high as that of Chaga decoction. Finally, seven antioxidant components were isolated and purified from the 80% MeOH extract of Chaga fruiting body, and their chemical structures were determined as small phenolics as follows: 4-hydroxy-3,5-dimethoxy benzoic acid 2-hydroxy-1-hydroxymethyl ethyl ester (BAEE), protocatechic acid (PCA), caffeic acid (CA), 3,4-dihybenzaladehyde (DB), 2,5-dihydroxyterephtalic acid (DTA), syringic acid (SA) and 3,4-dihydroxybenzalacetone (DBL). Notably, BAEE was assigned as the new compound firstly identified from the natural source in the present study.

PMID: 17666849 [PubMed - indexed for MEDLINE]

Structure determination of inonotsuoxides A and B and in vivo anti-tumor promoting activity of inotodiol from the sclerotia of Inonotus obliquus.

Nakata T, **Yamada T**, **Taji S**, **Ohishi H**, **Wada S**, **Tokuda H**, **Sakuma K**, **Tanaka R**.

Department of Medicinal Chemistry, Osaka University of Pharmaceutical Sciences, 4-20-1 Nasahara, Takatsuki, Osaka 569-1094, Japan.

Two new lanostane-type triterpenoids, inonotsuoxides A (1) and B (2) along with three known lanostane-type triterpenoids, inotodiol (3), trametenolic acid (4), and lanosterol (5), were isolated from the sclerotia of Inonotus obliquus (Pers.: Fr.) (Japanese name: Kabanoanakake) (Russian name: Chaga). Their structures were determined to be 22R,25-epoxylanost-8-ene-3beta,24S-diol (1) and 22S,25-epoxylanost-8-ene-3beta,24S-diol (2) on the basis of spectral data including single crystal X-ray analysis. These compounds except for 2 were tested for their inhibitory effects on Epstein-Barr virus early antigen (EBV-EA) activation induced by 12-O-tetradecanoylphorbol-13-acetate (TPA), as a test for potential cancer chemopreventive agents. The most abundant triterpene, inotodiol (3), was investigated for the inhibitory effect in a two-stage carcinogenesis test on mouse skin using 7,12-dimethylbenz[a]anthracene (DMBA) as an initiator and TPA as a promoter. Compound 3 was found to exhibit the potent anti-tumor promoting activity in the in vivo carcinogenesis test.

PMID: 17049251 [PubMed - indexed for MEDLINE]

Reversal of the TPA-induced inhibition of gap junctional intercellular communication by Chaga mushroom (Inonotus obliquus) extracts: effects on MAP kinases.

Park JR, **Park JS**, **Jo EH**, **Hwang JW**, **Kim SJ**, **Ra JC**, **Aruoma OI**, **Lee YS**, **Kang KS**.

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Chaga mushroom (Inonotus obliquus) has continued to receive attention as a folk medicine with indications for the treatment of cancers and digestive diseases. The anticarcinogenic effect of Chaga mushroom extract was investigated using a model system of gap junctional intercellular communication (GJIC) in WB-F344 normal rat liver epithelial cells. The cells were pre-incubated with Chaga mushroom extracts (5, 10, 20 microg/ml) for 24 h and this was followed by co-treatment with Chaga mushroom extracts and TPA (12-O-tetradecanoylphorbol-13-acetate, 10 ng/ml) for 1 h. The inhibition of GJIC by TPA (12-O-tetradecanoylphorbol-13-acetate), promoter of cancer, was prevented with treatment of Chaga mushroom extracts. Similarly, the increased phosphorylated ERK1/2 and p38 protein kinases were markedly reduced in Chaga mushroom extracts-treated cells. There was no change in the JNK kinase protein level, suggesting that Chaga mushroom extracts could only block the activation of ERK1/2 and p38 MAP kinase. The Chaga mushroom extracts further prevented the inhibition of GJIC through the blocking of Cx43 phosphorylation. Indeed cell-to-cell communication through gap junctional channels is a critical factor in the life and death balance of cells because GJIC has an important function in maintaining tissue homeostasis through the regulation of cell growth, differentiation, apoptosis and adaptive functions of differentiated cells. Thus Chaga mushroom may act as a natural anticancer product by preventing the inhibition of GJIC through the inactivation of ERK1/2 and p38 MAP kinase.

PMID: 17012771 [PubMed - indexed for MEDLINE]

Chaga mushroom extract inhibits oxidative DNA damage in human lymphocytes as assessed by comet assay.

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The Chaga mushroom (Inonotus obliquus) is claimed to have beneficial properties for human health, such as anti-bacterial, anti-allergic, anti-inflammatory and antioxidant activities. The antioxidant effects of the mushroom may be partly explained by protection of cell components against free radicals. We evaluated the effect of aqueous Chaga mushroom extracts for their potential for protecting against oxidative damage to DNA in human lymphocytes. Cells were pretreated with various concentrations (10, 50, 100 and 500 microg/mL) of the extract for 1 h at 37 degrees C. Cells were then treated with 100 microM of H2O2 for 5 min as an oxidative stress. Evaluation of oxidative damage was performed using single-cell gel electrophoresis for DNA fragmentation (Comet assay). Using image analysis, the degree of DNA damage was evaluated as the DNA tail moment. Cells pretreated with Chaga extract showed over 40% reduction in DNA fragmentation compared with the positive control (100 micromol H2O2 treatment). Thus, Chaga mushroom treatment affords cellular protection against endogenous DNA damage produced by H2O2.

PMID: 15630179 [PubMed - indexed for MEDLINE]

Antihyperglycemic and antilipidperoxidative effects of dry matter of culture broth of Inonotus obliquus in submerged culture on normal and alloxan-diabetes mice.

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AIM OF THE STUDY: The antihyperglycemic and antilipidperoxidative effects of the dry matter of culture broth (DMCB) of Inonotus obliquus were investigated. MATERIALS AND METHODS: The normal, glucose-induced hyperglycemic and alloxan-induced diabetic mice were used to evaluate the antihyperglycemic and antilipidperoxidative effects of the DMCB of Inonotus obliquus. RESULTS: Treatment with the DMCB (500 and 1000 mg/kg body weight) exhibited a mild hypoglycemic effect in normal mice, and failed to reduce the peak

glucose levels after glucose administration. However, euglycemia was achieved in the DMCB of Inonotus obliquus (1000 mg/kg) and glibenclamide-treated mice after 120 min of glucose loading. In alloxan-induced diabetic mice, the DMCB (500 and 1000 mg/kg body weight for 21 days) showed a significant decrease in blood glucose level, the percentages reduction on the 7th day were 11.90 and 15.79%, respectively. However, feeding of this drug for 3 weeks produced reduction was 30.07 and 31.30%. Furthermore, the DMCB treatment significantly decreased serum contents of free fatty acid (FFA), total cholesterol (TC), triglyceride (TG) and low density lipoprotein-cholesterol (LDL-C), whereas effectively increased high density lipoprotein-cholesterol (HDL-C), insulin level and hepatic glycogen contents in liver on diabetic mice. Besides, the DMCB treatment significantly increased catalase (CAT), superoxide dismutase (SOD) and glutathione peroxidase (GPx) activities except for decreasing maleic dialdehyde (MDA) level in diabetic mice. Histological morphology examination showed that the DMCB restored the damage of pancreas tissues in mice with diabetes mellitus. CONCLUSIONS: The results showed that the DMCB of Inonotus obliquus possesses significant antihyperglycemic, antilipidperoxidative and antioxidant effects in alloxan-induced diabetic mice.

PMID: 18434051 [PubMed - in process]

Lanostane-type triterpenoids from the sclerotia of Inonotus obliquus possessing anti-tumor promoting activity.

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Two new lanostane-type triterpenoids, 1 and 2 besides two known lanostane-type triterpenoids, 3 and 4 were isolated from the sclerotia of Inonotus obliquus. Their structures were determined to be lanosta-8,23E-diene-3beta,22R,25-triol (1) and lanosta-7:9(11),23E-triene-3beta,22R,25-triol (2) by spectral data. These compounds were tested for their anti-tumor-promoting activity using a short-term in vitro assay for EBV-EA activation induced by TPA. Compounds 1, 2 and 4 were stronger than the positive control, oleanolic acid. The most abundant compound 4 was investigated for the inhibitory effect in a two-stage carcinogenesis test on mouse skin using DMBA as an initiator and TPA as a promoter. Compound 4 was found to exhibit the potent anti-tumor promoting activity in the in vivo carcinogenesis test.

PMID: 18387711 [PubMed - as supplied by publisher]

From: Mushroom-Collection.com

Chaga
(Inonotus obliquus)

Chaga before and after I chopped it off this mostly dead yellow birch.

Chaga, also known as clinker polypore, is not immediately recognized as a fungus by many people. Recently a person commented to me that they had seen them before but thought they were a bug infestation. Rather than being mushroom-like it is a large black canker. It is dense, very hard and deeply cracked on the surface resembling something that has been burned. Sometimes hints of the yellow interior can be seen. It often gets it's start on a scarred birch.

Flesh: The interior is yellow to yellow brown often with some bits of white mixed in and moderately hard with a somewhat pebbly, corky texture. The outer surface is dark brown to black, very hard, with a deeply cracked texture. It can be brittle with pieces easily rubbing or falling off.

Chopped off showing the yellow inner tissue.

Sometimes they are too high to get without a ladder!

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