

MEDICINAL PLANT AND MUSHROOM WALK 90 minutes

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The plants and mushrooms of the Rocky Mountains contain a vast variety of medicinal benefit.

Trees, shrubs, herbaceous plants, mosses, lichens, ferns, and various fungi provide a wealth of healing material for herbalists.

I am fortunate to live on the edge of the boreal forest in northern Canada, and within a half hour drive have ready access to a multitude of the plants and polypore mushrooms we hope to see on our walk.

As an herbalist/ethnobotanist, I have studied the medicines of the boreal forest for over forty years.

I will include, where possible, information on the uses by indigenous peoples of North America, as well as the modern scientific validation of their actions, energetics and contra-indications.

We will also look at the spiritual properties and personality traits of our forest friends, as well as homeopathic uses, flower and mushroom essences, and essential oil and hydrosol uses.

Herbal-drug interactions, preparation methods, and dosage suggestions will be discussed.

Mid-October in the mountains can bring a variety of weather patterns, so it is recommended that in addition to good footwear, water, etc; those joining the walk wear appropriate clothing. Here is one popular mushroom medicine we may see on our walk.

THE TRUE TINDER CONK: FIRST NATIONS USE

“He could not imagine any greater joy than to go away into the woods for months on end, to break off this chaga, crumble it, boil it up on a campfire, drink it and get well like an animal. To walk through the forest for months, to know no other care than to get better! Just as a dog goes to search for some mysterious grass that will save him...”

—From *Cancer Ward* by Alexander Solzhenitsyn

Chaga, *Inonotus obliquus* (Pers.:Fr.) Pilát is a conk living on birch trees throughout the northern hemisphere. It is considered a sterile conk, but does produce small fruiting bodies that appear after the tree has fallen down, for up to six years. It has been widely used in folk medicine in Russia, Poland and other

Baltic countries for a wide variety of gastric problems, cancer, tuberculosis, as well as heart and liver concerns.

Chaga has been used for various cancers in Russia since the sixteenth century, including tumors associated with angiogenesis, the buildup of blood vessels that feed and nourish the cancerous growths. In western Siberia, chaga has been widely used for treating tuberculosis, liver conditions and stomach problem, including gastritis, and ulcers. The Khanty peoples of western Siberia put the sterile conk in fire until it grew red as smoldering charcoal. This was put into a pail of hot water and stirred. It was used for washing of women's genital region after menstruation or birthing (Saar, 1991). *Befungin* is an official alcohol extract containing 50% chaga that has been available Russia since 1955. In Finland, another commercial product *Pakurikaapa* has long been available.

Little known a decade ago, chaga is now widely advertised on the worldwide web, with citation of both legitimate scientific inquiry and a plethora of ridiculous health claims.

But let's go back to the beginning.

Living on the southern edge of the Canadian boreal forest has given me the opportunity to collect and work with this medicinal mushroom. It has long been prized and used by the First Nations people. Cree healers call it *Posahkan* or *Wiskakecakomikih*. Wisakecak is a character of mythology who threw a scab he mistook for piece of dried meat against a birch tree and tried to ingest it. Chaga produces sweet smelling incense and is often added to ceremonial smoking pipes to ensure a continual burn. It is considered the true tinder conk, as the black, clinker-like coating easily accepts a spark from a bow drill, or flint and steel.

It was used by the Cree and other native tribes as a counter-irritant and a moxibustion-type application for meridian stimulation. The Chipewyan name is *Cha'a'ihthi*. Clifford Cardinal, Assistant Professor in Family Medicine at the University of Alberta is a Cree medicine man. He boils chaga for viral-related conditions, in the form of ingested tea.

My botanical buddy, Dr. Robin Marles (2000) reported on a ritual of divination by the Dene of Saskatchewan. Two long lines of powdered tinder representing two related events were laid out end to end and lit at opposite sides. Whichever burned through first signified which event would come first. This was known as *ETSEN DEK'*, "it smells when its burning."

The Gitksan of British Columbia know chaga as *DIDIHUXW* or *DI DIYUH*. They used the lit black "coals" of the fungi to relieve rheumatic pain. Two other words used by Gitksan elders are *MII'HLW* and *TIIUXW*. Leslie Johnson Gottesfeld (1992), a former University of Alberta anthropologist, surveyed Gitksan elders about the medicinal use of chaga. One elder said "Mii'hlw—the black growth from the crack in the birch tree. Like yellow cotton inside. If you cut it off, use the yellow cotton stuff. Take a sliver like a match stick and burn it for pain in joint."

The Wet'suwet'en of northwestern British Columbia used it for similar purposes. They have two names for the conk, *DIDIC'AH CI'ISTS'O'* and

TL'EYHTSĖ. The Tenaina of south-central Alaska used it in a similar manner, as well as for toothache (Kari, 1987).

Traditionally, the rusty brown inner layers have been used for medicine. When prepared as an infusion or decoction, the taste is reminiscent of wintergreen, due in large part to the contribution from its host, the birch tree. Birch bark was traditionally hydro-distilled as a source of oil of wintergreen, with a minor use today in aromatherapy. The vast majority of birch oil on the market today is cheap, synthetic methyl salicylate.

Chaga contains a number of compounds that can be found in numerous other herbs and mushrooms, including polyphenols, melanins, beta-glucans, sterols, triterpenes, amino acids, etc. One of the most widely used marketing tools for selling chaga is based on the reported ORAC scale. Known as the Oxygen Radical Absorbent Capacity test, this is a laboratory measure of the capacity of any food or supplement to measure the amount of free oxygen radicals they can absorb. Phenolics do this well. It is often compared to goji or wolf berry (*Lycium* species) in advertising and suggests that one gram of chaga has an ORAC score of 36,557 compared to goji at 258, and blueberry at only 24.5.

Work by M. Y. Kim et al. (2008) compared the phenolic and anti-oxidant activity of ten medicinal and edible mushrooms including chaga. These results suggest otherwise. Another paper looked at various extracts and found polyphenol extracts had strong antioxidant activity, but the polysaccharide extract was inactive (Cui et al., 2005). These studies form the basis for a number of MLM and mass marketing websites, touting chaga as a cure for nearly every human disease. And please, whatever the “true” ORAC, a pound of blueberries are much tastier than a pound of chaga, that I can guarantee!

The USDA recently removed its ORAC database from its NDL website due to “mounting evidence that the values indicating antioxidant capacity have no relevance to the effects of specific bioactive compounds.”

Another study by Park et al. (2004) suggests that human white blood cells exposed to hydrogen peroxide in a lab showed a 40% reduction in DNA damage. OK. Good. But chaga is then described on some websites to possess “promising anti-cancer activity.” I am not looking to suggest chaga has no place in health and healing. Far from it. I believe it has great medicinal potential. But I am suggesting that some of the *in vitro* and animal *in vivo* studies need to be followed up with human clinical trials. I know, I know, companies will not spend money on a natural product that cannot be patented you will say. I agree. I have studied as a professional herbalist for over 40 years, including 18 years of clinical practice, and fully aware of the issues involved. I have personally had good clinical success utilizing a number of medicinal herbs and mushrooms with few or no double blind, placebo controlled, randomized trials.

In vitro studies involving inhibition of various cancer cells are a good start, but do they really translate into human experience? Gasoline kills HIV in test tubes, does that make it a cure for AIDS? A few years ago, Saint John's wort was found to kill sperm in a laboratory test tube. The mass media then printed

headlines suggesting the herb caused infertility in men. So I understand the issues and concerns.

Isolated compounds such as betulinic acid and betulin have been tested in laboratories and because birch tree bark contains significant amounts of these compounds, their presence in chaga is often cited as part of the scientific literature. Betulinic acid has been found to induce apoptosis in tumors and is active at lower pH levels, similar to the interior of tumor tissue. That is good to know, but betulinic acid is not chaga.

One recent and interesting study (Lemieszek et al., 2011) looked at a fraction isolated from the fruiting bodies of chaga. Again, this *in vitro* look confirmed tumor cell proliferation, tumor cell motility, tumor cell morphology against human lung carcinoma (A549), colon adenocarcinoma (HT-29) and rat glioma (C6) cell cultures. Low or no toxicity was noted in normal cells.

A recent study found Chaga polysaccharides improved function of pancreatic beta cells in rats, a preliminary stage in the search for a human hyperglycemic compound. (Diao et al, 2014).

What I find interesting about this and numerous other studies is the reference to the sterile conk as the fruiting body. It is not! Very few people, including myself, have ever seen these ubiquitous bodies. Considering chaga is only found on 0.025% of birch trees, this makes it a rare find indeed. The fruiting bodies are even more difficult to find.

I know of one adventuresome wild crafter that has successfully made use of a dendrochronology drill to inoculate surrounding healthy birch with a column of mycelium from the sterile conk and underlying mycelium. He drills the healthy tree first, removes the wood column, then drills the conk and inserts this into the first drilled hole. This is interesting for several reasons. The first is that I believe the wild crafting of chaga is going to rapidly deplete our native stands in a manner similar to the decimation of wild ginseng, goldenseal, echinacea and other herbs. Paul Stamets believes there is no need for this frenzied destruction of birch conks, and that fermented and cultivated products are suitable for medicinal purposes. Others disagree and insist that only the wild crafted conks from birch contain the compounds needed for preventing and protecting one's health. Many practitioners believe that the wild-harvested Chaga is superior to that grown in fermentation tanks. Time will tell. I believe that the host tree supplies valuable compounds other than betulin and betulinic acid that contribute to its activity on various cancer cell lines. Having said this, I also believe that sustainable harvesting is neither viable nor possible.

The wild and cultivated mycelium differ greatly in chemical makeup. Work by Wei-Fa Zheng et al. (2007) found wild samples were composed of 45% lanosterol and 25% inotodiol and ten other sterols. The cultivated mycelium was 82% ergosterol, but when silver nitrate was added, this turned to 56% lanosterol. More work is obviously needed, but research is steady and ongoing.

One thing of interest to me is that traditional preparations involved boiling (decoctions) of the conks and a period of fermentation. Could it be that some of the compounds require an enzymatic influence to release their healing powers? It could be that fermentation degrades some larger sugar molecules into

absorbable size and makes sterols and various fatty molecules more emulsified. Just a theory; I am thinking out loud.

Infusing a small amount of dry, powdered chaga in a chai latte or exotic health drink as a chemopreventative or wellness product is, I believe, a waste of a valuable resource.

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A great resource for fungi of Colorado is *Mushrooms of the Rocky Mountain Region* by Vera Stucky Evenson & Denver Botanic Gardens. Timber Press 2015.

You can go to www.academia.edu/robertrogers and download for free, 8 peer-reviewed papers on medicinal plants and fungi by the author.