Proponents say burdock root boosts the immune system, reduces inflammation & stimulates detox. Does science back them up?

Burdock Root Benefits & Uses Backed By Science

Burdock is a staple and medicinal plant throughout Europe, Asia, and North America. Its roots are rich in antioxidants, fiber, and anti-inflammatory compounds. Burdock is also said to support the immune system and help the body get rid of toxins. It's the main ingredient in Essiac. Does the research back up its widespread use?

What Is Burdock Root?

Burdock (*Arctium lappa*) is a hairy shrub that belongs to the daisy family, although its bluish-red prickly flowers look nothing like daisies. If you spot burdock, be careful not to brush against it—

its furry flowerheads will firmly cling onto your clothes. That explains the expression “to stick like a burr.”

Burdock’s well-developed root system makes up for its unsightly flowers. It has fleshy, yellowish roots that may reach 60 cm below ground.

Burdock root is a key part of Japanese and Chinese cuisine. People have also used it as a medicinal and table herb throughout Europe, Russia, North America, and Asia for hundreds of years (Moro & Clerici, 2021; Chan et al., 2011)

It goes by many names such as greater burdock, thorny burr, beggar's buttons, gobo, happy major, lappa, love leaves, and niubang. Some of these refer to a similar plant species (common burdock or *Arctium minus*) (Gross et al., 1980).

Many burdock subspecies exist. For example, purple burdock (*A lappa f . purpurascens*) grows only in Quebec (Gross et al., 1980).

The origins of burdock in North America

Nobody is certain about the geographical origin of burdock. Some scientists think it may be native to Japan. Others say it’s native to other parts of Asia or Europe. The official narrative claims it was brought to North America by early European settlers (Moro & Clerici, 2021).

But burdock might even be from North America. There is evidence that native people used burdock before colonial times (Cao JianFeng et al., 2012; Lewis & Lewis, 2003; Drummond, 1904; Gross et al., 1980).

Wherever it came from, burdock is now widespread throughout the U.S. and Canada. Considered a “weed,” burdock can be spotted on many roadsides and vacant lots.

Burdock Root Uses

Traditional Use

Burdock has been used in China for over 3,000 years. Its use is mentioned in the “bible” of Traditional Chinese medicine (TCM) called *the Compendium of Materia Medica* (Chan et al., 2011; JianFeng et al., 2012).

TCM practitioners believe burdock root helps cleanse toxins from the body. They also consider it a remedy for fertility, infections, sore throat, boils, rashes, and other skin problems (Chan et al., 2011; Don & Yap, 2019).

In Canada, burdock has been used for coughs, asthma, blood and skin diseases, rheumatism, and gout. It was also added to sarsaparilla, a popular saloon drink. Native Americans may have included the root in herbal preparations for women in labor. It's also believed to be a diuretic and laxative (Gross et al., 1980; Cao JianFeng et al., 2012; Lewis & Lewis, 2003).

The entire plant is edible. The Iroquois cooked young leaves as greens and prepared dried roots in soup. In Russia, **the roots are roasted and served as a coffee substitute** (Lee & Kim, 2017; Kuhnlein & Turner, 2020; Hutchens, 1992).

Japanese chefs prepare the root as a side dish, while the Koreans like to drink it as tea (Silver & Krantz, 1931; Lee & Kim, 2017)

Although most medicinal preparations mention burdock root, the seeds are claimed to better flush fluids from the body. The fruit and leaves are said to be especially helpful for soothing the skin and mucous membranes (Lee & Kim, 2017).

Despite such diverse use, most traditional indications for burdock haven't yet been backed by clinical studies.

Modern Use

People nowadays use burdock by mouth for (Gao et al., 2018):

- Cold and flu
- Immune support
- Low appetite and anorexia
- Gastrointestinal complaints
- Fever
- Diabetes
- Heart disease (inducing high blood pressure and clogged arteries)
- Inflammatory conditions (including gout, liver, bladder, joint, and colon inflammation)
- Trimethylaminuria (TMAU)
- Support to cancer therapy

Burdock root is the main ingredient in Essiac, which also contains sheep sorrel, slippery elm bark, and Indian rhubarb.

Applied on the skin, burdock is used for (Gao et al., 2018)

- Aging skin
- Dry skin
- Inflammatory skin conditions (acne, psoriasis, eczema)
- Vaginal inflammation

As with traditional use, however, most modern uses of burdock root lack sufficient clinical research.

How Does Burdock Root Work?

Burdock root is considered to be a functional food. It's rich in **inulin and inulin-like prebiotic fiber, enzymes that help digest complex carbs, and antioxidants**. Burdock root has stronger antioxidant activity than many vegetables and fruits. Plus, burdock extract is a more powerful antioxidant than vitamin C (Moro & Clerici, 2021; Ferracane et al., 2010; Yari et al, 2018).

Active Compounds

The main active compounds in burdock are arctigenin and arctiin. All parts of the plant contain them. Arctigenin is more active and is being investigated for its anti-inflammatory and potential anti-cancer properties (Gao et al., 2018).

Burdock is also a source of (Moro & Clerici, 2021; Jaiswal & Kuhnert, 2011; Wu et al., 2014; Zhang et al., 2019):

- Mucilage, which helps protect the gut lining
- Over 15 chlorogenic acids, antioxidants that may help support normal blood pressure, blood sugar, and weight loss
- Cinnarine, which may promote detox and reduce allergies
- Quercetin, a well-researched plant antioxidant
- Polysaccharides, which reduce inflammation and feed good gut bacteria

The active compounds in burdock likely act in synergy (Moro & Clerici, 2021).

The seeds also seem to be high in anti-inflammatory compounds while the leaves may be a better source of antimicrobials (Chan et al., 2011).

Mechanism of Action

Cell-based and animal experiments hint that **arctigenin may work by blocking key inflammatory pathways and helping balance immune function** (Gao et al., 2018).

The downside is that arctigenin is quickly broken down by the liver and intestinal enzymes, which might limit its clinical benefits (Gao et al., 2018).

In one cell-based study, arctigenin helped reduce the loss of gut lining cells. Scientists hypothesize it achieves health effects by (Wu et al., 2014; Chan et al., 2010):

- Turning "off" major inflammatory genes and pathways (like COX-2, TNF-alpha, IL-6, NF-κB, and MAPK)
- Reducing markers of oxidative stress (like malondialdehyde or MDA)

- Boosting key antioxidant enzymes (like SOD and glutathione).

This has yet to be confirmed in human studies.

Burdock Root Benefits

1) Inflammatory Conditions

Most of burdock's health benefits seem to rely on its anti-inflammatory potential, backed by a couple of clinical trials.

In one trial of 36 people with knee osteoarthritis, drinking 3 cups of burdock root tea per day **reduced markers of inflammation and oxidative stress** (CRP, IL-6, MDA). It also improved total antioxidant status and the levels of a key antioxidant enzyme called SOD (superoxide dismutase) (Maghsoumi-Norouzabad et al., 2014).

Drinking burdock tea three times per day for about 26 months **reduced symptom recurrence in patients with colon inflammation (*colonic diverticulitis*)**. Only 10.6% of those who drank burdock tea experienced recurrence, compared with 31.8% of those not taking the tea. The symptom-free duration was also increased by 14 months (Mizuki et al., 2019)

Arctigenin in burdock may improve colon inflammation by balancing the immune system. It stops the body from making immune cells (Th1 and Th17) associated with autoimmunity and inflammation in test tubes (Wu et al., 2015).

According to small clinical studies in women and children with vaginal inflammation (vaginitis), a solution containing burdock, chamomile, and aloe improves symptoms like itching, redness, swelling, and discharge (Guinot et al., 2019; Garcia et al., 2018).

In another trial, a multi-ingredient supplement with burdock (Infla-Kine) reduced inflammatory markers and improved the quality of life in healthy volunteers over 4 weeks. The supplement also contained anti-inflammatory herbs like curcumin, so it's uncertain if burdock contributed (Mikirova et al., 2017).

All in all, human studies suggest that burdock may help reduce inflammation, but more clinical research is needed to assess its effectiveness.

2) Stomach Ulcers & Infections

H. pylori infection is a major cause of stomach ulcers.

A multi-ingredient supplement with 64% burdock improved *H. pylori* infection, inflammation, and ulcer wound healing in a placebo-controlled study of 36 people. This product also contained angelica, gromwell, and sesame oil—so the contribution of each herb is unknown (Yen et al., 2018).

In test tubes, burdock stopped *H. pylori* from attaching to stomach cells and setting off an inflammatory response. In animals, burdock helped restore antioxidant enzymes, heal the stomach lining, and reduce ulcer size (Yen et al., 2018; Silva et al., 2013).

The root extract also prevented stomach damage in animals by reducing excessive acid production and neutralizing harmful free radicals (Dos Santos et al., 2008).

Plus, bitter compounds in burdock leaf extract killed bacteria and their sticky biofilms—a big cause of antibiotic resistance—in test tubes. For this reason, researchers think burdock leaves can be used to naturally preserve food (Lou et al., 2016; Pirvu et al., 2017).

Burdock root has been tested against the many bacteria and yeast in test tubes, including candida and hospital-dwelling superbugs. One study even claimed anti-HIV effects, but this hasn't been confirmed (Rajasekharan et al., 2017; Gentil et al., 2006; Rajasekharan et al., 2015; Schröder et al., 1990).

To sum it up, limited evidence suggests that burdock may help protect the stomach lining from *H. pylori* infection and inflammation. Larger clinical studies are needed before it's recommended.

3) Skin & Hair Health

Burdock is often added to facial creams to encourage skin rejuvenation. It may improve the appearance of aging skin by lowering inflammation and boosting collagen production. In one study, an emulsion with burdock fruit extract reduced wrinkles around the eyes better than placebo in women aged 39-65 (Knott et al., 2008).

In a human study, homeopathic burdock taken by mouth improved acne. However, the study was small (34 people), used varying dilutions (which mostly don't contain active substances), and lacked a placebo control (Miglani & Manchanda, 2014).

One study protocol mentions burdock seed extract for the relief of dry skin and eczema, but no results have been published (Lee et al., 2013).

Hair loss and baldness have been linked with inflammation and oxidative stress, pathways that burdock is purported to block. Burdock is a common ingredient in hair care products, but none of them have yet been tested in humans (Koriem et al., 2016; Trüeb, 2009).

4) Heart Health & Lipid Levels

Folk healers say that burdock root is good for the circulatory system, but only one clinical study tested this benefit so far.

In the study, burdock root along with aquarobic exercise improved blood lipids in 40 elderly Korean women. It reduced total cholesterol, triglycerides, and "bad" LDL cholesterol, but it also lowered the "good" HDL cholesterol (Ha et al., 2018).

Burdock improved lipid status in quails fed an unhealthy, high-fat diet. Its effects were similar to cholesterol medication (simvastatin), with the added perk of enhanced antioxidant status. Human studies haven't yet compared burdock to any medication, though (Wang et al., 2016).

In one study on mice, burdock root improved heart function and helped prevent heart enlargement. An enlarged heart can be caused by heart disease and lead to serious complications (Li et al., 2017).

Also, complex sugars from burdock root reduced platelet clumping and improved blood flow in rats. Excessive platelet clumping can result in heart attack, stroke, and even death (Qiu et al., 2020).

5) Blood Sugar Control & Diabetes

One review concluded that there is not enough clinical evidence to recommend burdock to people with diabetes. Animal studies have had promising results (Annunziata et al., 2019).

Inulin, the main prebiotic fiber in burdock, supports healthy blood sugar levels. A recent analysis of 25 studies concluded that inulin helps improve insulin resistance, the hallmark of type 2 diabetes (Moro & Clerici, 2021; Rao et al., 2019).

One study conducted back in 1931 reported that batter prepared from dried burdock root prevents dangerous post-meal spikes in blood sugar in diabetic patients (Silver & Krantz, 1931).

The same group reported that diabetic patients taking crackers with burdock root powder as a substitute for regular carbs needed lower insulin doses. As soon as burdock crackers were replaced with typical carbs, blood sugar spiked again (Silver & Krantz, 1931).

Burdock root extract lowered high blood sugar and liver markers and increased low insulin and leptin in mice with diabetes (Ahangarpour et al., 2017).

It also reduced the weight of obese rats fed an unhealthy diet. It might work by reducing the activity of enzymes that produce fatty tissue (Hou et al., 2018; Kuo et al., 2012).

Burdock has anti-diabetic and anti-obesity potential, but clinical trials are needed to determine its effects in people.

6) Digestion & Gut Health

Inulin prebiotic fiber in burdock root feeds good gut bacteria and encourages digestion. It stimulates the release of immune-balancing butyric acid in the colon. Plus, burdock root's high mucilage content may help soothe the gut (Duke, 2002; Watanabe et al., 2020).

Inulin from burdock helped probiotic bacteria grow in test tubes. Also, dietary burdock inulin increased the number of *Bifidobacteria* and *Lactobacilli*—the main good probiotic bacteria—in mice (Moro & Clerici, 2021; Li et al., 2008).

An imbalanced gut microbiome (*dysbiosis*) with low diversity has been linked with many diseases, including inflammatory bowel disease (IBD) and irritable bowel syndrome (IBS) (Kriss et al., 2019)

Burdock root powder increased the gut microbiome diversity in mice better than pure inulin. Taking burdock in the evening vs. morning had a stronger effect (Watanabe et al., 2020).

Arctigenin from burdock is being investigated for maintaining the integrity of the gut lining in IBD. It might keep the junctions between gut cells strong by activating estrogen receptor beta (ERβ). Estrogenic activity is usually seen as "bad," but ERβ is anti-inflammatory and a key target of new IBD therapies (Tao et al., 2020; Saleiro et al., 2012).

Polysaccharides from burdock are complex sugars that may help balance the gut and whole-body immune response. They act on cytokines, the main signalling molecules involved in an inflammatory response (Zhang et al., 2019).

In a study on immune cells, a burdock polysaccharide called *ALP-1* reduced proinflammatory cytokines and boosted an anti-inflammatory cytokine (IL-10). In mice, ALP-1 increased beneficial gut bacteria, reduced potentially harmful gut bacteria (*Bacteroides*), and enhanced the production of anti-inflammatory short chain fatty acids (SCFAs) (Zhang et al., 2019).

Burdock is also a herbal bitter. Bitters work by stimulating digestive juices and are traditionally used for low appetite, indigestion, bloating, and heartburn (McMullen et al., 2015).

Burdock contains prebiotics and bitter compounds that support digestion and gut health. However, its effects on people with gut disorders have yet to be tested in human trials.

7) Immunity, Allergies & Autoimmunity

Burdock root may help balance the immune system without stimulating it. An overactive immune response may cause either allergies or autoimmune disease. Herbal immune stimulants can worsen autoimmune diseases, according to research (Lee & Werth, 2004).

In animals, burdock root suppressed both allergic and autoimmune inflammation. In cells, burdock reduced histamine and other inflammatory compounds. (Yang et al., 2016; Li et al., 2016).

8) Cancer Research

Burdock root in Essiac

Essiac is a burdock-containing herbal formulation reported to be used by some cancer patients. No clinical studies on Essiac have yet been carried out.

According to a study published in 2006, people use Essiac as an add-on to breast cancer treatment, for reducing the negative side effects of conventional breast cancer treatment, and as prevention in cancer survivors (Zick et al., 2006).

The same study sent out a survey to 510 women who were diagnosed with breast cancer, 8% of which used Essiac. Women using Essiac reported beneficial effects. Yet, the study did not find a link between the use of Essiac and improvements in quality of life or mood. Well-controlled, clinical trials are needed (Zick et al., 2006)

Burdock alone

One study reported favorable outcomes of a specific burdock fruit extract called GBS-01 at high doses (12 g/day) in a pilot trial. The trial included 15 patients with advanced pancreatic cancer who didn't respond to the standard chemo (gemcitabine). They describe a partial response in one patient and stable disease in four patients. Larger trials are needed (Ikeda et al., 2016).

GBS-01 is high in arctigenin. Scientists hypothesize it might act by reducing the tolerance of cancer cells to glucose deprivation. In theory, this might make cancer cells die off quicker if starved of sugar. However, this hypothesis remains unproven for now (Ikeda et al., 2016).

In one study, burdock extract injections enhanced survival and reduced inflammation and tumor growth in mice with melanoma (Nascimento et al., 2019).

In other mice studies, high oral doses of arctigenin reduced prostate tumor growth by up to 70%. Yet, it's important to have in mind that findings from animal studies can't be applied to humans (Wang et al., 2018).

In cells, arctigenin turned "off" cancer-promoting genes while making cancer cells more susceptible to chemotherapy medication (Wang et al., 2018; Yao et al., 2011).

According to scientists, arctigenin may activate crucial cancer-fighting mechanisms such as apoptosis (programmed cell death). One of the ways in which cancer cells evade death and cause metastasis in the body is by becoming resistant to apoptosis. Arctigenin could trigger apoptosis in cells and animals, but it's unknown whether it might have this effect in humans (He et al., 2018).

Another burdock active compound called L-asparagine increased the effects of chemotherapy (cyclophosphane) that prevents the spread of cancer in animals. It also killed cancer cells in test tubes (Urazova et al., 2011).

A Japanese research team found burdock extract the most active out of 364 herbal plant extracts screened using cancer and healthy cells. Arctigenin from burdock killed lung, liver, and stomach cancer cells and stopped them from dividing (Susanti et al., 2013).

Other cellular studies investigated the mechanisms of burdock root extracts on blood, breast, and other cancer cells. Active compounds in burdock appear to act selectively on cancer cells without harming healthy cells in test tubes (Don & Yap, 2019; Ghafari et al., 2017; Susanti et al., 2013; Wegiera et al., 2012; Baba et al., 2018; Lee et al., 2019)

This tells us little about its effects in humans, though, as a compound may behave completely differently in humans than it does in test tubes.

The bottom line…

Proponents claim burdock root supports the immune system and overall health. However, evidence is currently lacking to support its use—alone or in multi-ingredient herbals—for cancer prevention or treatment. Clinical studies are needed to assess its efficacy and safety in this population.

9) Detox & Liver Health

Burdock is purported to help the body detox toxins, drugs, and carcinogens. **Only animal and cell-based studies have been carried out, so this benefit remains uncertain**.

In lab animals, burdock reduced inflammation from cigarette smoke exposure and liver-damaging chemicals. It also protected the liver against the heavy metal cadmium, acetaminophen, a toxic Chinese herb, and a diet high in unhealthy fats (Possebon et al., 2018; Lin et al., 1996; Predes et al., 2014; El-Kott et al., 2015; Zhou et al., 2020; Romualdo et al., 2020).

10) Libido & Fertility

Anecdotes and traditional medicine say that burdock helps with libido and fertility, but no human studies exist.

In male rats, burdock root extract increased testosterone and enhanced sexual function and behavior. The extract also increased sperm viability in diabetic rats. Diabetes is a known cause of poor sperm quality and erectile dysfunction (JianFeng et al., 2012; Ahangarpour et al., 2015).

Burdock root extract also improved markers of reproductive and sexual function in healthy mice (increasing sperm count, testosterone, LH, and FSH) (Ahangarpour et al., 2015).

In another rat study, burdock extract helped heal testicular damage caused by alcohol by acting as a strong antioxidant (Yari et al., 2018).

11) Mood, Brain & Bone Health

Evidence is lacking to support the use of burdock root for mood, brain, and bone health. The research is limited to animal and cellular studies.

Arctigenin from burdock reduced depression and anxiety in mice exposed to stress. It also improved memory and helped clear toxic beta-amyloid plaques from the brains of mice with Alzheimer's disease. In brain cells, arctigenin reduced inflammation and injury (Du et al., 2019; Zhu et al., 2013; Song et al., 2016).

Burdock root improved memory by blocking acetylcholinesterase (AChE) in mice. AChE is an enzyme that breaks down acetylcholine, the brain's most powerful innate nootropic. By blocking AChE, burdock root may help boost acetylcholine (Lee et al., 2011).

Arctigenin from burdock root blocked the activity of bone-degrading cells in test tubes, but its effects on bone health remain unexplored (Wei et al., 2019)

Precautions

Disease and drug interactions are possible. Please consult your doctor before use,

Pregnant and breastfeeding women should avoid burdock root due to a lack of safety data.

In Summary

Unfortunately, only 8 clinical trials have been conducted with burdock so far. Most burdock uses rely on animal and cellular studies and anecdotes. The published findings are promising, but more clinical trials are needed to assess its health benefits.

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