

# Birch Essential Oil Health and Beauty Benefits

## Fast Facts

<b>Botanical Name</b>	<i>Betula lenta</i>
<b>Botanical Family</b>	Betulaceae
<b>Common Names</b>	Black birch, cherry birch, mahogany birch, southern birch, sweet birch
<b>Note</b>	Top
<b>Aroma</b>	Camphorous, sweet and similar to wintergreen
<b>Extraction Method</b>	Steam distilled
<b>Plant Part Used</b>	Bark
<b>Shelf Life</b>	3–5 years
<b>Kid Safe?</b>	No
<b>Safety Concerns</b>	Keep out of reach of children. Do not use if pregnant or nursing. Avoid if taking blood thinners, are about to have surgery, have hypertension, heart problems or diseases, bleeding disorders, gastrointestinal disorders, Parkinson's, seizure or epileptic disorders, or ADD/ADHD. Avoid if you have a salicylate deficiency or hypersensitivity. Possible skin sensitivity. Best to use at a dilution no greater than 2.5%.

## DESCRIPTION OF BIRCH TREES

A birch is a thin-leaved deciduous (sheds leaves in autumn) hardwood (wood from dicot trees) of the genus *Betula* (/ˈbɛtjələ/), in the family Betulaceae, which also includes alders, hazels, and hornbeams. It is closely related to the beech-oak family Fagaceae. The genus *Betula* contains 30 to 60 known taxa of which 11 are on the [International Union for Conservation of Nature](#) (IUCN) 2011 [Red List of Threatened Species](#).

They are a typically rather short-lived pioneer species widespread in the Northern Hemisphere, particularly in northern areas of temperate climates (occurring in the middle latitudes between the tropics and the Polar Regions) and in boreal climates (characterized by long, cold winters, and short, warm summers, occurring on large landmasses away from oceans). Pioneer species are hardy species which are the first to colonize barren environments or previously biodiverse steady-state ecosystems that have been disrupted, such as by fire.

## LEAVES

Birch species are generally small to medium-sized trees or shrubs. The simple leaves are alternate, singly or doubly serrate, feather-veined, petiolate and stipulate. They often appear in pairs, but these pairs are really borne on spur-like, two-leaved, lateral branchlets.

## FRUIT

The fruit is a small samara (a winged achene, a simple, indehiscent dry fruit), although the wings may be obscure in some species. They differ from the alders in that the female catkins (a slim flower cluster without petals) are not woody and disintegrate at maturity, falling apart to release the seeds, unlike the woody, cone-like female alder catkins.

## FLOWERS

The flowers are monoecious (separate male and female cones or flowers are present on the same plant), opening with or before the leaves. Once fully grown, these leaves are usually 3–6 millimeters ( $\frac{1}{8}$ – $\frac{1}{4}$  in) long on three-flowered clusters in the axils of the scales of drooping or erect catkins or aments. Staminate catkins are pendulous, clustered, or solitary in the axils of the last leaves of the branch of the year or near the ends of the short lateral branchlets of the year.

They form in early autumn and remain rigid during the winter. The scales of the mature staminate catkins are broadly ovate, rounded, yellow or orange color below the middle and dark chestnut brown at apex. Each scale bears two bractlets and three sterile flowers, each flower consisting of a sessile, membranous, usually two-lobed, calyx. Each calyx bears four short filaments with one-celled anthers or strictly, two filaments divided into two branches, each bearing a half-anther. Anther cells open longitudinally.

The pistillate segments are erect or pendulous, and solitary, terminal on the two-leaved lateral spur-like branchlets of the year. The pistillate scales are oblong-ovate, three-lobed, pale yellow-green often tinged with red, becoming brown at maturity. These scales bear two or three fertile flowers, each flower consisting of a naked ovary. The ovary is compressed, two-celled, and crowned with two slender styles; the ovule is solitary. Each scale bears a single small, winged nut that is oval, with two persistent stigmas at the apex.

## BARK

The bark of all birches is characteristically marked with long, horizontal lenticels (porous tissue consisting of cells with large intercellular spaces), and often separates into thin, papery plates, especially upon the paper birch (*Betula papyrifera*). The strong and water-resistant cardboard-like bark can be easily cut, bent, and sewn, which has made it a valuable material, since pre-historic (pre-literary history) times.

Distinctive colors give the common names gray (*Betula populifolia*), white (*Betula papyrifera*), black (*Betula dahurica*, *Betula lenta*), silver (*Betula pendula*, formerly known as *Betula alba*) and yellow (*Betula alleghaniensis*) birch to different species. The buds, forming early and full-grown by midsummer, are all lateral, without a terminal bud forming; the branch is prolonged by the upper lateral bud. The wood of all the species is close-grained with a satiny texture and capable of taking a fine polish.

Because birches are on the list of threatened species and because removing the bark from live trees is harmful, it must be avoided. Instead, the bark can be removed easily from the trunk or branches of dead wood, by cutting a swath lengthwise through the bark and pulling or prying it away from the wood. The best time for collection is spring or early summer, as the bark is of better quality and most easily removed.

Removing the outer (light) layer of bark from the trunk of a living tree may not kill it quickly, but it will weaken it and make it prone to infections. Removal of the inner (dark) layer or phloem (the living tissue in plants that transports the sugar sucrose made during photosynthesis throughout the plant), kills the tree by preventing the flow of sap to the roots.

## ESSENTIAL OIL

Boasting of a smooth and rich aroma, birch essential oil is derived from sweet birch (*Betula lenta*) and white birch (*Betula pendula*). The scent of birch essential oil lacks the "woody" aroma of other tree

essential oils. Instead, it has a mint-like scent similar to that of wintergreen. Birch essential oil is extracted from the bark of the birch tree through the process of steam distillation.

Sweet birch is approximately 25 meters long with a cone-shaped appearance. It is native to southern Canada and the southeastern U.S. Its leaves are bright green and the bark is a reddish-brown. White birch has slender scaly branches and is native to the Northern Hemisphere. It is about 20 meters long with light green egg-shaped leaves.

## THE TAXONOMY OF BIRCH

*Betula* species are organized into five subgenera.

Birches Native to Europe	Birches Native to Asia	Birches Native to North America
<i>Betula baschkirica</i> (eastern European Russia)	<i>Betula albosinensis</i> Chinese red birch (northern & central China)	<i>Betula alleghaniensis</i> yellow birch ( <i>B. lutea</i> ) (eastern Canada, Great Lakes, upper eastern US, Appalachians)
<i>Betula browicziana</i> (Turkey and Georgia)	<i>Betula alnoides</i> alder-leaf birch (China, Himalayas, northern Indochina)	<i>Betula caerulea</i> blue birch (northeast of North America)
<i>Betula celtiberica</i> (Spain)	<i>Betula ashburneri</i> (Bhutan, Tibet, Sichuan, Yunnan Provinces in China)	<i>Betula cordifolia</i> mountain paper birch (eastern Canada, Great Lakes, New England US)
<i>Betula coriaceifolia</i> (Uzbekistan)	<i>Betula bomiensis</i> (Tibet)	<i>Betula glandulosa</i> American dwarf birch (Siberia, Mongolia, Russian Far East, Alaska, Canada, Greenland, mountains of western US and New England, Adirondacks)
<i>Betula ermanii</i> Erman's birch (eastern Siberia, Russian Far East, northeastern China, Korea, Japan)	<i>Betula buggsii</i> (China)	<i>Betula lenta</i> sweet birch, cherry birch, or black birch (Quebec, Ontario, eastern US)
<i>Betula falcata</i> (Tajikistan)	<i>Betula calcicola</i> (Sichuan & Yunnan Provinces in China)	<i>Betula michauxii</i> Newfoundland dwarf birch (Newfoundland, Labrador, Quebec, Nova Scotia)
<i>Betula fruticosa</i> (eastern Siberia, Russian Far East, northeastern China, Mongolia, Korea, Japan)	<i>Betula chichibuensis</i> (Chichibu, Saitama Prefecture region of Japan)	<i>Betula minor</i> dwarf white birch (eastern Canada, mountains of northern New England and Adirondacks)
<i>Betula humilis</i> or <i>Betula kamtschatica</i> Kamchatka birch <i>platyphylla</i> (northern & central Europe, Siberia, Kazakhstan, Xinjiang, Mongolia, Korea)	<i>Betula chinensis</i> Chinese dwarf birch (China, Korea)	<i>Betula nana</i> dwarf birch or bog birch (also in northern Europe and Asia)
<i>Betula karagandensis</i> (Kazakhstan)	<i>Betula corylifolia</i> (Honshu Island in Japan)	<i>Betula nealaskana</i> Alaska paper birch also known as Alaska birch or Resin birch (Alaska and northern Canada)
<i>Betula klokovii</i> (Ukraine)	<i>Betula costata</i> (northeastern China, Korea, Primorye region of Russia)	<i>Betula nigra</i> river birch or black birch (eastern US)
<i>Betula kotulae</i> (Ukraine)	<i>Betula cylindrostachya</i> (Himalayas, southern China, Myanmar)	
<i>Betula medwediewii</i> Caucasian birch (Turkey, Iran, Caucasus)	<i>Betula dahurica</i> (eastern Siberia, Russian Far East, northeastern China, Mongolia, Korea, Japan)	
<i>Betula megrelica</i> (Republic of Georgia)	<i>Betula delavayi</i> (Tibet, southern China)	
<i>Betula microphylla</i> (Siberia, Mongolia, Xinjiang, Kazakhstan, Kyrgyzstan, Uzbekistan)	<i>Betula fargesii</i> (Chongqing & Hubei Provinces in China)	
<i>Betula nana</i> dwarf birch (northern & central Europe, Russia, Siberia, Greenland,	<i>Betula globispica</i> (Honshu Island in Japan)	

<p>Northwest Territories of Canada))</p> <p><i>Betula pendula</i> silver birch (widespread in Europe and northern Asia; Morocco; naturalized in New Zealand and scattered locations in US &amp; Canada)</p> <p><i>Betula platyphylla</i> (<i>Betula pendula</i> var. <i>platyphylla</i>) Siberian silver birch (Siberia, Russian Far East, Manchuria, Korea, Japan, Alaska, western Canada)</p> <p><i>Betula potamophila</i> (Tajikistan)</p> <p><i>Betula psammophila</i> (Kazakhstan)</p> <p><i>Betula pubescens</i> downy birch, also known as white, European white or hairy birch (Europe, Siberia, Greenland, Newfoundland; naturalized in scattered locations in US)</p> <p><i>Betula raddeana</i> (Caucasus)</p> <p><i>Betula saksarensis</i> (Khakassiya region of Siberia)</p> <p><i>Betula saviczii</i> (Kazakhstan)</p> <p><i>Betula tianshanica</i> (Kazakhstan, Kyrgyzstan, Tajikistan, Uzbekistan, Xinjiang, Mongolia)</p> <p><i>Betula zinserlingii</i> (Kyrgyzstan)</p>	<p><i>Betula gmelinii</i> (Siberia, Mongolia, northeastern China, Korea, Hokkaido Island in Japan)</p> <p><i>Betula grossa</i> Japanese cherry birch (Japan)</p> <p><i>Betula gynoterminalis</i> (Yunnan Province in China)</p> <p><i>Betula honanensis</i> (Henan Province in China)</p> <p><i>Betula insignis</i> (southern China)</p> <p><i>Betula luminifera</i> (China)</p> <p><i>Betula maximowicziana</i> monarch birch (Japan, Kuril Islands)</p> <p><i>Betula potaninii</i> (southern China)</p> <p><i>Betula schmidtii</i> (northeastern China, Korea, Japan, Primorye region of Russia)</p> <p><i>Betula sunanensis</i> (Gansu Province of China)</p> <p><i>Betula szechuanica</i> (<i>Betula pendula</i> var. <i>szechuanica</i>) Sichuan birch (Tibet, southern China)</p> <p><i>Betula utilis</i> Himalayan birch (Afghanistan, Central Asia, China, China, Tibet, Himalayas)</p> <p><i>Betula wuyiensis</i> (Fujian Province of China)</p>	<p><i>Betula occidentalis</i> water birch or red birch (<i>B. fontinalis</i>) (Alaska, Yukon, Northwest Territories, western Canada, western US)</p> <p><i>Betula papyrifera</i> paper birch, canoe birch or American white birch (Alaska, most of Canada, northern US)</p> <p><i>Betula populifolia</i> gray birch (eastern Canada, northeastern US)</p> <p><i>Betula pumila</i> swamp birch (Alaska, Canada, northern US)</p> <p><i>Betula uber</i> Virginia round-leaf birch (southwestern Virginia)</p>
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**Note:** many American texts have *Betula pendula* and *Betula pubescens* confused, though they are distinct species with different chromosome numbers.

## THE ETYMOLOGY OF BIRCH

The common name *birch* comes from Old English *birce*, *bierce*, from Proto-Germanic *\*berk-jōn* (cf. German *Birke*, West Frisian *bjirk*), an adjectival formation from *\*berkōn* (cf. Dutch *berk*, Low German (or Low Saxon) *Bark*, Danish *birk*, Norwegian *bjørk*), itself from the Proto-Indo-European (PIE) root *\*b<sup>h</sup>erHǵ-* ~ *b<sup>h</sup>rHǵ-*, which also gave Lithuanian *bėržas*, Latvian *Bērzs*, Russian *berēza*, Ukrainian *beréza*, Albanian *bredh* “fir”, Ossetian *bærz(æ)*, Sanskrit *bhurja*, Polish *brzoza*, Latin *fraxinus* “ash (tree)”. This root is presumably derived from *\*b<sup>h</sup>reh<sub>1</sub>ǵ-* “to shine, whiten”, in reference to the birch's white bark. The Proto-Germanic rune (letter representing a sound value) *berkanan* (the name of the b rune “ᚼ”) is named after the birch.

The generic name *Betula* is from Latin, which is a diminutive (a root word that has been modified to convey a slighter degree of its root meaning) borrowed from Gaulish (an ancient Celtic language spoken in parts of Europe before and during the Roman Empire) *betua* (cf. Old Irish *bethe*, Welsh *bedw*).

## THE EVOLUTIONARY HISTORY OF BIRCH

Within Betulaceae, birches are most closely related to alder. The oldest known birch fossils are those of *Betula leopoldae* (an extinct species of birch) from the Klondike Mountain Formation in Washington State, U.S., which date to the early Eocene (the second geological epoch of the Paleogene Period in the modern Cenozoic Era) Ypresian (the oldest age or lowest stratigraphic stage of the Eocene), around 49 million years ago.

## THE ECOLOGY OF BIRCH

Birches often form even-aged stands on light, well-drained, particularly acidic soils (high pH). They are regarded as pioneer species, rapidly colonizing open ground especially in secondary successional (ecology of a plant's life, is a process started by an event that occurs on preexisting soil and reduces an established ecosystem to a smaller population of species) sequences following a disturbance or fire.

Birches are early tree species to become established in primary successions (the beginning step in ecology after an extreme disturbance, which occurs in an environment devoid of soil, vegetation and other organisms), and can become a threat to heathland if the seedlings (a young plant developing from a seed) and saplings are not suppressed by grazing or periodic burning.

Birches are generally lowland species, but some species, such as *Betula nana*, have a montane (found on the slopes of mountains) distribution. In the British Isles, there is some difference between the environments of *Betula pendula* and *Betula pubescens*, as well as some hybridization. *Mycorrhizal fungi*, including sheathing (ecto) *mycorrhizas*, are found in some cases to be beneficial to tree growth.

Birches, *Betula* species, are used as food by the larvae of a large number of *Lepidoptera* (an order of about 180,000 species of insects that includes butterflies and moths) insects that feed on their foliage.

## THE CULTIVATION OF BIRCH

White-barked birches in particular are cultivated as ornamental trees, largely for their appearance in winter. The Himalayan birch, *Betula utilis*, especially the variety or subspecies *jacquemontii*, is among the most widely planted for this purpose. It has been cultivated since the 1870s, and many cultivars are available, including "Doorenbos", "Grayswood Ghost" and "Silver Shadow"; "Knightshayes" has a slightly weeping habit. Other species with ornamental white bark include *Betula ermanii*, *Betula papyrifera*, *Betula pendula* and *Betula raddeana*.

## THE MANY USES OF BIRCH

### Construction Material

Birch bark was a valuable construction material in any part of the world where birch trees were available. Containers such as wrappings, bags, baskets, storage boxes, or quivers (a container for holding arrows, bolts, darts or javelins) were made by most societies well before pottery was invented.

In various Asian countries (including Siberia) birch bark was used to make waterproof coverings for composite bows (a form of laminated bow, is a traditional bow made from horn, wood, and sinew laminated together), such as the Mongol bow, the Chinese bow, Korean bow, Turkish bows, Assyrian bow and the Perso-Parthian bow. Composite bows are still used and are made from more than one variety of birch.

Many Native Americans in the U.S. and Indigenous peoples in Canada prize the birch for its bark, which because of its light weight, flexibility, and the ease with which it can be stripped from fallen trees, is often used for the construction of strong, waterproof but lightweight canoes (boats), wigwams (semi-permanent domed dwellings used for ceremonial events), bowls, torches, fans, musical instruments and clothing.

Because of the hardness of birch, it is easier to shape it with power tools; it is quite difficult to work it with hand tools. Birch wood is fine-grained and pale in color, often with an attractive satin-like sheen. Ripple figuring may occur, increasing the value of the timber for veneer and furniture-making. The highly decorative Masur (or Karelian) birch, from *Betula verrucosa var. carelica*, has ripple textures combined with attractive dark streaks and lines.

Birch plywood (material manufactured from thin layers or "plies" of wood veneer glued together with adjacent layers rotated up to 90 degrees to one another) is made from laminations of birch veneer. It is light but strong, with many other good properties. It is among the strongest and most dimensionally stable plywood, although unsuitable for exterior use. Birch plywood is used to make longboards (long skateboards), giving it a strong yet flexible ride. It is also used (often in very thin grades with many laminations) for making model aircraft.

### Building Material

In Scandinavia and Finland, birch bark was used as the substratum of sod roofs (or turf roof, a traditional roof covered with sod on top of several layers of birch bark on sloping wooden boards), it was the most common roof for rural log homes, and birch-bark roofs (a roof construction traditional to farmhouses and log homes).

The Hughes H-4 Hercules (a prototype strategic airlift flying boat designed and built by the Hughes Aircraft Company) was made mostly of birch wood, despite its better-known moniker, "The Spruce Goose".

### Handicrafts and Arts Material

Birch bark can be cut with a sharp knife, and worked like cardboard. For sharp bending, the fold should be scored (scratched) first with a blunt stylus (a writing utensil or small tool for marking or shaping). Fresh bark can be worked as is; bark that has dried can be softened by steaming, by soaking in warm water, or over a fire. To prevent it from rolling up during storage, the bark should be spread open and kept pressed flat.

The Indigenous peoples of North America also used birch bark to create ritual art, known as birch bark biting (artists bite on small pieces of folded birch bark to form intricate shapes), an art form practiced by Anishinaabeg, including Ojibwe people, Potawatomi, and Odawa, as well as Cree and other Algonquian peoples of the Subarctic and Great Lakes regions of Canada and the U.S.

In Scandinavia and Finland, birch bark was used for making boxes, casks and buckets, fishing implements, and shoes (as worn by the Egtved Girl [ˈektveð]) a Nordic Bronze Age girl whose well-preserved remains were discovered outside Egtved, Denmark in 1921. Whose shoes resemble bast shoes (basket woven and shaped like a foot) made primarily from bast-fiber taken from the bark of trees, a traditional footwear of the forest areas of Northern Europe. Ground birch bark, fermented in sea water, was used for seasoning the woolen, hemp or linen sails and hemp rope of traditional Norwegian boats.

Birch oil is used in the manufacture of Russia leather (a particular form of bark-tanned cow leather), a water-resistant leather. Birch bark knife handles are popular tools still made currently. Birch seeds are used as leaf litter in miniature terrain models.

## Writing Material

Wood pulp made from birch gives relatively long and slender fibers for a hardwood. The thin walls cause the fiber to collapse upon drying, giving a paper with low bulk and low opacity. The birch fibers are, however, easily fibrillated and give about 75% of the tensile strength of softwood. The low opacity makes it suitable for making glassine (a smooth and glossy paper that is air, water, and oil resistant).

In the culture of North India, the birch (Sanskrit: भुर्ज, *bhurja*) holds great historical significance, where the thin bark that came off in winter was used as writing paper. Birch bark (Sanskrit: भुर्ज पत्र, *bhurja patra*) is exceptionally durable and together with dried palm leaves were the primary writing implements before the widespread advent of paper, in the second millennium CE. The Gandharan Buddhist Texts, the oldest known Buddhist and Indian manuscripts (dating from the 1st century BCE to 3rd century CE) from Afghanistan, were written on birch bark.

The Roman period Vindolanda tablets (the oldest surviving handwritten documents, a source of information about life in northern Roman Britain) also use birch as a material on which to write. Birch bark was used widely in ancient Russia as notepaper (*beresta*), many birch bark manuscripts have survived from the Middle Ages. Birch bark was also used for decorative purposes and even for making footwear (*lapti*) and baskets.

The Indigenous peoples of North America also used birch bark to create maps (including the oldest maps of North America) and scrolls (known as wiigwaasabak, on which the Ojibwa people of North America wrote complex geometrical patterns, considered to be their written language). When these scrolls were used specifically for Midewiwin ceremonies they are called mide-wiigwaas.

## Personal Care Items

Fragrant twigs of some groups of birches are used in saunas. Extracts of birch are used for flavoring or leather oil, and in cosmetics such as soap or shampoo. In the past, commercial oil of wintergreen (*methyl salicylate*) was made from the sweet birch (*Betula lenta*).

Birch-tar, birch pitch or Russian oil, a substance derived from the dry distillation of birch bark, is *thermoplastic* (a polymer material that becomes pliable or moldable at elevated temperatures and solidifies upon cooling) and waterproof; it was used for medicinal purposes and as a glue for such tools as arrows. Neanderthals used birch bark to make a tar adhesive through the process of dry or destructive distillation.

## Firewood Material

Birch is used as firewood because of its high calorific value (or heating value, the amount of heat released during the combustion of it) per unit weight and unit volume. It burns well, without popping, even when frozen and freshly hewn. Birch bark also makes an outstanding tinder (easily combustible material used to start a fire). It will burn very well even when wet because of the oils it contains, as the inner layers will stay dry even through heavy rainstorms. With care, it can be split into very thin sheets that will ignite from even the smallest of sparks.

## Tonewood Material

Baltic birch is among the most sought-after woods in the manufacture of speaker cabinets (loudspeaker enclosures). Birch has a natural resonance (the phenomenon of increased amplitude occurring when the frequency of an applied force is equal to a natural frequency of the system on which it acts) that peaks in the high and low frequencies, which are also the hardest for speakers to reproduce. This resonance compensates for the roll-off of low and high frequencies in the speakers, and evens the tone. Birch is known for having "natural EQ".

Birch plywood was specified by the BBC as the only wood that can be used in making the cabinets of the long-lived LS3/5A loudspeaker (a small studio monitor loudspeaker for use by outside broadcast vans to ensure quality of their broadcasts).

Drums are often made from birch. Prior to the 1970s, it was one of the most popular drum woods. Because of the need for greater volume and midrange clarity, drums were made almost entirely from maple until recently, when advances in live sound reinforcement and drum microphones have allowed the use of birch in high-volume situations. Birch drums have a natural boost in the high and low frequencies, which allows the drums to sound fuller.

Birch wood is sometimes used as a tonewood (wood varieties possessing tonal properties that make them a good choice for use in woodwind or stringed instruments) for acoustic and semi acoustic guitars, and occasionally for solid-body guitars. It is also a common material used in percussion mallets (or beaters) for keyboard percussion.

### Birch as a Food Source

The inner bark is considered edible as an emergency food, even when raw. It can be dried and ground into flour, as was done by Native Americans and early settlers. It can also be cut into strips and cooked like noodles.

The sap can be drunk or used to make syrup. Birch syrup is a savory, mineral-tasting syrup made from birch sap, and produced in much the same way as maple syrup. However, it is seldom used for pancake or waffle syrup; more often it is used as an ingredient paired with pork or salmon dishes in sauces, glazes, and dressings, and as a flavoring in ice cream, beer, wine, and soft drinks. Tea can be made from the red inner bark of black birches (*Betula dahurica*, *Betula lenta*). Birch wood can be used to smoke foods.

### BIRCH IN MODERN MEDICINE

In the European Union (EU), a prescription gel containing birch bark extract (commercial name *Episalvan*, *betulae cortex dry extract* (5–10 :1); extraction solvent: n-heptane 95% (w/w)) was approved in 2016 for the topical treatment of minor skin wounds in adults. Although its mechanism of action (MOA, the specific biochemical interaction through which a drug produces its pharmacological effect) in helping to heal injured skin is not fully understood, birch bark extract appears to stimulate the growth of keratinocytes (the primary type of cell found in the epidermis, the outermost layer of the skin) which then fill the wound.

Preliminary research indicates that the phytochemicals, *betulin* and other *triterpenes*, are active in *Episalvan* gel and wound healing properties of birch bark.

On 22 April 2022, the [Committee for Medicinal Products for Human Use](#) (CHMP) of the [European Medicines Agency](#) (EMA) adopted a positive opinion, recommending the granting of a marketing authorization for the medicinal product *Filsuvez*, a gel for cutaneous use intended for the treatment of *epidermolysis bullosa* (or EB, a group of medical conditions that result in blistering of the skin and mucous membranes caused by trauma and can range from mild to fatal). The applicant for this medicinal product is Amryt Pharmaceuticals DAC.

The active substance of *Filsuvez* is birch bark extract (as dry extract, refined) from *Betula pendula*/*Betula pubescens* (equivalent to 0.5–1.0 g birch bark), including 84–95 mg triterpenes calculated as the sum of *betulin*, *betulinic acid*, *erythrodiol*, *lupeol* and *oleanolic acid*. It is thought to work by modulating inflammatory mediators and stimulating keratinocyte differentiation and migration, thereby promoting wound healing and closure.



## BIRCH IN TRADITIONAL MEDICINE

Birch tree parts and products have been [used in traditional medicine](#) in various forms, e.g. herb, whole extract, tar, oil and infusions. The medicinal parts used are the bark, leaves, buds and sap, or their derivative products.

Birch bark contains substances of medicinal interest. Some of those (such as *betulin*) have fungicidal properties. For centuries, birch bark was used in traditional medicine practices by North American indigenous peoples for treating superficial wounds by applying bark directly to the skin. In the 16<sup>th</sup> century, splints made with birch bark were used as casts for broken limbs.

## THE CULTURAL SIGNIFICANCE OF BIRCH

In Celtic cultures, the birch symbolizes growth, renewal, stability, initiation and adaptability because it is highly adaptive and able to sustain harsh conditions with casual indifference. Proof of this adaptability is seen in its ability to repopulate areas damaged by wildfires or deforestation. Birches are also associated with *Tír na nÓg* (or *Tír na hÓige*, In Irish mythology) one of the names for the Celtic Otherworld, the land of the dead.

Birches are also associated with the *Sidhe* (*Aos sí*, in Celtic mythology) the Irish name for a supernatural race—spelled *sith* by the Scots, but pronounced the same—comparable to fairies or elves. They are said to descend from either fallen angels or the *Tuatha Dé Danann*, meaning the "People of Danu". As part of Gaelic folklore they frequently appear in Scottish, Irish, and English folksongs and ballads in association with death, or fairies, or returning from the grave. The leaves of the silver birch tree are used in the festival of St. George, held in Novosej and other villages in Albania.

The birch is New Hampshire's state tree and the national tree of Finland and Russia. The yellow birch is the official tree of the province of Quebec (Canada). The birch is a very important element in Russian culture and represents the grace, strength, tenderness and natural beauty of Russian women, as well as the closeness to nature of the Russian people. It is associated with marriage and love. There are numerous folkloric Russian songs featuring the birch tree as a recurring theme.

The Czech word for the month of March, "Březen", is derived from the Czech word "břıza" meaning birch, as birch trees flower in March. The Ornäs birch is the national tree of Sweden. The silver birch tree is of special importance to the Swedish city of Umeå. In 1888, the Great City Fire of Umeå spread all over the city and nearly burnt it down to the ground, but some birches supposedly halted the spread of the fire. To protect the city against future fires, wide avenues were created, and these were lined with silver birch trees. Umeå later adopted the unofficial name of "City of the Birches" (*Björkarnas stad*). Also, the ice hockey team of Umeå is called *Björklöven*, translated to English "The Birch Leaves".

"Swinging" birch trees was a common game for American children in the nineteenth century. American teacher, poet and author Lucy Larcom's "*Swinging on a Birch Tree*" celebrates the game. The poem inspired American poet Robert Lee Frost, who pays homage to the act of climbing birch trees in his more famous poem, "*Birches*". Frost once told "it was almost sacrilegious climbing a birch tree till it bent, till it gave and swooped to the ground, but that's what boys did in those days." Birch twigs bound in a bundle, also called "birch", were used for *birching*, a form of corporal punishment.

Birch is also associated with the feast of Pentecost (a Christian holiday which takes place on the 50th day after Easter Sunday) in Central and Eastern Europe and Siberia, where its branches are used as decoration for churches and homes on this day.

## THE PHYTOCHEMISTRY OF BIRCH

The major chemical compounds contributing to its therapeutic benefits are *salicylic acid*, *methyl salicylate*, *betulene*, *betulenol*, *creosol* and *guaiacol*. An [analysis of white birch \(\*Betula pendula\*\) essential oil](#) identified more than 50 chemical compounds representing approximately 86% of the extract. The main components found were  $\alpha$ -*copaene*, *germacrene D* and  $\delta$ -*cadinene*.

Diverse phytochemical investigations of *Betula* species have shown that they contain mainly phenolic acids, flavonoids, carotenes, bi-procyanidols, catechic tannins, saponins, glycosides, sterols, terpenoids and coumarins.

Birch essential oil has a chemical composition of 0.04–1% essential oil, which is comprised of 98% *monotropitoside*, the main *heteroside* component and 10% *betulin*. Flavonoids make up 2–3% *hyperoside*, *rutoside*, *kenferol*, *quercitroside* and *myricitros*, *tetracyclic triterpenes* derived from *damarene* (*betulafoldiendiol*, *-triol* and *-tetrol*) and *lupane* (*betulinol*, *betulinic acid*).

## THE HEALTH AND BEAUTY BENEFITS OF BIRCH ESSENTIAL OIL

The health benefits of birch essential oil can be attributed to its tonic, disinfectant, stimulant, antidepressant, anti-inflammatory, antispasmodic, analgesic, anti-cellulite, antipyretic, lipolytic (fluid retention), detoxifying, antirheumatic, antiarthritic, diuretic, antiseptic, astringent, febrifuge, germicide, insecticide and depurative properties.

There are two types of birch, the sweet birch (*Betula lenta*) is also known as black birch, southern birch, mountain mahogany, *capinefolia*, mahogany birch, and cherry birch. It contains 90% [methyl salicylate and is harmful](#), even poisonous, when concentrated. And the white birch (*Betula pendula*) is also known as silver birch, *birch pendula*, *birch odorata*, and European white birch. It should not be confused with sweet birch, it is non-irritant and non-toxic.

## FIGHTING CANCER

A group of compounds, *pentacyclic triterpenes*, mainly *betulin* and *betulinic acid*, are valuable anticancer agents found in the bark of birch trees.

In a [2012 study](#), new improved extraction methods were applied on the bark of *Betula pendula* (white birch) in order to reach the maximum content of *betulin* (over 90%). Growth inhibiting effects were measured in vitro on four malignant human carcinomas: skin, ovarian, cervix and breast. All of the prepared bark extracts exerted a pronounced antiproliferative effect against human cancerous cells.

Various other studies conducted in [2008](#), [2009](#) and [2016](#), on the *betulinic acid* present in birch essential oil have proved it to possess anti-tumor properties and kill cancerous cells.

## MANAGING HIV/AIDS

A [2014 study](#) investigated the use of *Betula pendula* (white birch) to determine its efficacy in controlling HIV/AIDS. The study took place on the records of HIV/AIDS patients attending Habibi Herbal Clinic, Kumasi, Ghana, based on intake information on their first visit, and results after two treatments: an herbal birch decoction and 2.5 mg/kg of *Levamisole*. The study revealed that the *Betula pendula* decoction had potent immunostimulatory properties and inhibited the growth of certain microorganisms, including *Candida albicans* compared to *Levamisole*.

Knowing that *betulinic acid* hinders HIV replication and is plentiful in North American birch trees, in [2007](#) [K.H. Lee's Natural Products Research Laboratories](#) (NPRL) at the [University of North Carolina](#) began a series of experiments to amplify *betulinic acid's* natural tendency to suppress virus replication.

The experiments worked. The *betulinic acid* found in white birch bark blocked HIV's ability to complete its last stage of replication. Because HIV mutates and builds a resistance to the treatments currently available, NPRL's development—called *bevirimat*—could add another layer of defense while helping HIV patients avoid severe side effects.

Another [study in 2010](#), exploring the immunomodulatory effects of *betulinic acid* extracted from the bark of white birch on mice, found that *betulinic acid* stimulated lymphocyte proliferation compared to the control group. The results suggest that *betulinic acid* is a potential immune stimulator and may strengthen the immune response of its host. *Betulinic acid* and its derivatives have been studied with a focus on their anti-HIV and other pharmaceutical properties. These effects may be due to their ability to modulate immune function. In addition, various bioactive materials derived from plants exhibit an immunomodulatory ability.

There are several advantages offered by bioactive compounds extracted from plants: low toxicity; high yield and easier obtainment; and favorable physiological functions, e.g., they can improve immunomodulation and have anti-oxidative and anti-microbial functions.

#### IN AROMATHERAPY

Birch essential oil is very stimulating when used with a diffuser or placed in an aroma lamp, it awakens and enlivens the senses, providing mental clarity. When used in aromatherapy, birch essential oil has a very sweet, wintergreen fragrance that is cool and calming. It can reduce anxiety and help you relax.

#### SUPPORTS MENTAL HEALTH

Birch essential oil acts as both an antidepressant and a stimulant, meaning it can simultaneously give a lethargic person energy or calm down a person with ADHD. Additionally, the antidepressant effect can balance emotions and ease anxiety and stress.

#### PROVIDES PAIN RELIEF

The anti-inflammatory and analgesic properties in birch essential oil relieve headaches and toothaches. This can be a natural remedy pain relief alternative to prescription drugs. Birch essential oil is also a pain reliever, helping with osteoarticular inflammations and anything else that requires analgesic medication.

Birch essential oil naturally reduces tension, swelling, and pain. It is a good choice for people who work out frequently and experience painful joints and muscles. Try blending with basil essential oil for an antispasmodic blend that may help relieve muscle cramping.

#### RELIEVES SYMPTOMS OF ARTHRITIS

Since it stimulates the circulatory system and improves circulation, birch essential oil can be helpful in relieving the symptoms of conditions such as edema (swelling), rheumatism, and arthritis. In addition, birch essential oil contains anti-inflammatory and analgesic properties and cortisone-like qualities which are very effective in providing pain relief for osteoarticular inflammations.

#### DETOXIFIES THE BODY

Birch essential oil may help flush out toxins like uric acid, urea, excess fats, sodium and water from the body through increased urination and perspiration (being diuretic and stimulant in nature), which helps prevent conditions like gout and arthritis.

Birch essential oil can promote urination. *betulene* and *betulenol* are the two components responsible for this property. Urination can also promote digestion, cleanse the kidneys, treat urinary tract infections (UTIs), urethritis, nephritis, digestive tract conditions; diarrhea, colitis and lower blood

pressure. Urination can help with weight loss by working with the liver so that the production of bile is more effective and allows the elimination of fat through the feces.

Urination can also help prevent the formation of kidney stones. It can help lower body temperature during a fever by promoting perspiration, which can also help remove toxins from the body, leading to a faster recovery.

#### SUPPORTS METABOLISM

Birch essential oil can stimulate the endocrine glands, resulting in the secretion of enzymes that prevent hormonal imbalances. Used as a tonic, it may give feelings of warmth and vitality, and stimulate the body. It can be ideal for use in winter in extremely cold climates. It may even help with weight loss.

#### DIABETES MANAGEMENT

People diagnosed with diabetes mellitus live with the compounded problem of difficulty in healing of wounds and injuries, which can often become more serious medical conditions. According to a [2016 study](#) published in the *Journal of Natural Products*, birch bark could be an effective option to promote wound healing under diabetic conditions.

#### SUPPORTS UPPER RESPIRATORY HEALTH

Because birch essential oil is an expectorant, and has anti-inflammatory and antibacterial properties, it helps clear congestion of the respiratory tracts. This allows for better air regulation through the airways and prevents mucus build-up. Birch essential oil can help in alleviating upper respiratory health conditions such as asthma, bronchitis and cough.

#### PREVENTS BACTERIAL & FUNGAL INFECTIONS

Protecting the skin from both bacterial and fungal infections are probably the two most important properties of birch essential oil. The components responsible for these properties are *salicylic acid* and *methyl salicylate*, two well-known germicides and bactericides. A [2004 study](#), from the *Journal of Evidenced-Based Complementary and Alternative Medicine*, also found that birch essential oil is highly resistant to and can kill different types of fungi.

#### HEALS MINOR WOUNDS

Birch essential oil disinfects, killing germs and bacteria. The antimicrobial agents in birch essential oil can kill some microorganisms. This prevents the spreading of infection from wounds and promotes fast healing. *Do not apply directly to open wounds and make sure to dilute with a carrier oil prior to topical application.*

#### TREATS SKIN DISEASES

Birch essential oil germicidal and insecticidal properties, due to its content of *salicylic acid* and *methyl salicylate*. These two components can be excellent treatments for eczema, psoriasis, dermatitis, ringworm and other skin diseases. There are currently pharmaceutical preparations available on the market like lotions and creams containing these two components for the treatment of some skin diseases. The crude tar in birch is also utilized in ointments and cream to combat dermatological conditions.

#### PROMOTES SKIN HEALTH

Birch essential oil was used as a skin toner in Scandinavia for centuries. Regular external application (in low dosages) can effectively reduce wrinkles and sagging of the skin. Birch essential oil provides balance for combination skin as well. The oil gives life to dull and aged skin. Birch essential oil has astringent

properties that helps to eliminate and keep the skin free of toxins, to avoid congestion of the pores, which lead to pimples and blemishes. These astringent effects can also be used to lighten freckles and dark spots.

The astringent components of the oil tighten the skin, giving it a younger, plumper look and feel. Birch essential oil contributes to the elimination of accumulated fat nodules in areas of the skin affected by cellulite, making it visibly firmer, rejuvenated and toned, as well as contributing to cell hydration and avoiding fatty fluid retention. *Do not use more than 2 drops of this essential oil on the skin, and never use in its undiluted form.*

### PROMOTES HAIR HEALTH

One of the lesser known uses of birch essential oil is that it can facilitate the growth of healthier hair. According to Professor Atta-ur-Rahman, *Betula* (birch) essential oils [are a great antiseptic](#) used in hair products. Birch essential oil can prevent hair loss (alopecia) by strengthening the hair follicles on the scalp.

Birch essential oil can control the proliferation of dandruff and prevent your hair from becoming dry and brittle. When added to water and used as a hair rinse, birch essential oil prevents dandruff and adds luster to hair.

### PROMOTES ORAL HEALTH

Maintaining oral health is important to prevent dental caries and infections. The antibacterial, astringent and antimicrobial properties of this oil effectively kill bacteria and are a natural remedy to prevent and treat infections, toothaches, gum disease and even bad breath. It can be used to make mouthwash.

### THERAPEUTIC USES OF BIRCH ESSENTIAL OIL

The usage of birch essential oil depends on the tree variety of extraction. The essential oil extracted from sweet birch (*Betula lenta*) is not used in aromatherapy. Due to the characteristic pleasant fragrance, sweet birch derivatives such as its essential oils have found many applications in cosmetics and related personal care products.

Historically, in Scandinavia, the twigs and leaflets of the white birch (*Betula pendula*) were tied together and used in saunas for skin toning. Today, the essential oil extracted from the white birch is used commercially as an aroma and flavoring for alcoholic beverages like rum and non-alcoholic beverages like root beer and other drinks. An herbal tea made from its leaves is recommended in Germany as a diuretic and for special diets.

Birch essential oil blends well with: basil, benzoin, cedarwood, clary sage, frankincense, geranium, grapefruit, jasmine, juniper berry, lavender, lemon, patchouli, peppermint, rosemary, sandalwood, spearmint, sweet marjoram and tea tree essential oils.

1. **To Relieve Headaches and Migraines:** Mix 1 drop birch essential oil with a carrier oil and massage topically on the forehead. For intense migraines, add 2–3 drops of diluted birch essential oil to a warm, moist soft cotton pad and press gently on the forehead.
2. **Ease Arthritic and Rheumatic Pain:** Dilute 2–4 drops of birch essential oil with 30 ml of a carrier oil of your choice. Adjust how many drops you use depending on the severity of pain. For light pain, 1–2 drops of birch essential oil will suffice. This treatment is most effective when massaged until warm, so it is best to apply before going to bed. The oil will take effect faster since pores open easier in a warm environment.
3. **Ease Arthritic and Rheumatic Pain:** Add 4 drops of birch essential oil to your bath water and soak in for at least 20 minutes.

4. **Painful Joints and Muscles:** Add 4 drops birch essential oil to a hot bath.
5. **To Clear Congestion:** Add 2–3 drops of diluted birch essential oil to a hot compress to be applied to your chest. Alternatively, dilute birch and peppermint essential oils with a carrier oil and apply topically onto your chest.
6. **To Clear Congestion:** Add 3–4 drops of birch essential oil to a bowl of hot water and inhale the steam.
7. **Open The Airways:** Apply 2 drops of a blend of birch, lavender and peppermint essential oils diluted with a carrier oil to your palms and gently massage the throat, chest and back.
8. **As A Massage Oil:** Dilute 2 drops each of birch, ginger, and tea tree essential oils with a carrier oil, apply it to your palms and gently massage the affected area, it will help reduce inflammation and pain.
9. **As A Massage Oil:** Dilute 2 drops of birch essential oil with a carrier oil of choice and massage on the affected area.
10. **Make A Hair Rinse:** Add 1 drop of birch essential oil to your shampoo or conditioner and wash as usual.
11. **Make A Mouthwash:** Mix 1 drop each birch and spearmint essential oils (peppermint is a suitable alternative) with 1 cup water. Gargle with this solution once in the evenings to prevent infections and fortify the gums. *Do not ingest.*
12. **Relaxing Bath:** Add 5 drops of birch essential oil to your bath water.

## PRECAUTIONS

Birch essential oil is 90% *methyl salicylate* and can be very dangerous and even fatal if used in high doses. Whether using birch essential oil topically or in aromatherapy, be advised that the fatal dose for children is a scant 10 mL and only 30 mL for adults. Even 1–2 milliliters can make you extremely ill. In fact, unless you are well-versed in the medicinal properties of herbs, spices and essential oils, you may want to avoid birch essential oil altogether. Never ingest birch essential oil.

Its use is contraindicated for people with hypersensitivity to salicylates. Control its use in patients with gastrointestinal problems, epilepsy and Parkinson's. Its use in cardiac and hypertensive conditions must be under medical supervision. Due to its high alcohol content, patients with anticoagulant treatments should avoid use.

If you are pregnant, breastfeeding, epileptic, or under a doctor's care, first consult your physician. If you're nursing or pregnant, consult with your physician prior to using birch essential oil and it should never be given to children. Keep out of reach from children. Use essential oils with extreme caution on children, only after ensuring that they are safe for use on children. Some brands clearly label their essential oils "KidSafe" on the bottle if the oil can be used on children ages 2–10. Birch essential oil has similar chemistry to wintergreen essential oil. Both contain high levels of *methyl salicylate*. It is important to have childproof caps on these two essential oils if using in a home with children. They have an enticing candy scent that may be tempting to taste.

Do not apply birch essential oil directly to broken or damaged skin. Do not apply directly to open wounds. Never use essential oils undiluted, in eyes or in mucous membranes. Birch essential oil can cause skin irritation or an allergic reaction. When applying any essential oil topically (on your skin), always perform a 24-hour skin patch test first, use 1–2 drops diluted with 1 teaspoon of carrier oil like jojoba, [read in further details](#). Since there are so many varieties of the species *Betula*, birch essential oils can vary from one manufacturer—or even one bottle—to another. Use only 100% authentic essential oils. Store in tightly-sealed dark glass containers; in a cool, dark place away from light.