Aging is a normal and natural part of living, a fact that most of us take for granted, at least on an intellectual level. Despite this, while we are young few have any real understanding of the limitations that come with aging, and instead it is equated with power, authority and respect. Most children often express how they can’t wait to get older and bigger, something that causes adults to smile fondly, remembering the fleeting days of their youth when a Saturday afternoon could seem like an eternity.

As Western society has evolved, some curious changes have taken place in how we view aging and death. For one thing, the burden of caring for an aging relative has shifted from being an intensely personal experience to a kind commodity that despite government regulation has become a very large and very profitable business, often with questionable business ethics. Old and aging people have increasingly become marginalized from mainstream society, sequestered away in nursing homes and hospitals where young people do not see them. With these changes our Western culture has become increasingly youth-oriented, some might say immature and puerile.

This is in striking contrast to developing countries such as India and China, in which families lack the finances to put their relatives away, and have thus retained a centuries-old tradition of caring for their aging family members. In these countries, children grow up and live with aging and actually witness the processes of death, and are therefore much more cognizant of the dynamics of aging. In such places there is more sympathy with the aging process, a better awareness of what needs to be done to take care of aging people, and a deeper understanding of the importance of rejuvenation. Both India and China maintain centuries-old traditions of preventing the effects of aging and rejuvenative therapies that enhance the body’s vital essence and delay the negative effects of aging. Perhaps these approaches once existed in Western society, but they have in large been replaced by the technology of medicine, in which the effects of aging are treated by cosmetic surgery and replacement therapies such as hormone replacement.
(e.g. hGH, estrogen, testosterone, DHEA) etc., organ transplants (post-mortem, animal), and artificial tissues (heart valves, joints). The most extreme technology is cryonic suspension, in which the body is essentially frozen and thawed at some point in the future (one hopes) when scientists have discovered the key to immortality. At this point however, the technology to thaw out a human placed in such a state of suspended animation has not been successful, and has only been observed in tiny human embryos.
Botanical Name: *Ginkgo biloba*, Ginkgoaceae

Common names: Ginkgo, Maidenhair tree

Plant description: Ginkgo grows to become a medium to large deciduous tree, with narrow spreading branches and a pyramidal shape when young, but after hundred years or so becoming more widely branched with a large or upright oval crown. The bark is light brown to brownish-gray, and becomes deeply furrowed with age. The characteristic bi-lobed leaves have forked veins that radiate outward from the stem. Ginkgo is dioecious, and like the conifers, wind is required to carry the pollen to female trees. The fruit is a large, woody stone, enclosed in a green inedible flesh, which has a very strong vomit-like smell. The nuts after being cleaned, are often eaten in the Orient.

Habitat, ecology and distribution: *Ginkgo biloba* is the only living representative of the order Ginkgoales, a group of gymnosperms comprised of the family Ginkgoaceae, which 200-300 million years ago consisted of some 18 members. Fossil records indicate there were at least two different species of *Ginkgo*. Today, *Ginkgo* has been found growing wild in the warm, mountainous regions of central and western China, but it is not known whether these specimens are truly wild or are derived from cultivated specimens. Despite being confined to China and Japan less than a few hundred years ago, Ginkgo is now widely cultivated all over the world as a tree of commerce.

Part used: Dried leaf; fresh and dried fruit (nuts).

History: Ginkgo is one of the oldest living tree species in the world, found in the fossil record more than 200 million years ago, first appearing in the Carboniferous period. During the Jurassic period, Ginkgo was widespread throughout Asia, Europe and North America, and even survived the Cretaceous period that marked the end of the dinosaurs. It appears that *Ginkgo* disappeared from North America about 7 million years ago, in Europe by about 2.5 - 3 million years ago, and was next to non-existent in most of Asia. Most European botanists had begun to think that Ginkgo was extinct, but in 1691 the German botanist Engelbert Kaempfer discovered it growing in the courtyards of...
Buddhist temples in Japan. Buddhist monks had cultivated these specimens since the 12th century, taken from older specimens found in China. Ginkgo was highly revered by the ancient Chinese, the characteristic bi-lobed leaf said to represent the duality of yin and yang within the unity of the tao. It was these same Taoist, Buddhist and Shaolin monks that appeared to have protected Ginkgo from complete extinction. The wide crowns of these ancient trees still spread over the quietude of temple courtyards. Some specimens in existence today are more than a thousand years old. The oldest European ginkgo was sown in 1730 in the Utrecht Botanical Gardens. A second tree was later planted in 1762 in the Kew Botanical Garden in London. Both are still living. Ginkgo was a favorite tree of the American architect Frank Lloyd Wright, and since his time ginkgo has become popular ornamental in North America. Ginkgo is particularly noted for its ability to withstand adversity, as evidenced by the survival of a specimen after the bombing of Hiroshima in 1945. After all plant life had been reduced to ash from the bombing, the following spring a Ginkgo was seen to sprout from the charred earth, and since that time a temple has been constructed around it as a memorial. This ability to withstand mutagens like radiation has encouraged urban planners to plant Ginkgo trees in polluted, high traffic areas.¹

Ginkgo is an important plant in China. The nuts are mentioned as a food item as early as the Han dynasty (206BCE-220CE). It is still popular today in Chinese cuisine. As a medicine the nuts were first mentioned in Li Tung-wan's Shih Wu Pen Ts'ao ('Edible Herbal') that dates from the Yuan Dynasty (1280-1368 CE). Later, in 1505, the leaves were mentioned by Liu Wen-Tai, as a treatment for diarrhea. In 1932 the Japanese first isolated terpene lactones called the ginkgolides, and later during the 1960’s German researchers discovered that the flavonoid glycosides were particularly active in circulatory problems. In 1965 the Dr. Willmar Schwabe company produced and marketed a high-potency extract standardized to its flavonoid constituents called EGb 761. In 1990 Elias Corey of Harvard University received the Nobel Prize for chemistry for the synthesis of ginkgolide B and other organic molecules.²

**Constituents:** The primary constituents of interest in Ginkgo are the flavonoids and lactone diterpenes that have been the subject of a significant amount of scientific research during the last forty years. The diterpenes are comprised of bilobalide and ginkgolides A, B, C, J and M. Among the flavonoid constituents of interest are dimeric flavones such as bilobetin, ginkgetin, isoginkgetin, and sciadopitysin, as well as the flavones quercitin, kaempferol, and isorhamnetin. Also found in Ginkgo are a range of proanthocyanidins, sterols, ginkolic acids, amino acids (e.g. 6-hydroxykynurenic acid, a metabolite of tryptophan), and polysaccharides. Today most extracts on the market are standardized to at least 24% flavone glycosides and 6% diterpenes, sometimes referred to in shorthand as EGB or GBX.³,⁴
Medical Research: As stated, Ginkgo has been the subject of a significant amount of research over the three decades, particularly by the Germans and the French. It has become one of the most popular herbal remedies in the market place, first in Europe and now in North America. Describing Ginkgo as a herbal remedy is something of a misnomer, as the strength of the standardized extract cannot be obtained in traditional herbal preparations such as an infusion or tincture. Furthermore, because Ginkgo leaf has weak traditional usage it is unclear if many of the benefits indicated in experimental research trials apply to actual clinical usage. Indeed, cursory examination of the number of pharmacological activities described for EGB appears to suggest that Ginkgo is a kind of panacea, which is unlikely. Many studies have shown that EGB has many beneficial effects, especially upon the cardiovascular system, with data obtained from in vitro studies, experimental animal models, and human clinical trials.

• Cardiovascular: The ginkgolides have been shown to antagonize platelet-activating factor (PAF), a potent vasoactive mediator released by all activated inflammatory cells, inducing platelet aggregation, vascular permeability, arachidonic acid metabolism and anaphylaxis. The ginkgolides have also been shown to prevent metabolic damage in experimental cerebral ischemia, significantly reducing arrhythmia and infarct size in myocardial occlusion. Overall, much of the evidence suggests that Ginkgo has a neuroprotective effect in ischemic and hypoxic conditions, increasing tolerance of the ischemic state and limiting the damage of reperfusion, inhibiting vasospasm and thrombus formation, and scavenging reactive oxygen species. Randomized placebo-controlled clinical trials in patients with peripheral arterial disease have consistently indicated an overall benefit with EGB, improving walking performance and cognitive function, decreasing ischemia and decreasing pain. There is evidence that shows by taking a specific ginkgo extract (EGB 761, Tanakan, Tebonin Konzent) orally increases pain-free walking distance in patients with Fontaine's IIb peripheral arterial occlusive disease and intermittent claudication and might decrease overall PVD event incidence such as surgery or amputation in elderly patients. Significant benefit has been found with doses as low as 120-160 mg per day; however, there is some evidence that a higher dose of 240 mg per day might be more beneficial in some patients.

• Cerebral insufficiency: Cerebral insufficiency (CI) is a collection of symptoms that are associated with mental deterioration, typically found in elderly people, manifesting as poor concentration, absentmindedness, confusion, fatigue, anxiety, dizziness, tinnitus and headaches. Although not widely accepted as a medical condition per se, recent research indicates that these symptoms can be correlated with low attenuation of the white matter of the brain, a feature often seen in head injuries and stroke. The efficacy of Ginkgo extracts in CI-related symptoms demonstrated in clinical trials suggests that Ginkgo may help prevent damage to the white matter by improving local blood supply.

• Central nervous system: Ginkgo extract has been shown to promote a significant increase in dopamine synthesis, enhance the release of the catecholamines epinephrine and norepinephrine, and increase the number of cholinergic receptors in the brain in experimental animal models.

• Neuroprotective: Ginkgo has also been shown to reduce brain edema by stabilizing the blood brain barrier (BBB), reducing ion-exchange problems and the accumulation of neurotoxins.
**Tinnitus and vertigo**: Researchers examined the efficacy of a Ginkgo extract in conjunction with physical therapy (kinezytherapy) in 45 persons aged between 35 and 48 years with clinical symptoms of peripheral vestibular lesion. After 30 days of administration almost all cases showed improvement, with or without the Ginkgo extract (i.e. kinezytherapy alone), although the group taking the extract with physical therapy were shown to gain full vestibular compensation sooner.\(^\text{19}\) An open, controlled study of 44 patients complaining of vertigo and dizziness caused by vascular vestibular disorders examined the efficacy of EGb 761, 80 mg twice daily for 3 months. A complete neuro-otologic and equilibrimetric examination was performed at baseline and after 3 months of treatment, the results indicating that EGb 761 can considerably improve oculomotor and vestibular function.\(^\text{20}\) The efficacy of a *Ginkgo biloba* extract was examined in a double-blind placebo-controlled clinical trial of 70 patients with vertiginous syndrome of recent onset and undetermined origin over a 3-month period. At the end of the trial, 47% of the patients treated with Ginkgo had found their symptoms completely ameliorated, compared with 18% in the placebo group.\(^\text{21}\)

**Cognition**: Researchers in Australia conducted a 30 day randomized, double-blind, placebo-controlled clinical trial of 61 healthy participants prescribed a standardized extract of Ginkgo (EGb) to determine its nootropic potential. The results indicated that EGb promotes significant improvements in the speed of information processing, working memory and executive processing.\(^\text{22}\) Other clinical trials support the nootropic properties of Ginkgo as well, but not when taken for short periods of time, even at high doses.\(^\text{23}\) Taking EGb orally does improve some measures of cognitive function in healthy young to middle-aged people. It modestly improve memory and speed of cognitive processing, including increasing speed of performance on factors assessing attention in people with no complaints of memory impairment.\(^\text{24,25,26,27,28}\) Lower doses of 120-240 mg per day have been shown to be as effective or more effective than higher doses up to 600 mg per day.\(^\text{29,30,31}\) It have been shown that a combination of Panax ginseng and ginkgo is effective for enhancing memory and that the combination might be more effective than either product alone.\(^\text{32,33}\)

**Age-related memory impairment** (see also Alzheimer’s): EGb orally has been shown to improve cognitive function in some elderly people with mild to moderate age-related memory or cognitive impairment. Ginkgo leaf extract might modestly improve some measures of cognitive function, particularly short-term visual memory and possibly speed of cognitive processing, in non-demented patients with age-related memory impairment.\(^\text{34,35}\) But these improvement in memory don’t seem to be present in people over the age of 60 with normal mental function.\(^\text{36,37,38}\)

**Alzheimer’s disease**: EGb research does indicate that oral consumption can create modestly improve symptoms of Alzheimer’s, vascular, or mixed dementias. Studies lasting from three months to a year show that ginkgo leaf extract can stabilize or improve some measures of cognitive function and social functioning in patients with multiple types of dementia.\(^\text{39,40,41}\) A 52-week, randomized, double-blind, placebo-controlled, parallel-group, multicenter research trial studied the benefit of a 120 mg standardized Ginkgo extract (EGb) in Alzheimer's disease. The results of the study suggested that the Ginkgo extract could enhance cognitive performance and social functioning regardless of whether the dementia was mild or moderately severe. The greatest improvements in cognitive abilities occurred in patients with only mild
A 24-week, randomized, double-blind, placebo-controlled, parallel-group, multicenter trial studied the benefits of *Ginkgo biloba* extract EGb 761 in older people with dementia or age-associated memory impairment. The results indicated that Ginkgo has little effect in patients with mild to moderate dementia or age-associated memory impairment. An uncontrolled clinical trial comprised of 18 elderly subjects with light to moderate dementia compared the efficacy of 40 mg of the drug tacrine, which is approved for use in the treatment of Alzheimer’s disease, with 240 mg of EGb 761. Outcomes were based on computer-analyzed EEGs (CEEGs) after administration, which looked for a relative increase of 7.5 to 13 Hz ("alpha") and decrease of 1.3 to 7.5 Hz ("delta" and "theta") activity, an event characterized by the term “cognition activation.” The results indicated that EGb achieved typical cognitive activator CEEG profiles in more subjects (8 of 18) than 40 mg tacrine (3 of 18 subjects). Researchers studied the influence of a daily dose of 240 mg of EGb 761 in a double-blind, randomized, placebo-controlled study of 20 outpatients with Alzheimer-induced dementia over a 3 month period. Outcomes were based on the sum score of the SKT-test for the determination of attention and memory, as well as other psychometric tests (i.e. trailmaking test, ADAS, CGI) and electrophysiological investigations (EEG topography). Overall, the active-treatment group experienced a greater improvement in measured parameters in the SKT-test, with similar indications of efficacy in psychometric tests. A 52-week, randomized double-blind, placebo-controlled, parallel-group, multicenter study examined the efficacy of EGb in 202 mild to severely demented outpatients with Alzheimer disease or multi-infarct dementia. Outcomes were assessed by the Alzheimer's Disease Assessment Scale-Cognitive subscale (ADAS-Cog), Geriatric Evaluation by Relative's Rating Instrument (GERRI), and Clinical Global Impression of Change (CGIC). The results indicated that EGb group had an ADAS-Cog score 1.4 points better than the placebo group (P=.04) and a GERRI score 0.14 points better than the placebo group (P=.004). No difference was seen in the CGIC. The tolerability of EGb was similar to placebo. Overall EGb appeared to be a safe remedy to improve cognitive performance, with the changes of significant enough to be recognized by caregivers. A large-scale clinical trial also shows that taking ginkgo extract 120 mg twice daily does not reduce the risk of developing all-cause dementia or Alzheimer’s disease in elderly patients with mild cognitive impairment.

**Asthma:** A standardized extract of Ginkgo was shown to improve peak flow rates in asthmatic children and promote a significant clinical improvement in adult asthmatics.

**Altitude sickness:** A randomized placebo-controlled clinical trial studied the preventative effects of a Ginkgo extract, dosed at 160 mg daily, during a Himalayan mountaineering expedition. Results indicate that Ginkgo can prevent altitude sickness at moderate altitudes (5400 m) and decrease vasomotor disorders in the extremities.

**Ophthalmological disorders:** In 24 patients suffering from a blockage of the veins of the retina a Ginkgo extract was shown to improve blood vessel integrity, visual acuity and enhance the field of vision (near and far vision and colour recognition). An uncontrolled trial with 120 mg of EGb over a three month period was shown to improve symptoms in 86% of patients with impaired vision. There is good evidence that taking ginkgo leaf extract orally for six months can significantly improve measures of color vision in patients with early diabetic retinopathy. Taking EGb orally can improve pre-existing damage to the visual field in patients with normal tension glaucoma.
**PMS:** EGB orally can produce significant relief in breast tenderness and neuro-psychological symptoms associated with PMS when started during the 16th day of the menstrual cycle and continued until the 5th day of the following cycle.  
**Raynaud’s syndrome:** EGB can decrease the number of painful attacks per week in patients with Raynaud's syndrome.  
**Vertigo:** EGB can improve symptoms of vertigo and equilibrium disorders. In these studies it was shown to be significantly more effective than placebo and possibly as effective as betahistine for improving vertigo and dizziness caused by vascular vestibular disorders and vestibular disorders of unknown origin.

**Toxicity:** A standardized extract of Ginkgo was shown to have an oral LD_{50} value of 7.7 g/kg in mice. Chronic toxicity studies of oral doses up to 1600 mg/kg daily in rodents showed no evidence of organ damage or teratogenic effects. The seeds of Ginkgo nut contain the toxin 4'-O-methylpyroxidine, which can cause symptoms of a vitamin B_{6} deficiency. There have been cases of poisoning reported in Japan and China, with children apparently more susceptible. The acute oral dose is listed as 11 mg/kg in guinea pigs, and the toxin has been measured at levels up to 42 mcg per gram of fresh weight Ginkgo stem. The fruit pulp is reported to cause severe allergic reactions when applied to exposed skin, including erythema, edema, itching and blisters.

**Herbal action:** antioxidant, circulatory stimulant, cerebrovascular stimulant, geriatric restorative; the nuts are used in China as an expectorant and antitussive.

**Indications:** cerebrovascular insufficiency, vertigo, tinnitus, age-related macular degeneration, age-related deafness, dementia, mental confusion, memory loss, Alzheimer’s disease, and altitude sickness

**Contraindications and cautions:** Ginkgo may potentiate the effects of warfarin and aspirin. Consuming more than 10 roasted seeds per day can cause difficulty breathing, weak pulse, seizures, loss of consciousness, and shock. Crude ginkgo plant parts can exceed concentrations of 5 ppm of the toxic ginkgolic acid constituents and can cause severe allergic reactions. Fresh seeds are toxic and potentially deadly.

**Medicinal uses:** Ginkgo is an unusual example of a herbal product that has little foundation in traditional herbal medicine. Its modern clinical usage derived almost entirely from research conducted on the standardized extract. On the whole the research suggests that Ginkgo is a useful plant in age-related disorders, used primarily to enhance blood flow and oxygen utilization, inhibit inflammation and scavenge free radicals. Even though the extract EGB represents a ratio of 50 parts plant to one part extract (50:1), more closely resembling what might be called a ‘neutraceutical,’ it has been remarkably well-tolerated in clinical trials. Despite the safety of the extract, some
herbalists prefer to make their own, typically as a fresh or dry plant tincture. Limited clinical experience suggests that the tincture is probably active, although most practitioners will probably combine it with other, similarly acting herbs such as *Crataegus*. In Chinese medicine both the nut and the leaf are used cough, wheezing and lung pain from Lung deficiency syndromes. The nut is also used in incontinence and spermatorrhea, excessive vaginal discharges and turbid urine.64

**Pharmacy and dosage:**
- **Fresh Plant Tincture:** fresh leaf, 1:2, 95% alcohol, 3-10 ml
- **Dry Plant Tincture:** recently dried leaf, 1:5, 25%, 3-10 ml
- **Standardized extract:** 24% flavonoids, 6% diterpenes, 80-240 mg

**NHP Monograph**65

- Helps to enhance cognitive function in adults
- Helps to enhance memory in adults
- Helps to support peripheral circulation

**Adults:**
- **Preparation:** All Standardised Extracts
  - Dose(s): 4-12 Grams per day, dried leaves
  - 22-27 Percent Flavonoid glycosides
  - 5-7 Percent Terpene lactones

**Licensing:** As of Nov. 30, 2010, 184 Canadian NHP licenses have been issued for products that contain Ginkgo.

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Botanical Name: *Pilocarpus jaborandi*, Rutaceae

**Common names:** Jaborandi, Pilocarpus, Indian hemp.

**Similar species:** *P. microphyllus*, *P. pennatifolius*, *P. trachylophus*

**Plant description:** *P. jaborandi* is small shrub 120-150 cm in height, but in some species can the height of a medium-sized tree. *P. jaborandi* has dull green leaves finely marked with small, transparent oil-cells that are visible when held up to the light. The leaves are almost sessile, pinnate, one to nine leaflets, ovate-oblong, entire, about 10-12 cm long and 3-5 cm wide. The upper surface is glabrous, slightly pubescent below. The small pink flowers are borne on an erect raceme, the calyx reduced to a rim.

**Habitat, ecology and distribution:** Various species of Jaborandi are native South America, occurring most densely in Brazil, and to a much lesser extent in Central America.

**Part used:** Leaves.

**History:** The earliest record of the use of Jaborandi is attributed to Gabriel Soares de Souza, who in 1570 observed the Guarani Indians using the plant to treat mouth ulcers. In the 1630's two Dutch West Indian Company scientists documented Brazilian Indians using Jaborandi as a treatment for colds and flu, as a remedy against gonorrhea and kidney stones, and found that it was often used as an antidote to various poisons or toxins due to its ability to promote sweating, urination and salivation. This particular ability to promote diaphoresis made Jaborandi highly prized in the treatment of many different diseases. The introduction of Jaborandi into clinical medicine occurred in 1873 with Symphronio Coutinho, a doctor from Brazil who traveled to Paris for a European doctoral degree, taking a sample of the leaves with him. The particular activity of Jaborandi attracted the attention of French physicians who began clinical research, publishing first studies that showed Jaborandi "...increases enormously the perspiration and saliva, and, in a much less degree, the secretion from the mucous membranes of the nose, the bronchial tubes, and the stomach and intestines." In 1875, both Hardy and Gerrard independently discovered the alkaloid pilocarpine and its use to lower the intraocular pressure in glaucoma and act as a miotic. By 1876, Jaborandi leaves were being employed in the treatment of many diseases and were introduced into the ophthalmological therapy.¹
Constituents: The primary constituent of note in Jaborandi is the alkaloid pilocarpine and related imidazole alkaloids (0.7-0.8%) including isopilocarpine, pilosine, and isopilosine. Other constituents include a volatile oil (0.5%). Bertrand et al. report flavonoids, terpenoids and polyrenols in the leaves of *P. trachylophus*.

Medical Research: Despite the fact that Jaborandi has been an important herb of commerce since the late 1800’s, there has been almost no investigation upon the whole, crude herb. It appears that the relatively early isolation of the alkaloid pilocarpine, and its designation as the active constituent, diminished any interest in the crude drug. Pilocarpine is an M1 muscarinic agonist, promoting the typical symptoms of parasympathetic stimulation including nausea, vomiting, vertigo, perspiration, and pupil contraction.

Cholinergic effect: pilocarpine stimulates the parasympathetic system to cause secretions of saliva, sweat, and smooth muscle contraction in the gastrointestinal tract along with ocular miosis.

Toxicity: Symptoms of toxicity begin with nausea, vomiting, vertigo, hiccough, heaviness of the head, and contraction of the pupils. Coffee is stated as an antagonist to Jaborandi, and if taken concurrently may prevent nausea and vomiting. Duke reports an oral LD50 for pilocarpine in rats as 911 mg/kg. Chronic use may promote myopia due to ciliary muscle contraction with short focal length accommodation. Atropine and pilocarpine are antagonists to one another.

Herbal action: diaphoretic, stimulant, antispasmodic

Indications: fever, mucosal dryness, edema, ascites, pleurisy, nephritis, inflammatory joint disease, asthma, pertussis, glaucoma, Alzheimer’s disease, senile dementia

Contraindications and cautions: pregnancy, lactation, and weakness of the heart.

Medicinal uses: Jaborandi is stated by Weiss as the only true diaphoretic, stimulating both the sweat glands and salivary secretions independent of heat. Felter and Lloyd state that as little as 2 or 3 grams of the powdered leaf infused in a cupful of boiling water will “…occasion a tingling sensation with redness of the cutaneous surface… first experienced in the face, but soon extends over the whole surface, and is quickly followed by an abundant perspiration, which is apt to continue for 4 or 5 hours”. Simultaneous with its diaphoretic action is its great ability to promote salivary secretion, sometimes occasioned by the enhancement of bronchial and lacrimal secretions, and may even promote diarrhea in significant doses.
As a diaphoretic Jaborandi is an important remedy to enhance mechanisms of non-specific resistance in viral infections, enhancing the secretion of IgA in mucosal secretions.\(^{11}\) As a diuretic Jaborandi was used by the Eclectics in the symptomatic treatment of serous effusions, as in ascites or pleurisy, and in the treatment of nephritis, by which it relieves the burden on the kidneys by promoting perspiration. This diaphoretic activity may even extend to efficacy in a poorly progressing labor, based on the traditional indication that diaphoretics are useful in such cases, overcoming rigid, hard os uteri. The Eclectic considered Jaborandi to be a powerful sedative and antispasmodic agent, specific to sthenic conditions indicated in by hot, dry skin, fever, a dry mouth, a full, strong, hard and sharp pulse, diminished renal secretion with reddish urine, restlessness, and pain.\(^{12}\)

It is considered useful in acute joint inflammation and acute pain, with redness and swelling. Jaborandi is used in cough when the throat is very dry and secretions diminished, recommended in bronchial asthma and whooping-cough with dryness. As a diaphoretic, Jaborandi has particular affinity for skin disorders, including eczema. In a homeopathic fashion, very small doses of Jaborandi are stated as being helpful in night sweats. Pilocarpine of course is well known as a miotic agent, applied in solution as a topical treatment for the eye, acting as a parasympathetic agent to reduce intraocular eye pressure. A similar effect however will also occur with the internal use of the herb, although not as dramatic. In the treatment of glaucoma Jaborandi can be combined with Eyebright (Euphrasia officinalis), Ginkgo, and Vaccinium, in combination with antioxidants rich foods such as blueberries, mustard greens, carrots, kale and cooked tomatoes. Jaborandi may also be of benefit in senile dementia and Alzheimer’s, and in particular the latter, which is marked by a loss of cholinergic neurons in the nucleus basalis of Maynard.\(^{13}\) Jaborandi, through its ability to bind with M1 receptors, may improve or delay symptoms of dementia.

**Pharmacy and dosage:**
- **Dry Plant Tincture:** recently dried plant, 1:5, 50%, 3-30 gtt.
- **Hot Infusion:** recently dried plant, 1:20, 30-60 ml
- **Powder:** recently dried plant, finely sieved, 500-2000 mg

**Licensing:** As of Nov. 30, 2010, five Canadian NHP licenses have been issued for products containing this botanical.

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Botanical Name: *Rosmarinus officinalis*, Lamiaceae

Common names: Polar Plant, Compass-weed, Compass Plant.

Plant description: Rosemary is an evergreen shrubby herb, recent growth green and pliable becoming woody with age, with numerous leaves arranged in an opposite fashion, sessile, linear, dark green above and light-green below, 2.5-3 cm in length. The flowers are small and pale blue, and much of the active volatile constituents are said to reside in the calyces. The leaves and flowers have a distinctive balsamic-aromatic smell that characterizes rosemary.

Habitat, ecology and distribution: Rosemary is native to southern Europe and areas adjacent to the Mediterranean. It is now commonly cultivated as a culinary and medicinal herb.

Part used: leaves.

History: Rosemary has long been associated with memory, used traditionally as a symbol of commitment, to fidelity in marriage or in remembrance at death. Originally a Mediterranean medicine it was used by Dioscorides, Plinius and Galen. The Arabic physicians held it in high regard. It was also burned as incense, with herbs such as juniper, to ward off negative influences, and was more generally used to decorate buildings and rooms during festive occasions. Rosemary is associated with the feminine principle and more specifically with the matron of the home – it is said that rosemary grows well in a place where the women are strong. The Spanish regard rosemary as sacred to Virgin Mary, and in the past it was used to ward off evils spirits. It is a traditional belief among the Sicilians that young fairies, taking the form of snakes, lie amongst the branches. Grieve reports that the Countess of Hainault, Queen Philippa's mother, sent the first rosemary plants to England. Shortly after, rosemary made its way into Banckes' Herbal (1525), which states the following: “Take the flowers thereof and make powder thereof and binde it to thy right arme in a linnen cloath and it shale make thee light and merrie. Take the flowers and put them in thy chest among thy clothes or among thy Bookes and Mothes shall not destroy them. Boyle the leaves in white wine and washe thy face therewith and thy browes, and thou shalt have a faire face. Also put the leaves under thy bedde and thou shalt be delivered of all evill dreames. Take the leaves and put them into wine and it shall keep the wine from all sourness and evill savours, and if thou wilt sell thy wine thou shalt have goode speede. Also if thou be feeble boyle the leaves in cleane water and washe thyself and thou shalt waxe shiny. Also if thou have lost appetite of eating boyle well these leaves in cleane water and when the water is colde put thereunto as much of white wine and then make sops, eat them thereof.
wel and thou shalt restore thy appetite againe. If thy legges be blewne with gowte, boyle the leaves in water and binde them in a linnen cloath and winde it about thy legges and it shall do thee much good. If thou have a cough drink the water of the leaves boyld in white wine and ye shall be whole. Take the Timber thereof and burn it to coales and make powder thereof and rubbe thy teeth thereof and it shall keep thy teeth from all evils. Smell it oft and it shall keep thee youngly. Also if a man have lost his smellyng of the ayre that he may not draw his breath, make a fire of the wood, and bake his bread therewith, eate it and it shall keepe him well. Make thee a box of the wood of rosemary and smell to it and it shall preserve thy youth.¹¹

**Constituents:** Like many aromatic members of the Lamiaceae the essential oil is among the most important constituents in rosemary, which is upwards of 0.5% of the plant, comprised primarily of monoterpenes including alpha and beta pinenes, camphene and limonene, together with camphor (upwards of 10%), cineole, borneol, linalool, verbinol, terpineol, 3-octane and isobornyl acetate. Other important constituents in rosemary include a variety of flavonoids, including diosmetin, diosmin, genkwanin and derivatives, luteolin and derivatives, hispidulin and apigenin. Rosemary is also stated to contain terpenes such as carnosol, oleic and ursolic acid triterpenes, as well as phenols such as caffeic, chlorogenic, labiatic, neochlorogenic and rosmarinic acid.

**Medical Research:** Rosemary has undergone some preliminary investigation, with *in vitro* studies showing antioxidant, anti-inflammatory, and a mildly antimicrobial activity. Several of these studies concern the use of rosemary essential oil, or purified constituents, rather than the whole herb.

• **Antioxidant:** Caffeic acid and its derivatives such as rosmarinic acid have been shown to have strong antioxidant activities. The phenolic compound, rosmarinic acid, obtains one of its phenolic rings from phenylalanine via caffeic acid and the other from tyrosine via dihydroxyphenyllactic acid. Rosmarinic acid is well absorbed from gastrointestinal tract and from the skin, increasing the production of prostaglandin E2, reducing the production of leukotriene B4 in human polymorphonuclear leucocytes, and inhibiting the complement system, *in vivo*.³

• **Antispasmodic:** Al-Sereiti et al. report that an extract of rosemary has been shown to relax tracheal and intestinal smooth muscle, and is choleretic.⁴ Others say it has a spasmylytic effect on smooth muscle of the gastrointestinal tract and in the ducts of the gallbladder(4).⁵

• **Antimicrobial:** A liquid, deodorized rosemary extract was tested for antioxidant and antiviral activities *in vitro*. The rosemary extract (Herbor 025) inhibited peroxidation of phospholipid liposomes with 50% inhibition concentration values of 0.0009% (v/v) and 0.0035% (v/v), respectively. The main active components in the herbal preparations
were determined to be carnosol and carnosic acid. Purified carnosol exhibited definite anti-HIV activity at a concentration of 8 microM but was not cytotoxic.  

**Aromatherapy:** EEG activity, alertness, and mood were assessed in 40 adults given 3 minutes of aromatherapy with rosemary (considered a stimulating odor). Participants were also given simple math computations before and after the therapy. Participants showed decreased frontal alpha and beta power, suggesting increased alertness. They also had lower state anxiety scores, reported feeling more relaxed and alert and they were only faster, not more accurate, at completing the math computations after the aromatherapy session.  

**Hepatotoxicity:** A dried ethanol extract of the aerial parts of *Rosmarinus tomentosus* (Lamiaceae) and its major fraction separated by column chromatography (fraction F19) were evaluated for anti-hepatotoxic activity in rats with acute liver damage induced by a single oral dose of thioacetamide. Silymarin was used as a reference anti-hepatotoxic substance. Pre-treatment with *R. tomentosus* ethanol extract, fraction F19 or silymarin significantly reduced the impact of thioacetamide toxicity on plasma protein and urea levels as well as on plasma aspartate aminotransferase, alanine aminotransferase, lactate dehydrogenase and gamma-glutamyl transpeptidase activities compared with thioacetamide-treated animals (group T). Pre-treatment with *R. tomentosus* ethanol extract significantly reduced the impact of thioacetamide damage on alkaline phosphatase and gamma-glutamyl transpeptidase activities compared with group T. Fraction F19 administration reduced only alkaline phosphatase activity compared with group T.  

**Cosmetics:** Skin is particularly vulnerable to free radical damage because of its contact with oxygen and with other environmental stimuli. Researchers investigated the effect of an ethanol extract of rosemary to protect free radical-induced skin damage. Results indicate that rosemary has a strong antioxidant activity *in vitro and in vivo* systems, and is capable of inhibiting oxidative alterations to skin surface lipids.  

**Alopecia areata.** A multi ingredient essential oil (lavender oil in combination with the essential oils from thyme, rosemary, and cedarwood) applied topically improves hair growth in up to 44% of patients after 7 months of treatment.  

**Cardiovascular:** Rosemary appears to have a positive inotropic effect on the heart and increases coronary blood flow.  

**Toxicity:** Rosemary is a safe culinary herb. It is quite safe when used orally and appropriately in medicinal amounts; topically and appropriately. Rosemary oil has been used safely for up to 7 months as an inhalation for aromatherapy. Safety issues arise when the essential oil is ingested. Ingestion of undiluted oil from rosemary can cause significant adverse effects. Exceptionally large doses may have an abortifacient activity, and Rosemary EO may promote seizures in exceptionally sensitive individuals.  

**Herbal action:** cardiovascular stimulant, diaphoretic, antispasmodic, carminative, analgesic, sedative, antimicrobial, thymoleptic
Indications: circulatory stasis, peripheral coldness, weakness, fatigue, cardiovascular disease, hypotension, melancholia, memory loss, mental confusion, heart constriction, dysmenorrhea, amenorrhea, anemia, headaches, neuralgia

Specific Indications

Constitution, Complexion, Characteristic Symptoms
- Pale, thin, weak person with poor circulation to the surface, cool skin; pale, sallow person with weak digestion; older persons with cardiopulmonary edema

Mind, Senses, Nerves, Emotions, Personality
- Lack of self-identity and strength of personality (Rudolf Steiner)
- Depression, nervousness, anxiety
- Quickens the senses; indicated for foggy brain, lack of clarity, in deficient people

Head
- Hair loss, thinning (oil external)
- Weak cerebral circulation; vertigo, fainting, loss of memory, headaches (oil external)
- Headaches associated with weak liver function
- Headache; from eyestrain, mental strain, long distance driving (oil external)

Respiration
- Young children with head colds, ear and throat problems; due to weak liver
- Sinusitis, bronchitis, asthma

Digestion
- Diminished appetite, bitter taste in mouth, bad breath
- Poor gastric reflexes and secretions, weak autonomic and digestive nervous system, chronic gastric catarrh
- Bloating, vomiting; can’t stop vomiting, dry haves (tea)
- Incipient intestinal fever (very hot tea)

Liver, Gallbladder, Spleen, Pancreas
- Spleen congestion; chronic hypertension resulting in splenic engorgement and hypertrophy; splenic enlargement from malaria
- Liver function depressed; poor anabolism, low blood sugar, weakness, pallor; fetid breath, pale, yellow, gray complexion
- Gallbladder reflexes depressed; poor expulsion of bile, sluggish digestion, bitter taste, indigestion in stomach, pale, yellow complexion, lack of energy

Cardiovascular and Circulation
- Cardiovascular depression; weak peripheral circulation, cold extremities; low blood pressure; cardiopulmonary edema with heart palpitation
- Arteriosclerosis, high cholesterol, high blood pressure
- Old people with heart palpitations, pain and cramps in the region of the heart, but actually in the stomach, immediately after eating

Female
- Amenorrhea in pale, weak, cold women
- Leucorrhea; infection, foul-smelling discharge
- Pregnancy; to prevent miscarriage
• Postpartum depression
• Menopause, mild hot flashes

**Muscular and Skeletal**
• Extremities weak, unsteady, paralytic, cold, pale
• Externally, the oil as a liniment on bruises and strains; paralytic affections; muscle tension; fits chorea
• Rheumatoid arthritis ‘Occipital tension (apply a saturated cotton pad to the occiput and sacrum)
• Tired muscle; after unaccustomed exercise (external)
• Gout in hand and feet

**Skin**
• General for skin disease

**Other**
• Mental over activity; rain draining energy from the stomach
• Headaches of weak circulation and languid health
• Sedate HCl production
• Good for health food fanatics; i.e., cerebral relationship to stomach and food
• Hysterical dogs
• Exhaustion following typhus, fever, influenza, hepatitis
• Bleeding wounds (external)
• Inflamed eyes (external)
• Obesity
• Popular used for unnatural falling of hair and brightening the hair (rub infused oil into scalp)

**Fever**
• Septic fever (combined with wormwood, vervain, sage, or lavender)

**Contraindications and cautions:** symptoms of acute heat

**Medicinal uses:** Rosemary is an important herb to stimulate and restore the body, awakening and enlivening metabolic processes, and working to remove accumulated congestion. It can be used to enhance blood sugar and fat metabolism. Through nerve stimulation it can increase muscle activity via the parasympathetic nervous system, thus strengthening the arteries, stomach, intestines, gallbladder and heart, while relaxing the sympathetic and voluntary nerves. It is a mild herb, and for this reason is ideally suited to weakened conditions, such as pediatrics or geriatrics, or to mild, subtle conditions. It is particularly valued in restoring the memory and is said to awaken the spirits to arrest feelings or sadness.
and depression, and because of this, and its gentle stimulant activities on the heart and arterial system, it is an excellent remedy for elderly patients. Rudolf Steiner felt that rosemary increased the sense of selfhood, which he related to the fire element, or warmth of the body. For this purpose it can be combined with similar herbs such as hawthorn, garlic and bilberry. Combined with garlic and black pepper and infused in olive oil it makes a delicious and medicinally active condiment used against cold and congestion.

Rosemary is very good for digestion, especially when someone feels they have a retention of meat with poor digestion, which produces gas in the stomach and bowels, affecting the spleen. As an infusion, rosemary is a good treatment for mild headaches and colds, and is an important herb in beauty care, valued by women for millennia as a hair rinse and cosmetic agent. According to Weiss, rosemary is useful as a bath to invigorate the body in hypo-tension. The essential oil is a good antimicrobial when applied topically, and may be effective in neuralgia. As an aromatherapeutic agent, rosemary is useful to enhance concentration and awareness, with a role in offices and schools.

**Pharmacy and dosage:**

- **Fresh Plant Tincture:** fresh herb, 1:2, 70-90% alcohol, 3-60 gtt
- **Dry Plant Tincture:** recently dried herb, 1:3, 50% alcohol, 3-60 gtt, 1-3 mL
- **Acetum Tincture:** recently dried herb, 1:7, 5-15 ml
- **Hot Infusion:** recently dried herb, 1:20, 60-120 ml
- **Powder:** recently dried herb, finely sieved, 500-3000 mg

**Licensing:** As of Nov, 30, 2010, 60 Canadian NHP licenses been issued for products containing this herb.

**REFERENCES**


Western Materia Medica
By Terry Willard CIH, PhD, Todd Caldecott CIH

Rosmarinus officinalis
LAMIACEAE

17 Wood, Mathew; The Earthwise Herbal (Old World); 2008
Botanical Name: *Vaccinium myrtillus*, Family

**Common names:** Bilberry, Airelle, Arándano, Whortleberry, Black Whortles, Bleaberry, Burren Myrtle, Dyeberry, Whinberry, Trackleberry, Huckleberry, Hurtleberry, Blueberries, Whortleberry, Wineberry

**Similar species:** All species of *Vaccinium* are used as herbs, more or less interchangeably, including species native to North America such as *V. alaskanse*, *V. ovalifolium*, *V. membranaceum*, *V. parvifolium*, *V. ovatum*, *V. caespitosum*, *V. deliciosum* and *V. uliginosum*.

**Plant description:** Bilberry is an erect shrub, 30-40 cm in height, with branching flowering stems. The leaves are alternate, light green, flat and oval shaped, tip acute and a finely toothed margin. The pink or white flowers contain 4-5 petals, and give way to a deep purple, fleshy berry with crescent-shaped leaves.

**Habitat, ecology and distribution:** *Vaccinium* species occur worldwide in temperate forests ranging up to the alpine tundra. Most species prefer acidic soils, such as bogs or in moist meadows, typically in shady locations often underneath conifers.

**Part used:** Leaves, fruit, root, root bark.

**History:** Grieve states that the name bilberry is derived from the Danish word 'bollebar,' which means ‘dark berry.’ Mills and Bone recount that bilberry was at one time used as a food-coloring agent and textile dye, as that bilberry jam was given to RAF pilots during the second world war to improve their night vision.1,2

** Constituents:** The most commonly described constituents in the leaf of bilberry and other *Vaccinium* species are the anthocyanins or anthocyanosides, including glucosides of delphinidin, malvidin, pelargonidin, cyaniding and petunidin. Other glycosidal constituents include ericolin, arbutin, beta-amyrin, nonacosane and flavonoids. Catechin, epicatechin, condensed tannins, oligomeric procyanidins, phenolic acids and pectin have also been described.3,4,5

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Medical Research: Experimental research both in vitro and in vivo had indicated that bilberry has vascular protective, antioxidant, wound healing, antiplatelet, anti-ulcer and anti-tumor properties. Specifically, it appears that the anthocyanins have a collagen-stabilizing activity and growth promoting activities for fibroblasts and smooth muscle cells. There is some experimental clinical evidence that supports the traditional use of bilberry, as follows.

• Peripheral and vascular disorders: Mills and Bone report a number of uncontrolled and placebo-controlled clinical trials that demonstrate the efficacy of bilberry in the treatment of peripheral vascular disorders. More recent trials have utilized a Vaccinium extract standardized to between 57 and 173 mg of anthocyanins, which have similarly indicated an improvement in peripheral vascular disorders, including edema, parathesia, pain, and subjective symptoms of varicose veins, including hemorrhoids. Some of these studies also indicate the benefit in Raynauld’s disease, improving movement of the finger joints.

• Visual disorders: In both uncontrolled and controlled clinical trials, a standardized extract of bilberry has been shown to improve diabetic retinopathy by reducing or even completely ameliorating retinal hemorrhages, with significant improvements in ophthalmoscopic and angiographic patterns. Other studies have shown improvements in visual perception in mild to medium myopia, as well as glaucoma.

Night vision. There is contradictory evidence about the effectiveness of bilberry for improving night vision; however, much on the research is of poor quality.

• Dysmenorrhea: In a double-blind placebo-controlled study 30 women with chronic dysmenorrhea were treated with a bilberry extract equivalent to 115 mg of anthocyanins for 3 days before and after menses. Bilberry was shown to significantly reduce symptoms of dysmenorrhea, including pelvic, lumbar-sacral and breast pain, as well as headache and nausea.

Capillaries function: anthocyanidins in bilberry have a variety of biological effects including increasing the synthesis of glycosaminoglycans, decreasing vascular permeability, reducing basement membrane thickness, and aiding in the redistribution of microvascular blood flow and the formation of interstitial fluid.

Anti-Ulcer: anthocyanidin pigment have anti-ulcer and gastroprotective effects.

Anti-inflammatory: anthocyanidins have anti-inflammatory and anti-edema effects.

Blood Sugar and Lipids: the leaf extract has blood glucose, triglyceride, and cholesterol lowering effects. The chromium, glucokinin, neomirtilline, seem to play a role in lower blood glucose. Some researchers speculate that flavonoids in bilberry leaf might also be useful for diabetic circulatory disorders.

Liver and Kidney: Bilberry extract might have some effects on liver and kidney damage. Preliminary research in an animal model shows that a specific bilberry extract containing 42% anthocyanidins decreases alanine aminotransferase (ALT) in experimentally induced liver damage. Similarly, administration of a bilberry extract reduces blood urea nitrogen (BUN) and creatinine levels in experimentally induced
kidney damage. Bilberry is thought to reduce liver and kidney damage through free radical scavenging and reducing lipid peroxidation.\(^{20,21}\)

**Toxicity:** Generally well tolerated. Mills and Bone report that the oral LD\(_{50}\) of the whole bilberry extract in rats and mice was greater than the equivalent of 720 mg/kg of the anthocyanins. Long-term administration of the equivalent of 180 mg/kg of anthocyanins in experimental animals did not show any indication of toxicity.\(^{22}\)

**Herbal action:** tonic, astringent, vasoprotective, antioxidant, anti-inflammatory, astringent, diuretic

**Indications:** dyspepsia, diarrhea, gastroenteritis, cystitis, hemorrhoids, ischemic injuries, respiratory allergies, inflammation, peripheral vascular disorders (e.g. edema, varicosities), capillary fragility and easy bleeding (e.g. nosebleeds, bruising), adult onset diabetes, diabetic retinopathies, myopia, retinitis, glaucoma, poor night vision, post-operative surgical wounds

**Contraindications and cautions:** As an anti-platelet activity has been ascribed to bilberry, its use along with aspirin, warfarin and other anti-platelet drugs should be avoided.

**Medicinal uses:** In many respects, bilberry is the perfect geriatric herbal remedy, active against many of the problems that come with aging, including a general loss of tone in the tissues, with capillary fragility and a declining ability to deal with free radical injury. Bilberry certainly isn’t an elixir of immortality, but it can help to improve many of the symptoms of aging, both subjectively and objectively. Bilberry should be taken in modest doses on a daily basis as a preventative. Moore mentions that bilberry is useful in cystitis with alkaline urine, a tendency more common in women that tend to eat a diet rich in carbohydrates. For this purpose bilberry can help to gently acidify the urine, but in cases of acidic-loving bacterial infections bilberry won’t be effective. Moore also mentions that bilberry may be effective to manage labile blood sugar levels in both type 1 and type 2 diabetics. For early morning awakening due to hyperglycemia Moore states that a couple of cups of bilberry tea the afternoon before can help to gently lower blood sugar levels.\(^{23}\) Felter and Lloyd state that a tincture of the berries and roots is an excellent diuretic, useful in edema and urinary gravel, whereas a decoction of the leaves and root bark is a useful astringent, in the treatment of diarrhea, and in topical applications in ulcers, leucorrhea, and ulcerations of the mouth and throat.\(^{24}\) Cook states that a decoction of the root is useful as a gargle in sore throat.\(^{25}\) The German physician Rudolf Weiss gives different consideration to the dried and fresh bilberry fruit, considering both as a
useful therapy in bowel disorders. Prepared as a decoction, the
dried berries are stated by Weiss to be effective diarrhea and
infantile dyspepsia, having astringent, tonic and absorptive
properties. Upon ingestion the stools become slightly more acidic,
and the bluish-purple pigments are absorbed by the intestinal
mucosa forming an adherent layer that protects against mechanical
irritation and inflammation. Weiss states that such preparations are
particularly effective in mild intestinal dyspepsia that responds
poorly to other approaches. In regard to the consumption of the
fresh fruit however, Weiss states that the properties of the fruit
tends more towards a laxative effect, but with a similar healing and
protective property that is often required in cases of chronic
constipation.  

**Pharmacy and dosage:**

- *Fresh plant tincture*: fresh leaves, 1:2, 95% alcohol, 20-40 gtt
- *Hot Infusion*: recently dried leaves, 1:20, 60-120 ml
- *Decoction*: dried fruit, 1:20, 150-200 ml
- *Powder*: dried leaves, standardized to 120 mg anthocyanins
- *Fresh fruit*: *ad libitum*

**NHP Monograph**

- (Traditionally) used in Herbal Medicine as an astringent and to help relieve diarrhea
- Provides antioxidants for the maintenance of good health.
- Used in Herbal Medicine to help slow the progression of disorders of the eye, such as
diabetic and hypertensive retinopathy, and macular degeneration
- Used in Herbal Medicine to help relieve symptoms related to non-complicated chronic
venous insufficiency (CVI), such as sensation of swelling, heaviness and tingling
of the legs

**Adults:**

**Progression of disorders of the eye; Relieve symptoms related to non-complicated CVI**

**Preparation:** All Standardised Extracts

Dose(s): 12-75 Grams per day, fruit 36 Percent Anthocyanosides

**Relief of diarrhea; Antioxidant**

**Preparation:** Dry, Powder, Decoction & Infusion + All Non-Standardised Extracts

Dose(s): 1.8-75 Grams per day, dried fruit

**Licensing:** As of Nov. 30 2010, 124 Canadian NHP licenses have been issued for
products containing bilberry.
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Botanical Name: *Viscum album*, Loranthaceae

Common names: Mistletoe, Viscum

Plant description: Mistletoe is an evergreen parasitic plant that grows on the branches of certain deciduous trees, forming pendent bushes, 50-150 cm in diameter, the leaves thick and leathery, oval to round, 2.5-5 cm long. The small, spring flowers leave behind yellowish-white, sticky, autumn berries, smooth and semitransparent, that remain throughout the winter.

Habitat, ecology and distribution: Mistletoe (*Viscum album*) is native to temperate Europe, found on deciduous trees such as apple, oak, birch and poplar. Other genera in the Loranthaceae occur in North America, such as *Phoradendron* (with *Quercus*) and *Arceuthobium* (with conifers, e.g. *Abies*, *Larix*, *Juniperus*, *Pinus*, *Tsuga*), but it is not known to what extent these species can be used interchangeably with *Viscum*.

Part used: whole plant.

History: Mistletoe has long been one of the most magical and sacred plants in European folklore, held in great reverence by the Celtic Druids, who searched for the plant in the tops of the “sacred oak” tree on the sixth night of the moon. They believed that the mistletoe protected its possessors from all evil, and used it as an aphrodisiac, a protection against poison, and to bestow long life and fertility. Mistletoe was also hung from beams and ceilings to ward off evil spirits. Kissing under the mistletoe is first found associated with the Greek festival of Saturnalia. Scandinavian mythology states that Balder, the god of Peace, was slain with an arrow made of mistletoe. He was restored to life at the request of the other gods and goddesses. Mistletoe was afterwards given into the keeping of the goddess of Love, and it was ordained that everyone who passed under it should receive a kiss, to show that the branch had become an emblem of love, and not of hate. Christian folklore believes mistletoe was once a tree, of whose wood the cross on which Christ died was made. The tree then shriveled up with shame, changing into a plant that pours down good fortune on all who pass under it. The name ‘Mistletoe’ is derived from the Anglo-Saxon word ‘dung’ (mistle) ‘twig’ (tan). Culpepper states that mistletoe is under the dominion of the Sun. Those specimens found growing on Oaks also ruled by the influence of Jupiter, an influence native to this tree.
**Constituents:** Mistletoe contains a number of important constituents, some of which (such as the alkaloids) can vary depending upon the host species. The three main glycoprotein lectins are: MLI, also known as viscumin, MLII, and MLIII; as well as viscotoxins, alkaloids, and monoterpene glucosides. Generally represented compounds include the flavonoids (quercitin, chalcone and flavone derivatives), terpenoids (e.g. beta-amyrin, betulinic acid, oleic acid, beta-sitosterol, stigmasterol, ursolic acid, lupeol and ester combinations), amines (e.g. acetylcholine, choline, histamine, GABA and tyramine), and the viscotoxins A2, A3 and B. Mistletoe also contains an assortment of phenolic compounds including caffeic and myristic acid, lectins, fatty acids, sugars, tannins and mucilage.¹²,³,⁴

**Medical Research:** The vast majority of research conducted on mistletoe has involved the subcutaneous injection of an aqueous extract of mistletoe called Iscador, manufactured by Weleda AG of Switzerland. Other brands used in research include Eurixor, Helixor, Isorel, Vysorel, and ABNOBAviscum. Iscador products are subdivided according to the species of host tree. Thus IscadorM is obtained from apple trees (*Malus* spp.), IscadorP comes from pine trees (*Pinus* spp.), IscadorQ comes from oak trees (*Quercus* spp.), and IscadorU comes from elm trees (*Ulmus* spp.). The basis of its usage is rooted in the anthroposophical movement of Rudolf Steiner, who is said to have stated that mistletoe would eventually replace the use of a surgeon’s scalpel. In 1920 Rudolf Steiner founded the Society for Cancer Research to promote mistletoe extracts and anthroposophical medicine. Today, mistletoe is the most commonly used oncological drug in Germany. Unfortunately most this research, of which only recent highlights are presented, cannot be easily converted into oral dosages of the herbal extract used by herbalists.

European mistletoe is best known as a potential anticancer agent. Researchers think it might work as a biological response modifier that both stimulates the immune system and exerts cytotoxic effects.⁶ There is evidence that European mistletoe can stimulate the immune system in both animal models and humans. It seems to cause leukocytosis, increasing both the number and activity of neutrophils and natural killer cells.⁷⁸ European mistletoe also seems to increase white blood cell (WBC) secretion of cytokines interleukin-1 (IL-1), IL-2, IL-6, and tumor necrosis factor-alpha (TNF-alpha).⁹,¹⁰,¹¹ Additional evidence suggests European mistletoe might possess a DNA stabilizing effect, restricted primarily to the mononuclear cells of the peripheral blood in vitro.¹²

**Immunostimulant:** Ninety-two children 5 to 14 years of age living in areas exposed to the radioactive fallout from Chernobyl with respiratory infections (RRI) were treated after randomization with either *Viscum album* praeparatum mali or pini (Iscador M or P). The dosage was two subcutaneous injections a week for 5 weeks with individual doses of 0.001 mg to 1.0 mg. Both *Viscum album* preparations were effective in significantly reducing clinical symptoms. One year after a single treatment course, the frequency of RRI relapses decreased by 78% and 73%, respectively. Immunomodulatory
effects were assessed by investigation of lymphocyte subsets, natural killer (NK) cell activity, phagocytic and oxidative activity of polymorphonuclear leukocytes, and antiviral activity of serum before and 1 week after treatment. *Viscum album* therapy resulted in normalization of initial immune indices either below or above the normal ranges. High levels of antiviral activity before treatment were significantly decreased by *Viscum album* mali.¹³

**Cancer:** Interleukin-6 (IL-6) has been shown to be involved in several diseases including lymphoid malignancies, binding to soluble IL-6 receptor (sIL-6R) circulating in blood, leading to signal transduction via gp130. Soluble IL-6R shows agonistic activity for IL-6, and the soluble form of gp130 (sgp130) an antagonistic effect against the complex IL-6/sIL-6R. Researchers investigated the effect of *Viscum album* extract (Iscador) on the serum levels of IL-6, sIL-6R and sgp130 in B-cell lymphoma patients (n = 27), in comparison to healthy controls (n = 28). Twenty-one of 27 patients had been treated previously with chemo-radiotherapy. The patients were divided into two groups; those with short-term (investigated before and during treatment) or those with long-term *Viscum album* (VA) therapy (investigated during therapy). Clinical results indicated that half of the patients (6/12) with long-term treatment had a continuous complete remission, whereas only 2/15 patients with short-term treatment had a complete remission.¹⁴ Researchers examined whether or not Iscador treatment prolongs survival time of patients with carcinoma of the colon, rectum, or stomach; breast carcinoma with or without axillary or remote metastases; or small cell or non-small-cell bronchogenic carcinoma; and to explore synergies between Iscador treatment and psychosomatic self-regulation. The research design was a prospective nonrandomized and randomized matched-pair study nested within a long-term epidemiological cohort study involving 10,226 cancer patients. These included 1668 patients treated with Iscador and 8475 who had taken neither Iscador nor any other mistletoe product. In the nonrandomized matched-pair study, survival time of patients treated with Iscador was longer for all types of cancer studied. In the pool of 396 matched pairs, mean survival time in the Iscador groups (4.23 years) was roughly 40% longer than in the control groups (3.05 years; P < .001). Synergies between Iscador treatment and self-regulation manifested in a longer survival advantage for Iscador patients with good self-regulation (56% relative to control group; P = .03) than for patients with poor self-regulation.¹⁵ The effect of an intrapleural administration of mistletoe extract (Helixor) was examined. Twenty cancer patients with malignant pleural effusions were treated intrapleurally with the mistletoe extract. The overall response rate for pleurodesis was 72%, with only 1.2% displaying side effects of the World Health Organization classification I. The decline of tumor cells in the effusion liquid correlated negatively with the number of instillations. However, the elimination of tumor cells was associated with a transient increase in macrophages and eosinophils, and a constant increase in CD8+T cells. Compared to the responder group, the non-responders exhibited high proportions of macrophages, CD8+T cells and T cells with human leukocyte antigens with DR specificity (HLA-DR) in the effusion
liquid, compatible with a disturbance of macrophage/T cell co-operation and thus failure to eliminate the malignant cells. The preliminary results suggest that mistletoe-mediated pleurodesis is due to a stimulation of anti-tumor immunity rather than mechanical sclerosis.\(^\text{16}\)

**Hypotensive:** Newal et al. report a hypotensive effect for mistletoe, associated with a variety of plant constituents including acetylcholine, histamine, GABA, tyramine and flavonoids.\(^\text{17}\)

**Hepatitis C:** Subcutaneous injection of an aqueous extract of European mistletoe may decrease viral load and improve quality of life in some patients with chronic hepatitis C.\(^\text{18}\)

**Toxicity:** Mistletoe taken orally or subcutaneously and appropriately can be used safely.\(^\text{19,20,21}\) They have a narrow therapeutic range; high doses are not safe. Consuming more than 3 mistletoe berries or 2 leaves is safe.\(^\text{22}\) European mistletoe is not recommended for self-medication. It is generally stated to be toxic and medical practitioners often treat ingestion aggressively. In 1997 researchers analyzed the outcomes of 1,754 exposures to mistletoe, the data extracted from the American Association of Poison Control Centers for the period of 1985 to 1992. Pediatric exposures accounted for 92.1% of the cases. Of all cases, 99.2% had an outcome associated with no morbidity, and there were no fatalities. Gastrointestinal decontamination techniques had no bearing on outcomes.\(^\text{23}\) The parenteral administration of European mistletoe may promote adverse events such as flu-like symptoms and transient exacerbations of gingivitis, fever, and eosinophilia.\(^\text{24}\)

**Herbal action:** mild hypotensive, cardiac sedative, anticonvulsant, analgesic

**Indications:** headaches, dizziness, fatigue, irritability, feeble pulse, edema, dyspnea, ventricular hypertrophy, valvular insufficiency, arrhythmia, hypertension, peripheral arterial disease, rheumatic or neuralgic pain, epilepsy, depression, anxiety

**Contraindications and cautions:** May have an oxytocic activity and therefore best avoided in pregnancy.\(^\text{25,26}\) Avoid combining with *Centella asiatica*.\(^\text{27}\)
**Medicinal uses:** Mistletoe has largely been used as a mild cardiac sedative with hypotensive properties, used particularly for elders in the treatment symptoms of cardiovascular disease, including headaches, dizziness, fatigue, and irritability. Felter and Lloyd state that the indications for mistletoe include a flushed face, chronic headaches, with weak cardiac function, dyspnea and a feeble pulse. Some practitioners may think mistletoe helpful in reducing blood pressure, but it is unlikely that it directs much of a clinical effect in this area, improving the symptomology but not objective assessments of cardiovascular disease. This is not so much the deficit of Mistletoe as it is of the idea that reducing blood pressure has any significant outcome in cardiovascular disease: elevated blood pressure is only a symptom, not the cause of heart disease. Another important traditional use for mistletoe mentioned by Culpepper is in “falling sickness” taken internally as well as hung around the neck. The efficacy of mistletoe in epilepsy is also noted by King’s American Dispensatory, as well as its utility in paralysis and psychological disturbance such as “hysteria” or “insanity”. Felter and Lloyd state that mistletoe (Phoradendron flavescens) is a reliable oxytocic, useful to “…restrain postpartum and other uterine hemorrhages… declared to be safer, in many respects, than ergot.”. Culpepper states that “…both the leaves and berries of Misselto do heat and dry, and are of subtle parts; the birdlime doth molify hard knots, tumours, and imposthumes; ripens and discusses them, and draws forth thick as well as thin humours from the remote parts of the body, digesting and separating them.”

**Pharmacy and dosage:**

*Fresh Plant Tincture:* fresh green plant, 1:2, 95% alcohol, 3-20 gtt  
*Dry Plant Tincture:* recent dried plant, 1:5, 50% alcohol, 3-30 gtt.  
*Hot Infusion:* recent dried plant, 1:20, 30-60 mL  
*Powder:* recent dried plant, finely sieved, 500-1500 mg

**Licensing:** As of Nov. 30, 2010, 21 Canadian NHP licenses have been issued for products containing mistletoe.
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