



LIME FLOWER- *TILIAE FLORES*

Lime - *Tilia cordata* Mill., Fam. Tiliaceae.

Synonyms: Lime Tree, Linden Tree.

Plant. Lime - trees growing to a height of 30 m, with glabrous cordate leaves with a serrate margin and brown hairs in the angles of the nerves on the lower surface. Greenish yellow, scented flowers, with numerous stamens and a relatively large, pubescent ovary, grouped together in cymes, and stalks fused with the accompanying bract.

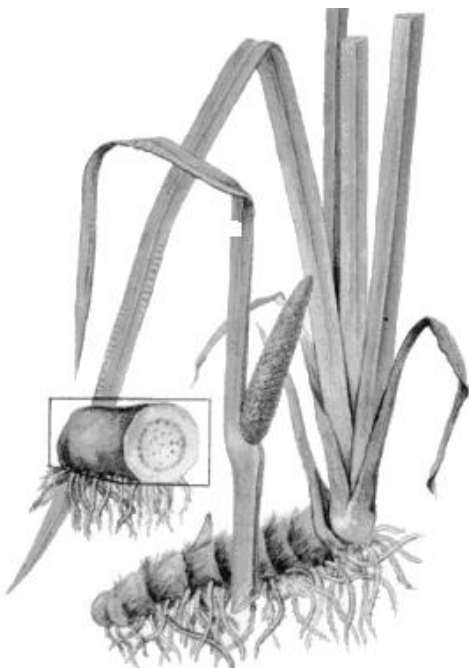
Area of distribution. Native throughout Europe: it is also planted. The drug comes partly from China and partly also from the Balkans (former Yugoslavia, Bulgaria, Romania) and Turkey

Description. The fragments of pale yellowish green entire bracts with a distinct reticulate nervature, which are partly fused with the flower stalk, are characteristic. There are also yellowish white flowers with five sepals and five free petals, numerous stamens, and a densely pubescent superior ovary. Occasionally buds are also present. Odour: Characteristic and faintly aromatic. Taste: Sweetish, mucilaginous, pleasant.

Constituents. It contains mucilage polysaccharides (3%); flavonoids: kaempferol, quercetin, myricetin and their glycosides; volatile oil: many components including farnesol (sesquiterpene), citral, citronellal. Other constituents include caffeic, chlorogenic and p-coumaric acids; saponin (unspecified), tannin (condensed), amino acids.

Uses. Lime flower is stated to possess sedative, antispasmodic, diaphoretic, diuretic and mild astringent properties. Traditionally it has been used for migraine, hysteria, arteriosclerotic hypertension, feverish colds, and specifically for raised arterial pressure associated with arteriosclerosis and nervous tension

Pharmacopoeial and Other Monographs: BHC 1992, BHP 1996, BP 2007, Complete German Commission E, Martindale 35th edition, Ph Eur 2007, SPU, WHO monographs on medicinal plants commonly used in the Newly Independent States (2010).



CALAMUS RHIZOME- *CALAMI RHIZOMATA*

Calamus - *Acorus calamus* L., Fam. Araceae.

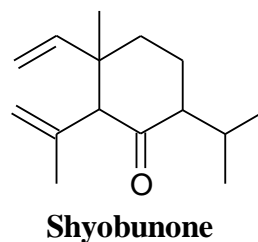
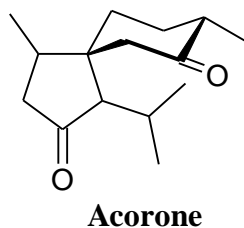
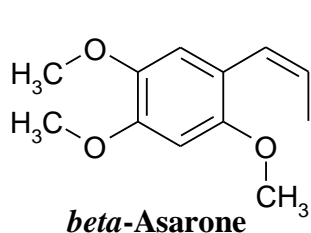
Synonym(s): Sweet Flag.

Plant. Calamus is a semiaquatic, perennial plant that grows along lakes and rivers and in muddy swamps and meadows. The plant has a long history of use dating back at least 4000 years as a product of commerce in the Near East. It is up to 1m tall plant with distichous, linear leaves and a triangular stem. Densely crowded flowers are in a finger like spike.

Area of distribution. Calamus originated in India, Central Asia, and Eastern Europe but now grows all over the world.

Description. The rhizome, freed from roots, leaf sheaths, is often split longitudinally and peeled; it exhibits triangular leaf and roundish root scars. It is up to 2 cm thick, whitish with a reddish tinge, and soft (lacunose tissue, aerenchyma). The demarcation between the bark and the central stele can be recognized in the transverse section. Odour: Characteristic and faintly aromatic. Taste: Aromatic and bitter, somewhat spicy.

Constituents. Three genotypes (diploid, triploid and tetraploid) have been identified which are chemically distinct with respect to the β -asarone content. 1.5–3.5%. β -Asarone content varies between genetic species: 96% in tetraploid (Indian), 5% in triploid (European) and 0% in the diploid (North American) species. Other identified components include calamenol (5%), calamene (4%), calamone (1%), methyl eugenol (1%), eugenol (0.3%) and the sesquiterpenes acolamone, acoragermacrone and isoacolamone. Considerable qualitative and quantitative differences have been reported between the volatile oil from different genetic species, and between the volatile fraction of an alcoholic extract and the essential oil from the same variety (European). Tannin - 1.5%. Bitter principles (e.g. acorin), acoric and palmitic acids, resin (2.5%), mucilage, starch (25–40%), sugars, Amines: Dimethylamine, methylamine, trimethyl amine and choline.



Uses. Calamus is stated to act as a carminative, spasmolytic and diaphoretic. On the basis of its constituents, the drug can be called a bitter aromatic; it is principally used as a stomachic and carminative. It is also employed externally as a rubefacient. Drug: Olimetine, Vicalin, Vicair.

Contraindications: The toxicity of calamus oil has been associated with the β -asarone content. It has therefore been advised that only roots free from, or with a low content of β -asarone should be used in human phytotherapy.

Drug interactions. None documented. However, the potential for preparations of calamus to interact with other medicines administered concurrently, particularly those with similar or

opposing effects, should be considered. For example, calamus has amine constituents, and there is limited evidence from in vitro studies that calamus has monamine oxidase inhibitory activity; however, the clinical significance of this, if any, is not clear.

Side Effects: Concerns over the toxicity of calamus centre around the volatile oil and in particular on the β -asarone content.

Pharmacopoeial and Other Monographs: BHP 1996, Martindale 35th edition.



GERMAN CHAMOMILE FLOWERS - *CHAMOMILLAE FLORES*

German chamomile - *Matricaria chamomilla* L., Fam. Asteraceae.

Synonym(s): *M. recutita* L, *M. suaveolens* L., *Chamomilla recutita* (L.) Rauschert.

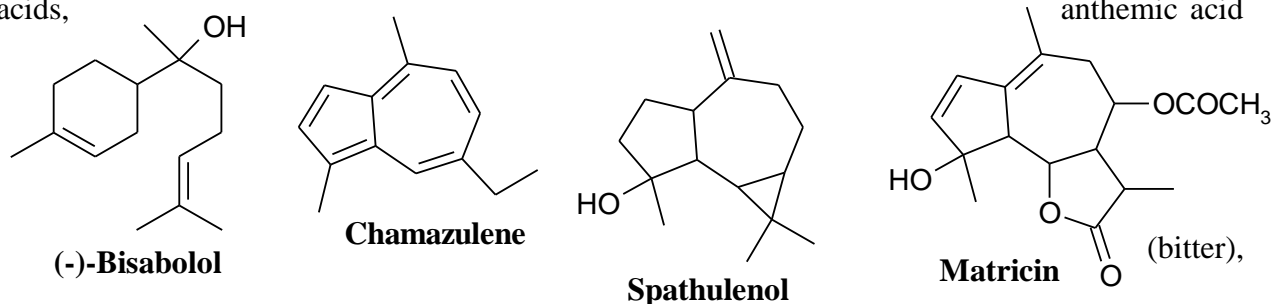
Plant. Herbaceous annual; 10-30 cm in height, with erect, branching stems and alternate, tripinnately divided leaves below and bipinnately divided leaves above, both types having almost filiform lobes; the capitulum (to 1.5 cm in diameter) comprises 12-20 white ligulate florets surrounding a conical hollow receptacle on which numerous yellow tubular (disk) florets are inserted; the inflorescence is surrounded by a flattened imbricated involucre; fruit small, smooth, yellowish.

Area of distribution. The plant is indigenous to northern Europe and grows wild in central European countries; it is especially abundant in eastern Europe. Also found in western Asia, the Mediterranean region of northern Africa, and the United States of America. It is cultivated in many countries.

Description. Flos Chamomillae consists of conical flower heads, each bearing a few white ligulate florets and numerous yellowish orange to pale yellow tubular or disk florets on conical, narrow hollow receptacles with a short peduncle; disk florets perfect and without a pappus; ray florets pistillate, white, 3-toothed and 4-veined; involucre hemispherical, composed of 20-30 imbricate, oblanceolate and pubescent scales; peduncles weak brown to dusky greenish yellow, longitudinally furrowed, more or less twisted and up to 2.5 cm long. Odour, pleasant, aromatic; taste, aromatic and slightly bitter

Constituents. Flos Chamomillae contains an essential oil (0.4-1.5%), which has an intense blue colour owing to its chamazulene content (1-15%). Chamazulene is formed from matricin during steam distillation

of the oil. It varies in yield depending on the origin and age of the flowers. Other major constituents include α -bisabolol and related sesquiterpenes (up to 50% of the oil). Apigenin and related flavonoid glycosides constitute up to 8% (dry weight) of the drug. It contains also amino acids,



coumarins, acetylenes, choline, polysaccharide, plant and fatty acids, tannin and triterpene hydrocarbons.

Uses. German chamomile is stated to possess anti-inflammatory, carminative, antispasmodic, mild sedative, antiseptic and anticatarrhal properties. Symptomatic treatment of digestive ailments such as dyspepsia, epigastric bloating, impaired digestion, and flatulence. Infusions of chamomile flowers have been used in the treatment of restlessness and in mild cases of insomnia due to nervous disorders. It is used externally to treat inflammation and irritations of the skin and mucosa (skin cracks, bruises, frostbite, and insect bites) including irritations and infections of the mouth and gums, and haemorrhoids. Drug: Recutan, Romasulan.

Contraindications: Chamomile is contraindicated in patients with a known sensitivity or allergy to plants of the Asteraceae such as ragweed, asters, and chrysanthemums.

Drug interactions. None documented.

Side Effects: Reports of allergic reactions to chamomile are common, although in the majority of cases the plant species is not specified.

Pharmacopoeial and Other Monographs: BHC 1992, BHP 1996, BP 2009, Complete German Commission E, ESCOP 2003, Martindale 35th edition, Ph Eur 6.4, WHO volume 1 1999, USP 32, SPU.



ROMAN CHAMOMILE FLOWER - ROMANAE CHAMOMILLAE FLOS

Roman chamomile - *Chamaemelum nobile* (L.) All., Fam. Asteraceae.

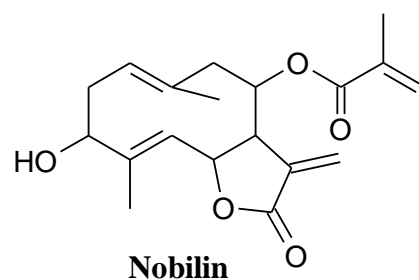
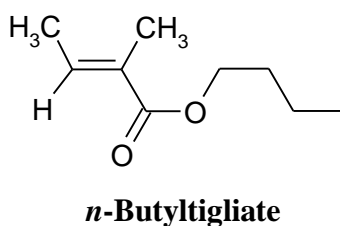
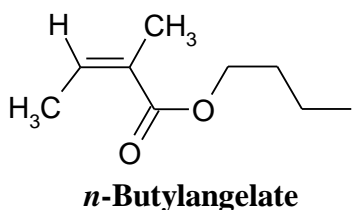
Synonym(s): Roman or English or Sweet chamomile, *Anthemis nobilis* L., Chamomile, *Ormenis nobilis* (L.).

Plant. The cultivated form of this low plant, only about 30 cm in height, with 2-3 times pinnately divided leaves; flower-heads up to 3 cm in diameter, comprising almost exclusively white ray-florets.

Area of distribution. Native in southern and western Europe (England, Belgium, France, Germany, Italy, Spain) and North Africa. For the drug, a variety that forms almost exclusively ray-florets is cultivated, especially in Belgium, France, and England, and also in the USA and Argentina.

Description. The white to yellowish white flower-heads of the double variety are 2-3 cm in diameter and have 2-3 rows of erect, imbricate, pale green, narrowly lanceolate, membranaceous, involucre bracts. The up to 7 mm long, female ray-florets have 4 more or less parallel nerves, an irregular three-toothed tip, and a short, yellowish brown ovary (achene). In the centre of the flower-head, there are a few disk-florets, but these may also be entirely absent. The base of the conical receptacle is covered with numerous oblong scales. Odour: Characteristic and pleasant, taste: Bitter and aromatic.

Constituents. Volatile oils 0.4–1.75%. Angelic and tiglic acid esters (85%); others include 1,8-cineole, chamazulene, farnesol, nerolidol; germacranolide-type sesquiterpene lactones (0.6%), including nobilin, 3-epinobilin, 1,10-epoxynobilin, 3-dehydronobilin; various alcohols including amyl and isobutyl alcohols, anthemol. Chamazulene is formed from a natural precursor during steam distillation of the oil, and varies in yield depending on the origin and the age of flowers. Other constituents include coumarins, flavonoids: apigenin, luteolin, quercetin and their glycosides. Anthemic acid (bitter), phenolic and fatty acids, phytosterol, choline and inositol.



Uses. Roman chamomile is stated to possess carminative, anti-emetic, antispasmodic, and sedative properties. It has been used for dyspepsia, nausea and vomiting, anorexia, vomiting of pregnancy, dysmenorrhoea, and specifically for flatulent dyspepsia associated with mental stress. Drug: Summertime Tea Blend (UK).

Contraindications: Instances of allergic and anaphylactic reactions to chamomile have been documented (see Chamomile, German) The allergenic principles in chamomile are thought to be the sesquiterpene lactones. Animal studies have indicated the oil to be either mildly or non-irritant, and to lack any phototoxic effects. The acute toxicity of Roman chamomile in animals is

reported to be relatively low. Acute LD₅₀ values in rabbits (dermal) and rats (by mouth) have been stated to exceed 5 g/kg.

Drug interactions. None documented.

Side Effects: In view of the documented allergic reactions and cross-sensitivities, Roman chamomile should be avoided by individuals with a known hypersensitivity to any members of the Asteraceae

Pharmacopoeial and Other Monographs: BHC 1992, BHP 1996, BP 2009, Martindale 35th edition, Ph. Eur. 6.4, USP29/NF24.



ELECAMPANE RHIZOME AND ROOT – *INULAE RIZOMATA ET RADICES*

Elecampane - *Inula helenium* L., Fam. Asteraceae.

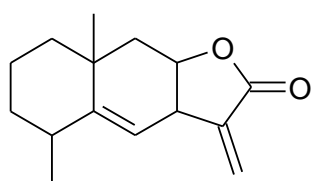
Synonym(s): Alant, Horseheal, Inula, Scabwort, Tu Mu Xiang, Yellow Starwort.

Plant. A herb up to 2,5 m in height with broadly lanceolate, irregularly toothed leaves. Flowering heads up to 7 cm in diameter, with numerous very narrow ligulate florets and many small tubular florets.

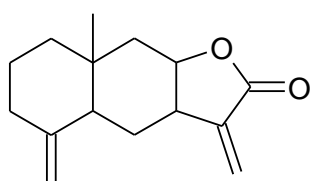
Area of distribution. Indigenous in southern and eastern Europe: naturalized in central Europe, the Near East, and North America. The drug is derived from cultivated plants and present-day imports come mainly from China, the former USSR, and Bulgaria, and also the USA.

Description. Elecampane consists of the broken roots, rhizomes, and lateral roots obtained from 2-3 year old cultivated plants. The drug is usually supplied as greyish brown, hard, and horny pieces which are longitudinally wrinkled on the outside and which have a short and fibrous fracture showing a dark brown cambium line and glistening because of the presence of numerous secretory canals. Odour is characteristically aromatic, taste - spicy and bitler.

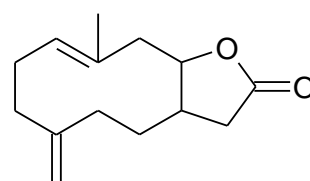
Constituents. Volatile oils 1–4%. Mainly contains sesquiterpene lactones including alantolactone, isoalantolactone and dihydroalantolactone (eudesmanolides), alantic acid and azulene. The mixture of alantolactones is also known as helenin or elecampane camphor. Other constituents includes polyacetylenes, triterpenoids (friedelin, damaradienol) as well as sterols (β -sitosterols, stigmasterol) and up to 44% carbohydrates - inulin are also present.



Alantolactone



Isoalantolactone



Germacrene-D-lactone

Uses. Antiseptic expectorant in bronchial catarrh, whooping cough (and irritating cough), and bronchitis. Elecampane preparations are used for complaints and problems affecting the respiratory and gastrointestinal tracts, as well as the kidneys and lower urinary tract.

In folk medicine, the drug, which is grouped with the bitter aromatics, is used as a stomachic, carminative, and cholagogue (among other things, the action of the bitter substances), as well as a diuretic, anthelmintic, and in menstrual complaints. The secretolytic, choleric, and diuretic actions of the drug have been confirmed experimentally and clinically. The active substances are aiantolactone, isoalantolactone, and the other sesquiterpene lactones. They have an exomethylene group on the γ -lactone ring, which is an important structural feature in bringing about various pharmacological effects. Compounds of this kind have antiphlogistic and antibiotic actions. Aiantolactone and isoalantolactone have been shown, both *in vitro* and *in vivo*, to have antifungal and antitumour activity.

Contraindications: Elecampane may cause an allergic reaction, particularly in individuals with an existing allergy or sensitivity to other plants in the Asteraceae family.

Drug interactions. Elecampane may interfere with existing hypoglycaemic and antihypertensive treatment.

Side Effects: The sesquiterpene lactones present in elecampane irritate the mucous membranes. They are sensitizing and cause allergic contact dermatitis. Alantolactone is bound as a hapten to the proteins of the skin: the adduct induces hypersensitivity to alantolactone and other compounds with a α -methylene- γ -lactone (cross-reaction).

Large amounts of the drug lead to vomiting, diarrhoea, cramps, and symptoms of paralysis.

Pharmacopoeial and Other Monographs: BHC 1992, BHP 1996, Martindale 33rd edition, PPRC.



WORMWOOD HERB - *HERBA ABSINTHII*

Wormwood - *Artemisia absinthium* L., Fam. Asteraceae.

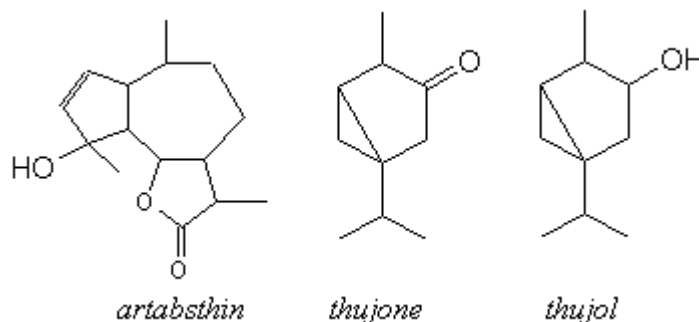
Synonym(s): Absinthium, Absinth, Maderwort, Mugwort, Mingwort.

Plant. A shrubby, odorous, grayish-green, finely canescent herb with branched stem attaining height of about 1 m. Its leaves are once, twice or thrice pinnately-divided into many obovate or

linear lobes, the lower, long petioled and the upper, short petioled or sessile. The inflorescence consists of racemose-paniculate heads, drooping on short pedicels. Each head is greenish-yellow, round ovoid and composed of tubular florets inserted on a pubescent receptacle, which is subtended by a hemispherical involucre's of imbricated bracts.

Area of distribution. Native in the dried regions Europe, Asia and Northern Africa. The plant is extensively cultivated in various parts of Europe mainly for flavoring beer and for the manufacture of a liquor termed "absinthe." The leaves and flowering tops are gathered in August and September, dried and stored in tin containers. The drug comes from the former USSR, Bulgaria, former Yugoslavia, Hungary and Poland.

Description. Stems and leaves gray-green, silky hairy and glandular throughout; the largest leaves 10 to 12 cm. in length and of almost equal breadth, 2- to 3-pinnately lobed or divided, the ultimate



segments oblong or obovate, obtuse, entire or slightly toothed; upper leaves becoming gradually shorter petioled, small and narrower, the uppermost only about 2 cm. long and resembling the ultimate segments of the larger lower ones; heads greenish-yellow, racemose-paniculate, from 3 to 4 mm. in breadth, globosely-ovoid, with a hemispherical involucre fragments of mesophyll; few lignified sclerenchyma fibers. Odor is aromatic and characteristic; taste – aromatic and strongly bitter.

Constituents. 0.2 1.5% volatile oil. The bitter compounds (0.15 0.4%) – is sesquiterpenoid lactone absinthin and also artabsthin, matricin. Depending on the origin of the drug, the following components can make up to 40% of the total essential oil content: thujone, sabinil acetate, ocimene. The drug also contains tannic acid, resin, etc.

Uses. Plant drug is used as aromatic bitter to stimulate appetite, for gastrointestinal complaints, e.g gastritis with reduced formation of acid, and as diaphoretic and flavoring agent. Drug: tincture, fluid extract.

Side Effects: Only likely on over dosage, and due essentially to toxic effects of the thujone. symptoms include vomiting, stomach and intestinal cramps retention of urine, and in serious cases renal damage, vertigo, tremors, and convulsions, Thujone can be quantitative removed from wormwood by high-pressure extraction with supercritical carbon dioxide. Owing to the toxicity of the thujone alcoholic wormwood extracts and the use of the essential oil (in absinth liqueurs), has been banned in many countries Aqueous extracts contain relatively little thujone.

Pharmacopoeial and Other Monographs: DAB, Ph.Eur. 6.4, BP 2009.



YARROW HERB –MILLEFOLII HERBA

Yarrow - *Achillea millefolium* L., Fam. Asteraceae.

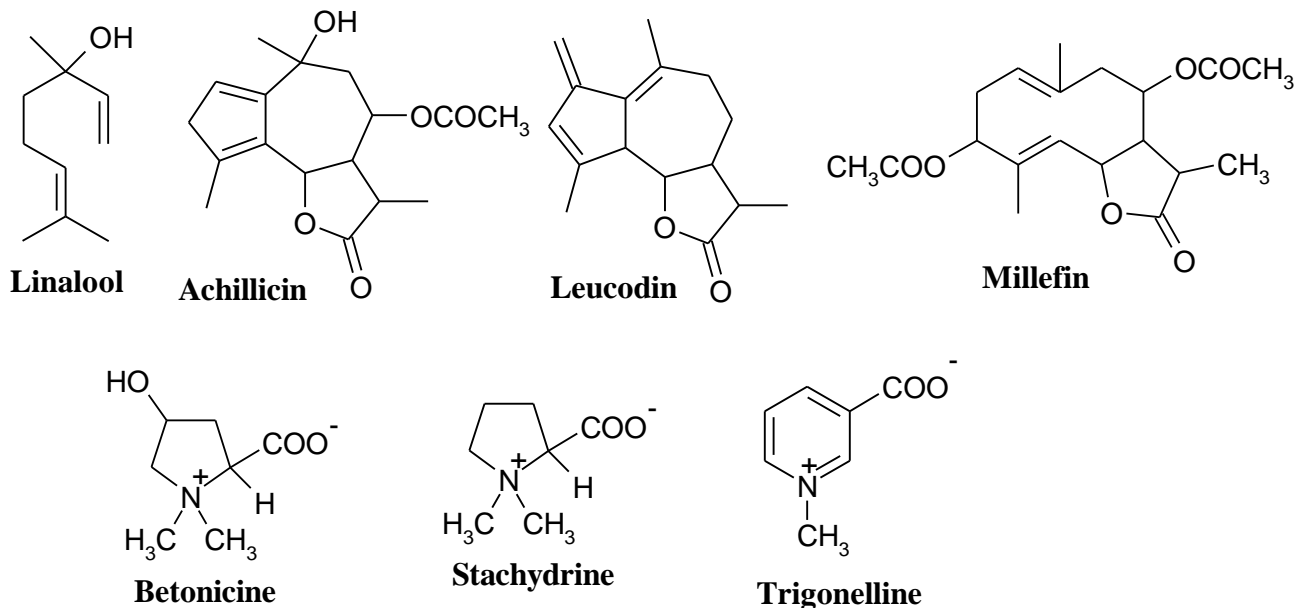
Synonym(s): Milfoil, Millefolium, Gordaldo, Nosebleed Plant, Old Man's Pepper, Devil's Nettle, Soldier's Woundwort, Thousand-Leaf.

Plant. A perennial herb to 70cm in height with a furrowed, grayish hairy stem, branched toward the summit, bearing alternate, multiple pinnate, lanceolate leaves with linear end lobes and nearly flat-topped, compound corymbs of small white flower heads. Each flower head possesses a flat receptacle by an ovoid-cylindrical involucre of imbricated and keeled, oblong, obtuse bracts.

Area of distribution. North America, Europe and Asia.

Description. The elliptical flower-heads are 3mm broad and 5mm long; and outside they have imbricately arranged and scarious – margined involucre bracts; they have 4-5 white or reddish ligulate florets, 3-20 disk (tubular) florets, and many narrow scarious bracts on the domed receptacle. The leaves are several times pinnately divided, so that the lamina consists mainly of thread-like or thin segments. The longitudinally ridged stem has pith and is more or less covered with matted hairs. The odor is characteristically aromatic; the taste bitter, aromatic and astringent.

Constituents. It contains volatile oils. Numerous identified components include borneol, bornyl acetate (trace), camphor, 1,8-cineole, eucalyptol, limonene, sabinene, terpinen-4-ol, terpineol and α -thujone (monoterpenes), caryophyllene (a sesquiterpene), achillicin, achillin, millefin and millefolide (sesquiterpene lactones), azulene and chamazulene (sesquiterpene lactone- derived) and isoartemisia ketone. The azulenes are not present in the fresh herb: they are formed as artefacts during steam distillation of the oil, from unstable precursors called proazulenes (e.g. achillin and achillicin), via equally unstable azulene–carboxylic acid intermediates. Amino acids (e.g. alanine, aspartic acid, glutamic etc.), fatty acids and others including ascorbic acid, caffeic acid, folic acid, salicylic acid and succinic acid. It contains betonicine and stachydrine, betaine and choline (bases) and uncharacterised alkaloids include achiceine, achilleine; flavonoids, predominantly flavone glycosides apigenin and luteolin, tannins condensed and hydrolysable.

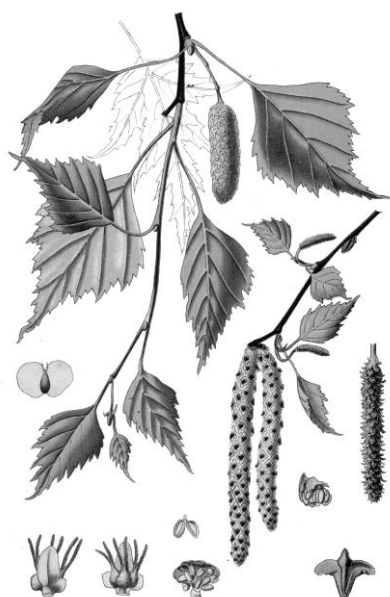


Uses. Yarrow is stated to possess stomachic, carminative and cholagogue, diaphoretic, astringent, diuretic and urinary antiseptic properties. Traditionally, it has been used for bruises, swellings, strains, fevers, common cold, essential hypertension, amenorrhea, dysentery, diarrhea, and specifically for thrombotic conditions. Drug: Rotocanum.

Contraindications: Yarrow may cause an allergic reaction in sensitive individuals, especially those with an existing hypersensitivity to other members of the Asteraceae. Yarrow should not be taken during pregnancy; the volatile oil contains trace amounts (0.3%) of the abortifacient principle thujone.

Drug interactions. None documented.

Pharmacopoeial and Other Monographs: BHC 1992, BHP 1996, BP 2009, Complete German Commission E, Martindale 35th edition, Ph. Eur. 6.4, SPU.



BIRCH LEAF - *BETULAE FOLIUM*

Birch - *Betula pendula* Roth., Fam. Betulaceae.

Synonym(s): *B. verrucosa*.

Plant. An up to 25m high tree with white, silvery trunks when young, turning dark when older; drooping branches.

Area of distribution. Indigenous in temperate Europe. The drug is imported from China, the former USSR, and various eastern European countries.

Description. The leaves of *Betula pendula* are 3-7 cm long and 2-4 cm wide, triangular to rhombic and acuminate, with a doubly serrate margin, glabrous punctate with glands on both surfaces. The upper surface of the leaves is dark green; the lower surface is lighter and on it the pale coloured nerves are particularly prominent. Often, 3-lobed fruit scale and winged fruits can be found among the leaves. Odour is faintly aromatic; taste – somewhat bitter.

Constituents. Up to 3% flavonoids (especially hyperoside, quercitrin, myricetin galactoside, and other kaempferol, myricetin, and quercetin glycosides: in the buds, also lipophilic flavone methyl ethers); further, among other things, up to 0.1 % essential oil, containing sesquiterpenes; catechin and epicatechin, and a range of procyanidins; phenol-carboxylic acids (among them chlorogenic and caffeic acids), resins of unknown composition, triterpenes (dammarane type).

Uses. As a diuretic. It is used in irrigation therapy of the urinary tract against bacterial, inflammatory and cramp-like disorders, e.g. pyelonephritis, cystitis. Whether the phytotherapy on its own is sufficient, or whether combination with chemotherapy is required, depends on the bacterial count as well as the on nature of the infecting bacteria. The diuretic and saluretic actions of the drug, which have been confirmed in animal experiments is doubtless to be ascribed particularly to the flavonoids present; this effect may perhaps be enhanced by volatile oil. The increased diuresis prevents the formation of urinary and renal calculi. In folk medicine, birch is used against arthritis and rheumatism and against loss of hair and skin rashes; it is also included in "spring cures" for "purifying the blood"

Pharmacopoeial and Other Monographs: Ph. Eur. 6.4., BP 2009.



SHOOTS OF LABRADOR TEA - *LEDI PALUSTRIS CORMUS*

Labrador tea - *Ledum palustre* L., Fam. Ericaceae.

Synonym(s): *Rhododendron tomentosum*, Marsh Labrador tea, Northern Labrador tea, wild rosemary.

Plant. Labrador tea is an evergreen, well branched, spreading shrub up to about 1 m in height. The twigs are densely hairy and the buds scaly. The leaves are simple, alternate, entire (not toothed), lanceolate, somewhat narrowly elliptic to oblong, 1.5 to 5 cm long, about 0.7 to 2 cm wide, thick, leathery and evergreen with rolled margins, dark green above, densely off-white to rusty hairy beneath,

and fragrant when crushed

Area of distribution. Labrador tea is an evergreen, well branched, spreading shrub up to about 1 m in height. The twigs are densely hairy and the buds scaly. The leaves are simple, alternate, entire (not toothed), lanceolate, somewhat narrowly elliptic to oblong, 1.5 to 5 cm long, about

0.7 to 2 cm wide, thick, leathery and evergreen with rolled margins, dark green above, densely off-white to rusty hairy beneath, and fragrant when crushed

Description. The raw material consists of shoots, leaves and fruits. Leaves are alternate, short-petiolate, leather-like; linear-oblong or oblong-elliptical in shape, entire; their margins are curved inwardly. The upper side of leaves is dark-green or brownish-green, shining; the lower ones are covered with rust-tomentose pubescence. The odor is sharp, specific. The plant is poison, the taste is not determined.

Constituents. Labrador tea contains volatile oil. Volatile oil consists of sesquiterpenes: ledol, palustrol. Shoots also contain arbutin, tannins, flavonoids and vitamins

Uses. Labrador tea is used as expectorant and antiseptic. It also possesses antimicrobial, diuretic action.



ARNICA FLOWER - *ARNICAE FLORES*

Arnica - *Arnica montana* L., Fam. Asteraceae.

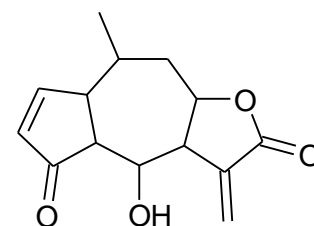
Synonym(s): Leopard's Bane, Mountain Tobacco, Wolf's Bane.

Plant. A 20- 30 cm tall perennial herb with opposite leaves. 1 -3 (rarely 5) flower-heads, one terminal, the others arising from the axils of the leaves. Receptacles are 5-8cm broad, with 15-25 ligulate florets.

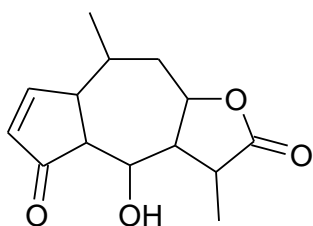
Area of distribution. It is collected from wild population in Spain and in some of the Balkan States.

Description. The drug consists of the dried, whole, but mostly fallen, flower-heads (capitula) or of individual ligulate and tubular florets. The grayish-white, bristly pappus hairs which form a wreath at the upper end of the long, slender, brown ovary (the later achenes), the ligulate and tubular florets are characteristic. The disk of the receptacle bears marginal yellow, ligulate florets surrounded by the pappus, and numerous less conspicuous, tubular florets. Odor is faintly, aromatic; taste – slightly bitter, somewhat pungent and spicy.

Constituents. It contains volatile oils up to 1%, normally about 0.3%, including sesquiterpene lactones of the pseudoguaianolidetype, 0.2–0.8%, helenalin, 11a,13-dihydrohelenalin and their esters with acetic, isobutyric, methacrylic, tiglic and other, carboxylic acids., diterpenes including z-labda-13-ene-8a,15-diol.



Helenalin



11,13-Dihydrohelenalin

Other constituents: amino acid (2-pyrrolidine acetic), bitter principle (arnicin), caffeic acid, carotenoids, fatty acids, phytosterols, polyacetylenes, resin, tannin (unspecified); amines: betaine, choline and trimethylamine; mucilage, inulin; coumarins: Scopoletin and umbelliferone; flavonoids: hispidulin, isorhamnetin, kaempferol, laciniatin, luteolin, patuletin, quercetin.

Uses. Arnica is stated to possess topical counter-irritant properties. It has been used for unbroken chilblains, alopecia neurotica, insect bites, gingivitis, aphthous ulcers, rheumatoid complaints and specifically for sprains and bruises. German Commission E approved external use for injuries and consequences of accidents, e.g. haematoma, dislocation, contusions, oedema due to fracture, rheumatoid muscle and joint pains, inflammation of oral and throat region, furunculosis, inflammation caused by insect bites and superficial phlebitis. Arnica is mainly used in homeopathic preparations; it is used to a lesser extent in herbal products. Drug: Ointments, creams, gels, compresses made with 5–25% v/v tinctures, 5–25% v/v fluid extracts

Contraindications: Arnica should not be taken internally except in suitable homeopathic dilutions.

Side Effects: Arnica is poisonous if taken internally. It is irritant to mucous membranes and ingestion may result in fatal gastroenteritis, muscle paralysis (voluntary and cardiac), increase or decrease in pulse rate, palpitation of the heart, shortness of breath, and may even lead to death. Helenalin is stated to be the toxic principle responsible for these effects. Thirty millilitres of a 20% arnica tincture, taken by mouth, was reported to produce serious, but not fatal, symptoms. The topical application of arnica has been documented to cause dermatitis. Arnica is a strong sensitiser, with the sesquiterpene lactone constituents implicated as the contact allergens: they possess an α -methylene group exocyclic to a γ -lactone ring, which is recognised as an immunological prerequisite for contact allergy. Helenalin is also reported to possess cytotoxic activity and this has been attributed to its ability to alkylate with sulfhydryl groups.

Pharmacopoeial and Other Monographs: BHP 1996, BP 2009, ESCOP 1997, Martindale 35th edition, Ph. Eur. 6.4.