

**Medicinal plants and  
medicinal plant materials  
containing volatile oils**  
*(Bicyclic monoterpenes and  
sesquiterpenes)*

**Rhizoma cum radicibus Valerianae –  
Rhizomata cum radicibus Valerianae  
Valerian, Cat's Valerian - *Valeriana officinalis*  
Family - *Valerianaceae***

*Bicyclic monoterpenes*

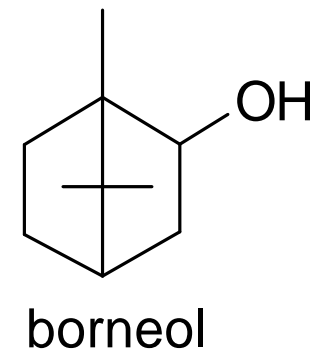
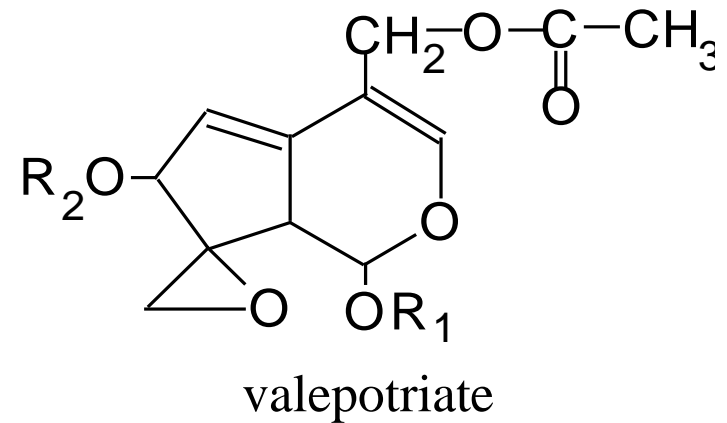


A tall perennial herb whose underground portion consists of a vertical rhizome bearing numerous rootlets and one or more stolons. The aerial portion consists of a cylindrical, hollow, channeled stem, branched in the terminal region, bearing opposite exstipulate, pinnatisect, cauline leaves with clasping petioles. The inflorescences consist of racemes of cymes whose flowers are small, white or pink. The fruits are oblong-ovate, 4-ridged. 1-seeded akenes.

The rhizome is obconical to cylindrical, up to 50 mm long and up to 30 mm in diameter; the base is elongated or compressed, usually entirely covered by numerous roots. The apex usually exhibits a cup-shaped scar from the aerial parts; stem bases are rarely present. In longitudinal section, the pith exhibits a central cavity transversed by septa. The roots are numerous, almost cylindrical, of the same colour as the rhizome, 1 mm to 3 mm in diameter and sometimes more than 100 mm long. A few filiform fragile secondary roots are present. The fracture is short. The stolons show prominent nodes separated by longitudinally striated internodes, each 20 mm to 50 mm long, with a fibrous fracture. The odor is characteristically valeric acid like, becoming stronger on ageing. The taste sweetish, camphoraceous and somewhat bitter. © CNC Department, NUPh, 14.10.2015

## *Chemical composition*

- **Volatile oil (up to 2%):** bornlisovalerianate, bornyl formiate, bornyl acetate and bornyl hutyrale, camphene, borneol and pinene;
- **alkoloids:** chalinine and valerianine,
- **iridoids-valepatriats:** valtrate, isovaltrate, acevaltrate,
- **phenolic acids:** caffeic acid, chlorogenic acid,
- **flavonoids**



## *Uses*

*Infusion, liquid extract, extract in tablets, tincture, Cardiophit, Valocormid, Cardiovalen, drops* - sedative, spasmolytic, analgesic, stomachic medicine.

# Fruits Juniper, Juniper berries, Horse Savin Berries -

## *Fructus Juniperi*

### Juniper - *Juniperus communis*

### Family - *Cupressaceae*

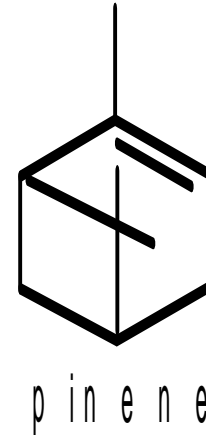
*Juniperus communis* is a low evergreen tree or erect shrub, sometimes attaining a height of 9 m., having thin, straight, long, acerose leaves, white glaucous on the lower surface, arranged in whorls of 3, and dioecious flowers. The carpellate cones are ovoid and consist of 3 fleshy scales, each one-ovuled. The fruit is a subglobose galbulus 5 to 8 mm. in diameter, which contains 3 seeds. The variety *depressa* Pursh or Low Juniper is a decumbent or depressed shrub usually up to about 3 ft. high, forming circular mats. Its leaves have a white stripe beneath and its fruit is a blue galbulus up to 10 mm. in diameter.



Subglobular, 5 to 10 mm. in diameter, externally smooth, shining, purplish black, occasionally reddish brown or sometimes, usually covered with a blue-grey bloom; at the summit a 3-rayed furrow marks the cohesion of the three fleshy bracts forming the pericarp; internally exhibiting a yellowish brown to dusky yellow flesh containing many large schizogenous cavities; seeds usually 3, triangular ovate, hard, brown, on the surface of which are large uneven oil glands; odour aromatic upon crushing; taste sweet, pleasant, terebithinate, slightly bitter.

## *Chemical composition*

- **Volatile oil (до 2,5%)**:  $\alpha$ -pinene, camphene, sabinene, isoborneol, terpinene, phellandrene, limonene, cadinene, bornylacetate;
- **sugars (upper 40%)**
- **pectins**
- **gums,**
- **organic acids**
- **flavonoids**
- **tannins**



## *Uses*

**Volatile oil, infusion** - diuretic, disinfect, choleric, expectorant.

**Fruits** - expectorant for diseases of upper airways.

**Camphor** is a ketone obtained from *Cinnamomum camphora* (natural camphor)

Camphor is a strong-smelling white substance used in various medicines. It is prepared from the wood by distillation in steam.

**Camphor tree wood- *Lignum***

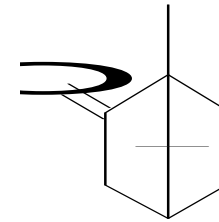
***Cinnamomi***

**Camphor tree- *Cinnamomum camphora***

**Fam. – *Lauraceae***

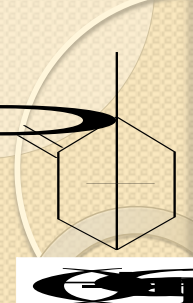
The plant is a large evergreen tree indigenous to eastern Asia but naturalized in the Mediterranean region, Sri Lanka, Egypt, South Africa, Brazil, Jamaica, Florida, and California. From 1900 until World War II, about 80% of the world's supply of natural camphor (about 4 million kg per year) was produced in Taiwan, where the tree occurs naturally in abundance and is also extensively cultivated.

**Bicyclic monoterpenes**



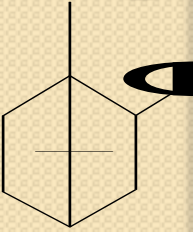
**(+)-Camphor**



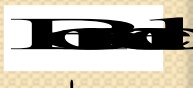


Natural camphor occurs as a crystalline product in clefts in the woody stems and roots and, to a greater extent, dissolved in the volatile oil. The wood is chipped and distilled with steam, and 1 lb (453,6g) of crude camphor is obtained from 20 to 40 lb of chips. The crude camphor is then freed of oil by centrifugation and pressing and finally re-sublimed and pressed into the familiar cakes.

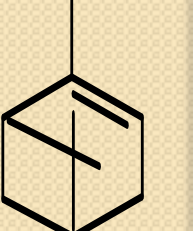
The specific rotation of natural camphor is between  $+41^{\circ}$  and  $+43^{\circ}$ .



Semisynthetic camphor ((-)-isomer) is made from borneol, obtained from fir tree.



Synthetic camphor is made from pinene, the principal constituent of turpentine oil. Synthetic camphor is the optically inactive **racemic** form.



A number of complex methods have been used for producing synthetic camphor, but all are based on (1) converting pinene into bornyl esters, which are (2) hydrolyzed to isoborneol, and (3) finally oxidized to camphor.

## USES

**Camphor** (natural camphor only) **oil solution for injection** – analeptic,

**Camphor is a topical antipruritic, rubefacient, and anti-infective**

**employed at 1 to 3% in preparations for use on the skin.**

## Source of semisynthetic camphor

**Fir twig- *Summitates Abietis***

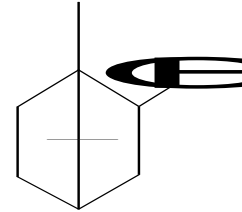
**Fir tree - *Abies sibirica***

**Fam. – *Pinaceae***

Fir tree is an evergreen coniferous tree with upright cones and flat needle-shaped leaves, typically arranged in two rows. Firs are an important source of timber and resins.

### Act const.

✿ essential oil (2,5-3%):  
borneolacetate, borneol, camphen,  
 $\alpha$ -,  $\beta$ -pinene,  
✿ resins



borneol



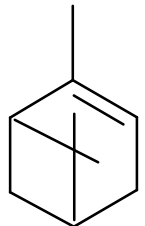
## Source of synthetic camphor

**Pine tree - *Pinus sylvestris***

**Fam. *Pinaceae***

### Act const.

$\alpha$ -pinene,  $\beta$ -pinene,



$\alpha$ -pinene



# **Calamus rhizome –Rhizomata Calami**

## **Calamus (sweet flag ) - Acorus calamus**

### **Fam. - Araceae**

Sweet Flag Root, 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. Calamus originated in India, Central Asia, and Eastern Europe but now grows all over the world.

Rhizome horizontal; up to 22 cm long and up to 2 cm thick; very pale orange to weak yellowish-orange to pinkish-brown or pinkish-white, the upper surface longitudinally furrowed, lower surface with circular, pitted scars of rootlets arranged in irregular, zigzag lines; fracture short, sharp and corky; inner surface whitish or pinkish-white and spongy, showing an elliptical endodermis separating the outer cortex from the central cylinder, both of these regions exhibiting yellowish dots; odor aromatic; taste pungent and bitter.

Аир болотный



## Active const.

**Volatile oil** 1.5–3.5%.  $\beta$ -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, isoacolamone.

### **Tannin**

1.5%.

### **Other constituents**

Bitter principles (e.g. acorin), acoric and palmitic acids, resin (2.5%), mucilage, starch (25–40%), sugars, dimethylamine, methylamine, trimethylamine and choline.

## Uses

- Calamus is a carminative, spasmolytic and diaphoretic. Traditionally it has been indicated for acute and chronic dyspepsia, gastritis and gastric ulcer, intestinal colic and anorexia.
- The toxicity of calamus oil has been associated with the  $\beta$ -asarone content. It has therefore been advised that only roots free from, or with a low content of  $\beta$ -asarone should be used in human phytotherapy.
- **Phyto medicine: Olimetine, Vicalin, Vicair**

# Elecampane Rhizome, Root - *Rhizomata et radices Inulae*

## Elecampane - *Inula helenium*

### Fam. - *Asteraceae*

#### Synonym(s)

*Alant, Horseheal, Inula, Scabwort, Yellow Starwort,*

#### Pharmacopoeial and Other Monographs

BHC 1992, BHP 1996; Martindale 35th edition

The mixture of elecampane alantolactones has been referred to as helenin. Alantolactone is also known as elecampane camphor,

Rhizome fusiform, when entire, branching, usually cut into longitudinal pieces, to which may be attached one or more roots; externally grayish-brown to dark-brown, longitudinally wrinkled, with occasional buds or stem scars; inner or cut surface somewhat concave, yellowish-brown to grayish-brown, longitudinally striate and more or less fibrous near the cambium zone; fracture short; inner surface light brown and showing circular or elliptical markings; roots cylindrical frequently twisted, up to 15 cm. in length and 1.6 cm. in diameter; odor aromatic; taste aromatic, then acrid and pungent.



# Act const

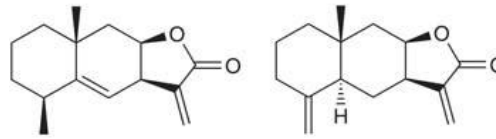
**Carbohydrates** Inulin (up to 44%), mucilage.

**Terpenoids** b- and g-sitosterols, stigmasterol and damaradienol (sterols), friedelin.

**Volatile oils** 1–4%. Mainly contains sesquiterpene lactones including alantolactone, isoalantolactone and dihydroalantolactone (eudesmanolides), alantic acid.

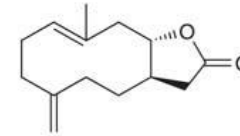
**Other constituents** Resin.

## Sesquiterpenes



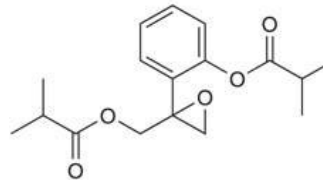
alantolactone

isoalantolactone



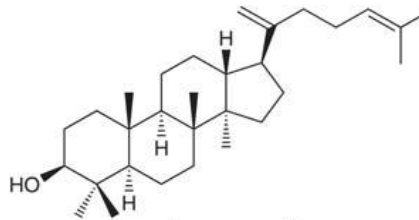
germacrene-D-lactone

## Monoterpenes



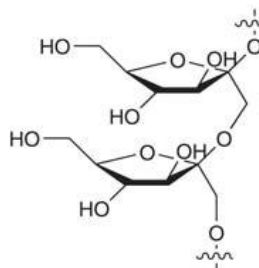
8,9-epoxy-10-isobutyryloxy-thymol isobutyrate

## Triterpenes



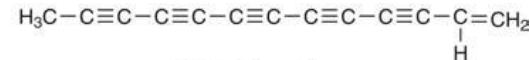
dammaranediol

## Polysaccharide



inulin  
(30-35 D-fructose residues)

## Polyacetylene



C-13 polyacetylene

## Uses

Elecampane is stated to possess expectorant, antitussive, diaphoretic and bactericidal properties.

Traditionally, it has been used for bronchial/tracheal catarrh, cough associated with pulmonary tuberculosis and dry irritating cough in children.

Alantolactone has been used as an anthelmintic in the treatment of roundworm, threadworm, hookworm and whipworm Infection.

### **Phyto medicine:**

**Alanton** – as antihy-inflammatory, **Pectosol** – as mucolytic.

German chamomile flowerhead - *Flores Chamomillae*  
 German chamomile - *Chamomilla recutita* (*Matricaria*  
*recutita*, *M. chamomilla*)

**Fam. - Asteraceae**

BHC 1992, BHP 1996, BP 2007 (Matricaria Flower),  
 Complete German Commission E, ESCOP 2003,  
 Martindale 35th edition, Ph Eur 2007 (Matricaria  
 Flower), USP29/NF24, WHO volume 1 1999



**Matricaria flower** consists of the dried-flower heads.  
German chamomile is an annual herbaceous plant about 40 cm in height. Stems are solitary, ribbed-grooved, and naked. Leaves are alternate, sessile. Flowers are numerous, gathered in heads. Marginal florets are ligulate, white, inner ones are tubular, yellow. The fruit is an achene. The bracts of the involucre are obovate to lanceolate, with a brownish-grey scarious margin. The receptacle is essentially conical and hollow. The base of the corolla of ligulate florets consists of a yellow tube extending to an elongated-oval, white ligule.



The corolla of tubular florets is yellow and broadens at the apex, where it splits into five teeth; its base is yellowish-brown to brown. The odor is strong, aromatic; the taste is bitterish-spicy, slightly mucilage-like.

**Coumarins** Umbelliferone and its methyl ether, heniarin.

**Flavonoids** Apigenin, apigetrin, apiin, luteolin, quercetin, quercimeritrin and rutin.

**Volatile oils** 0.24–1.9%. Pharmacopoeial standard not less than 4 mg/kg **blue oil**.

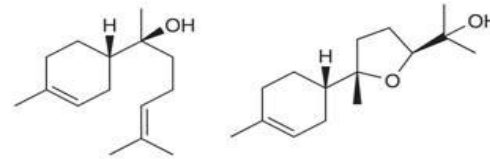
Main components are  $\alpha$ -bisabolol (up to 50%) and **chamazulene** (1–15%). Others include  $\alpha$ -bisabolol oxide A and B,  $\alpha$ -bisabolone oxide A, sesquiterpenes, cadinene, farnesene, furfural, spathulenol and proazulenes (e.g. matricarin and matricin).

**Chamazulene is formed from matricin during steam distillation of the oil.**

It varies in yield depending on the origin and age of the flowers.

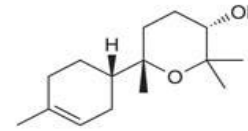
**Other constituents** Amino acids, anthemic acid (bitter), choline, polysaccharide, plant and fatty acids, tannin and triterpene hydrocarbons.

Sesquiterpenes

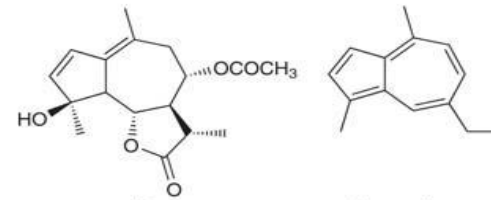


(-)- $\alpha$ -bisabolol

(-)- $\alpha$ -bisabolol oxide B

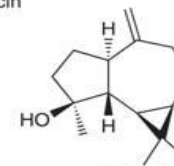


(-)- $\alpha$ -bisabolol oxide A



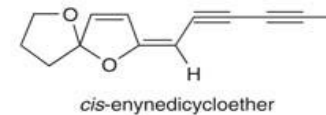
matricin

chamazulene

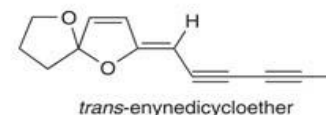


spathulenol

Acetylenes

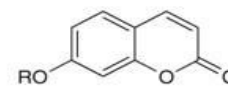


cis-enynedicycloether



trans-enynedicycloether

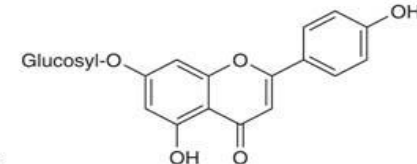
Coumarins



umbelliferone

umbelliferone methyl ether

Flavonoids



apigenin-7-glucoside

German chamomile is stated to possess carminative, antispasmodic, mild sedative, anti-inflammatory, antiseptic and anticatarrhal properties. It has been used for flatulent nervous dyspepsia, travel sickness, nasal catarrh, nervous diarrhoea, restlessness and specifically for gastrointestinal disturbance with associated nervous irritability in children. It has been used topically for haemorrhoids, mastitis and leg ulcers. German Commission E approved use for gastrointestinal spasms and inflammatory diseases of the gastrointestinal tract and externally for skin and mucous membrane inflammation and bacterial skin diseases including oral cavity and gums. It is also approved for inflammations and irritations of the respiratory tract (by inhalation) and ano-genital inflammation (baths and irrigation).

*Phyto medicine: Recutan, Romasulan, Alorom.*

### **Side effect**

In view of the documented allergic reactions and crosssensitivities, German chamomile should be avoided by individuals with a known hypersensitivity to any members of the Asteraceae family.



## Flowerhead Chamomile Roman

*Chamaemelum nobile* (L.) All.

Fam. *Asteraceae*

### Pharmacopoeial and Other Monographs

BHC 1992, BHP 1996, BP 2007, Martindale 35th edition, Ph Eur 2007, USP29/NF24.

The chemistry of Roman chamomile, particularly of the volatile oil, is well documented and is similar to that of German chamomile. Limited pharmacological data are available for Roman chamomile, although many actions have been reported for German chamomile. In view of the similar chemical compositions, many of the activities described for

German chamomile are thought to be applicable to Roman chamomile and thus support the traditional herbal uses.

However, rigorous clinical research assessing the efficacy and safety of preparations of Roman chamomile is required. Roman chamomile is stated to be of low toxicity, although allergic reactions (mainly contact dermatitis) have been reported.



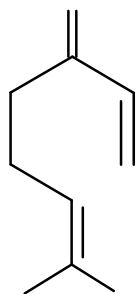
**Wild marigold flowerhead- *Flores Chamomillae discoideae***

**Wild marigold - *Chamomilla discoidea* (*Matricaria matricarioides*, *M. suaveolens*)**

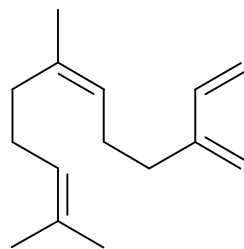
**Fam. - *Asteraceae***

***Active const***

- ✿ **volatile oil (up to 0,8%):**  $\beta$ -farnesene,  $\beta$ -mircene, geraniol,
- ✿ **flavonoids:** quercetin, luteolin, cinaroside,
- ✿ **coumarins:** gerniarin, umbelliferone,
- ✿ **salicylic acid**



$\beta$ -Мирцен



$\beta$ -Фарнезен



**Uses**

***Externally***

**Infusion - antyinflammatory, anthyspasmodic.**

## **Absinthium herb - *Herba Ahsinthii***

**Wormwood, Absinth, Maderwort, Mugwort, Mingwort -**

***Artemisia absinthinm* L.**

**Family – Asteraceae**

**Habitat.** 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.

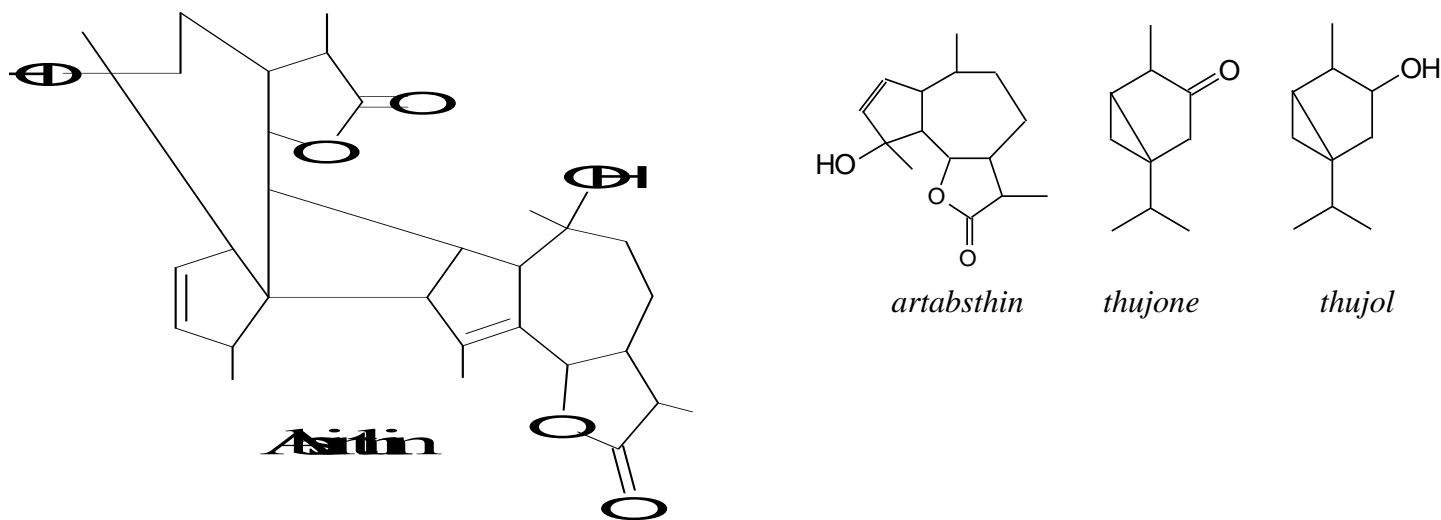
**Description.** Stems and leaves gray-green, silky hairy and glandular throughout; the largest leaves 10 to 12 cm. in length and of almost equal breadth, 2- to 3-pinnately lobed or divided, the ultimate segments oblong or obovate, obtuse, entire or slightly toothed; upper leaves becoming gradually shorter 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, globose-ovoid, with a hemispherical involucre fragments of mesophyll.



## Chemical constituents

*Volatile oil.*

The bitter glycoside – is sesquiterpenoid lactone *absinthin* and also *artabsthin*, *matricin*, 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.

**Yarrow herb- *Herba Millefolii***

**Yarrow flos- *Flores Millefolii***

**Yarrow- *Achillea millefolium***

**Fam. - *Asteraceae***

**Habitat.** North America, Europe and Asia.

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 ray (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.



**Anatomical characteristics.** Upper and lower epidermis of slightly wavy-walled, epidermal cells with wrinkled cuticle. Both epidermises have stomata. Hairs are long with 4-6 short cells and very long terminal cell. Oil-glands have 8 cells arranged in 2 layers.

**Volatile oils** Numerous identified components include borneol, bornyl acetate (trace), camphor, 1,8-cineole, eucalyptol, limonene, sabinene, terpinen-4-ol, terpineol and  $\alpha$ -thujone (monoterpenes), caryophyllene (a sesquiterpene), achillicin, achillin, millefin and millefolide (sesquiterpene lactones), azulene and chamazulene (sesquiterpene lactone- derived) and isoartemisia ketone. Azulene has been reported as the major component.

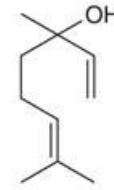
**Acids** Amino acids, fatty acids (e.g. linoleic, myristic, oleic, palmitic), and others including ascorbic acid, caffeic acid, folic acid, salicylic acid and succinic acid.

**Alkaloids** Betonicine and stachydrine (pyrrolidine), trigonelline (pyridine), betaine and choline (bases).

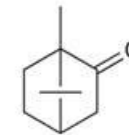
Uncharacterised alkaloids include achiceine, **Flavonoids** Predominantly flavone glycosides apigenin- and luteolin-7-glycosides.

**Tannins** Condensed and hydrolysable.

#### Monoterpenes

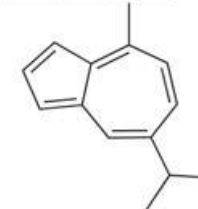


linalool

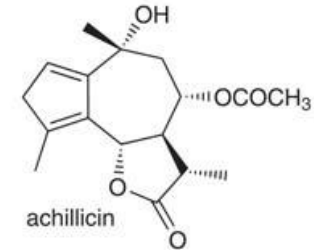


camphor

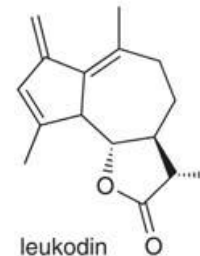
#### Sesquiterpenes



chamazulene



achillicin

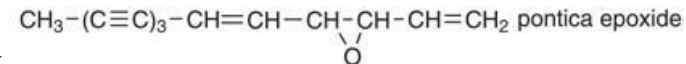


leukodin

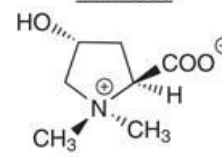


millefin

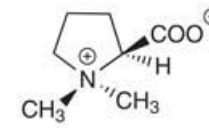
#### Acetylenes



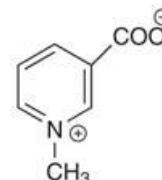
#### Alkaloids



betonicine



stachydrine



trigonelline

## Uses

Yarrow is stated to possess diaphoretic, antipyretic, hypotensive, astringent, diuretic and urinary antiseptic properties. Traditionally, it has been used for bruises, swellings, strains, fevers, common cold, essential hypertension, amenorrhoea, dysentery, diarrhoea, and specifically for thrombotic conditions with hypertension, including cerebral and coronary thromboses.

## Side effect

Allergic reactions to yarrow (e.g. dermatitis) have been documented, and positive patch tests have been produced in individuals sensitised to other plants.



## **Arnicae Flos - Flores Arnicae**

***Arnica montana* L, *Arnica chamissonis* Less. subsp. *foliosa***

**Fam. Asteraceae**

**BHP 1996, BP 2007, ESCOP 1997, Martindale 35th edition, Ph Eur 2007**

### **Act. Constituents**

**Terpenoids** Sesquiterpene lactones of the pseudoguaianolid type not less than 0.4%. Helenalin, 11a,13-dihydrohelenalin and their esters. Diterpenes.

**Alkaloids** Traces of non-toxic alkaloids tussilagine and isotussilagine but these are reportedly artefacts produced during Extraction.

**Amines** Betaine, choline and trimethylamine.

**Carbohydrates** Mucilage, polysaccharides including inulin.

**Coumarins** Scopoletin and umbelliferone.

**Flavonoids** Betuletol, eupafolin, hispidulin, isorhamnetin, kaempferol, luteolin, quercetin.

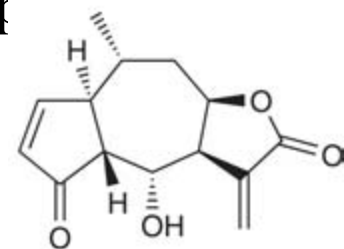
**Volatile oils** Up to 1%, normally about 0.3%. Thymol and thymol derivatives.

**Other constituents** Bitter principle (arnicin), caffeic acid, carotenoids, fatty acids, phytosterols, polyacetylenes, resin, tannin (unspecified).

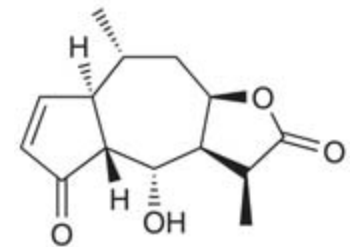


Arnica montana  
Sertürzer Photo CD

#### Sesquiterpene lactones



helenalin



11,13-dihydrohelenalin



## Uses

Arnica is stated to possess topical 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.

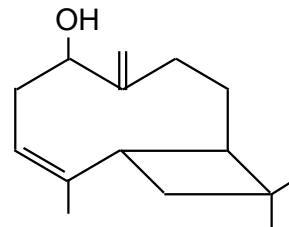
## Side effect

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.

**Birch leaf, bud - *Gemmae Betulae, Folia Betulae***  
**Birch - *Betula verrucosa; Betula pubescens***  
**Fam. - *Betulaceae***

**Active const**

- ✿ **volatile oil (5-8%):**  
betulen, cariofillen,  
betulenol,
- ✿ **resins,**
- ✿ **sugar,**
- ✿ **flavonoids:** apigenine,  
kempferol,
- ✿ **tannins,**
- ✿ **saponines,**
- ✿ **vitamin:** C, niacin



$\alpha$ -Betulenol



**Uses**

**Tincture, infusion** - diuretic, holagogue, antiinflammatory,

**Ginger root- *Rhizomata Zingiberis*****Ginger - *Zingiber officinale*****Fam. - *Zingiberaceae*****Carbohydrates**

Starch (major constituent, up to 50%).

**Lipids** 6–8%.

**Oleo–resin** Gingerol homologues (major, about 33%)

**Volatile oils** 1–3%. Complex, predominately hydrocarbons.  $\beta$ -Bisabolene and zingiberene (major); other sesquiterpenes include zingiberol, zingiberenol, *ar*-curcumene,  $\beta$ -sesquiphellandrene,  $\beta$ -sesquiphellandrol (*cis* and *trans*); numerous monoterpene hydrocarbons, alcohols and aldehydes (e.g. phellandrene, camphene, geraniol, neral, linalool, *d*-nerol).

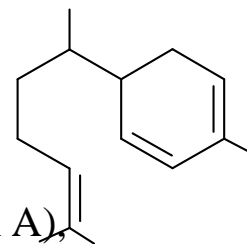
**Amino acids**,

**protein** (about 9%),

**diterpenes** (galanolactone),

**vitamins** (especially nicotinic acid, vitamin A),

**minerals**.



Зингиберен  
**zingiberene**

**Uses**

Ginger is stated to possess carminative, diaphoretic and antispasmodic properties. Traditionally, it has been used for colic, dyspepsia. Modern interest in ginger is focused on its use in the prevention of nausea and vomiting, particularly motion (travel) sickness, as a digestive aid, and as an adjunctive treatment for inflammatory conditions, such as osteoarthritis and rheumatoid arthritis.

## Shoots of Labrador tea - *Cormus Ledi palustris*

## Labrador tea - *Ledum palustre* L.

### Fam - *Ericaceae*

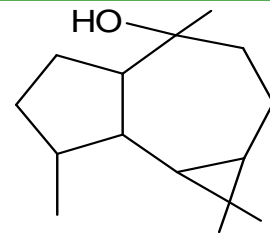
**Habitat. Collection.** Labrador tea is widely distributed in Russia, North Mongolia, North-eastern China, Korea, North America. The shoots of Labrador tea are collected in autumn in the phase of fruit-bearing and dried at a temperature below 40°C.

**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.

### Act. 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. © CNC Department, NUPh, 14.10.2015



Ледол