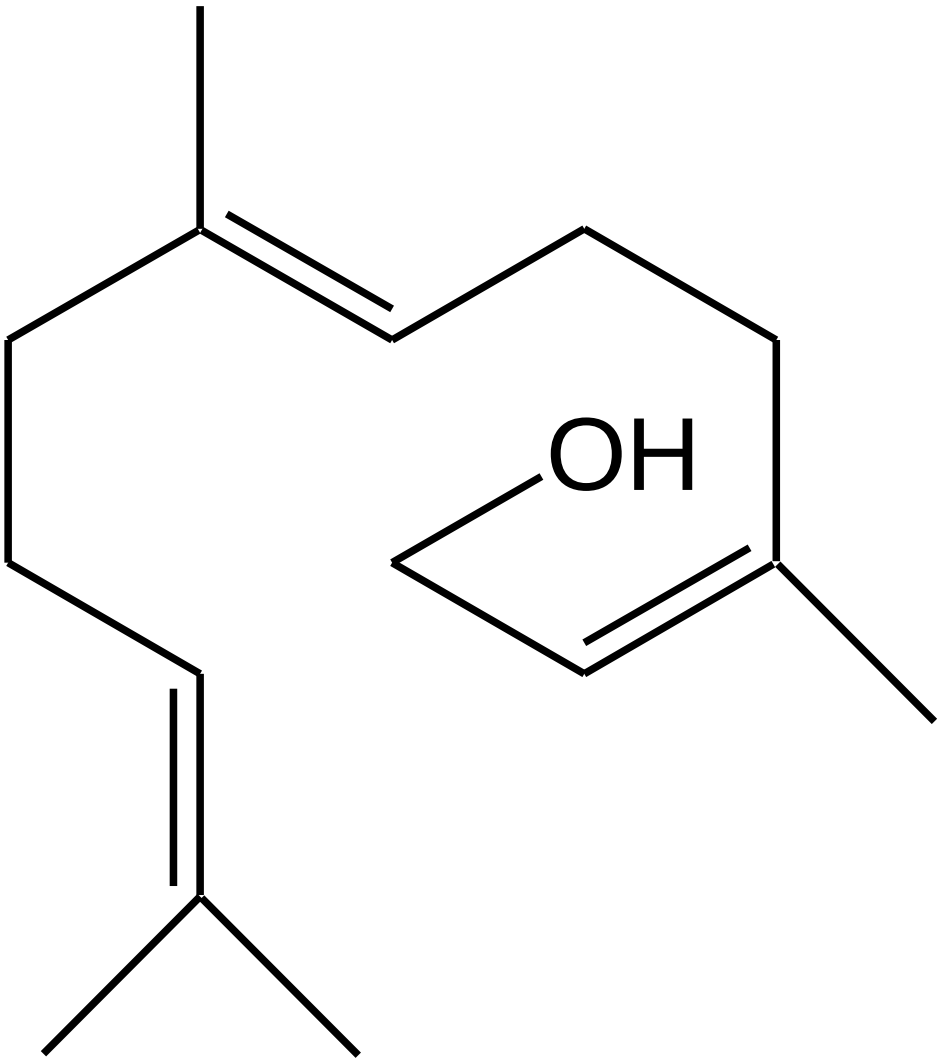
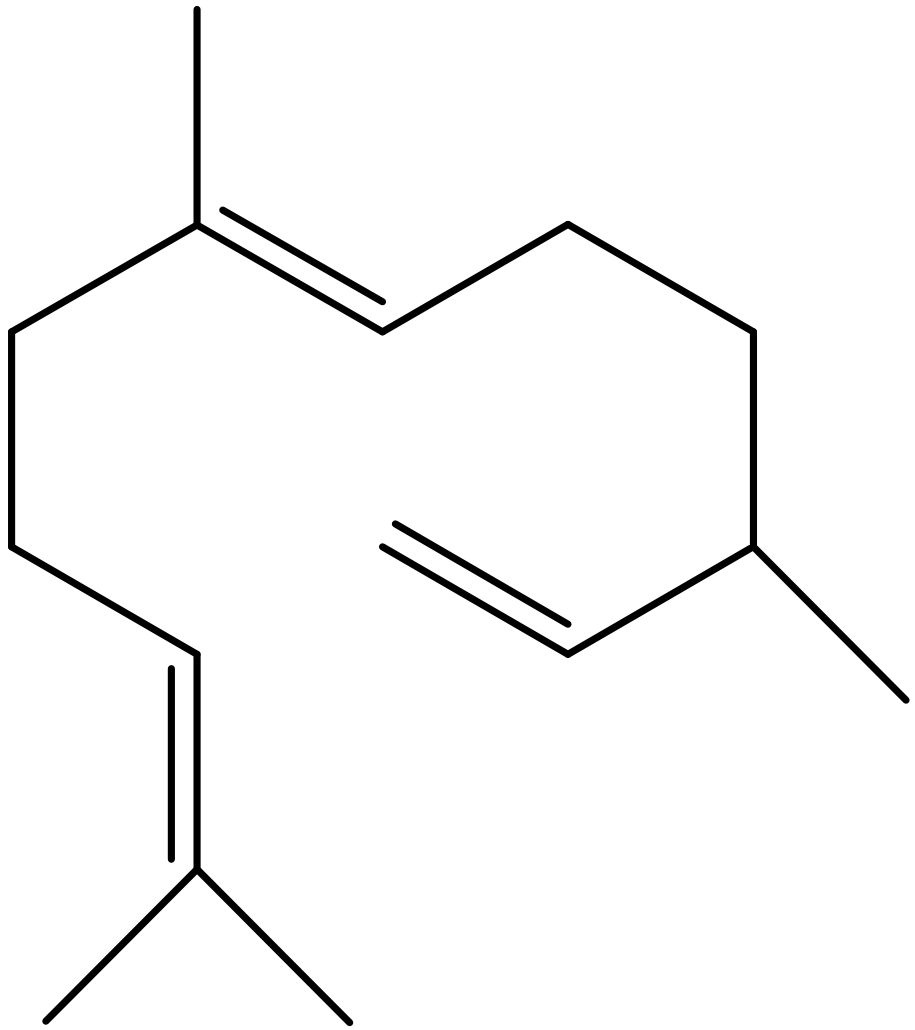
Sesquiterpenes

Sesquiterpenes, compounds that contain 15 carbon atoms(C15).

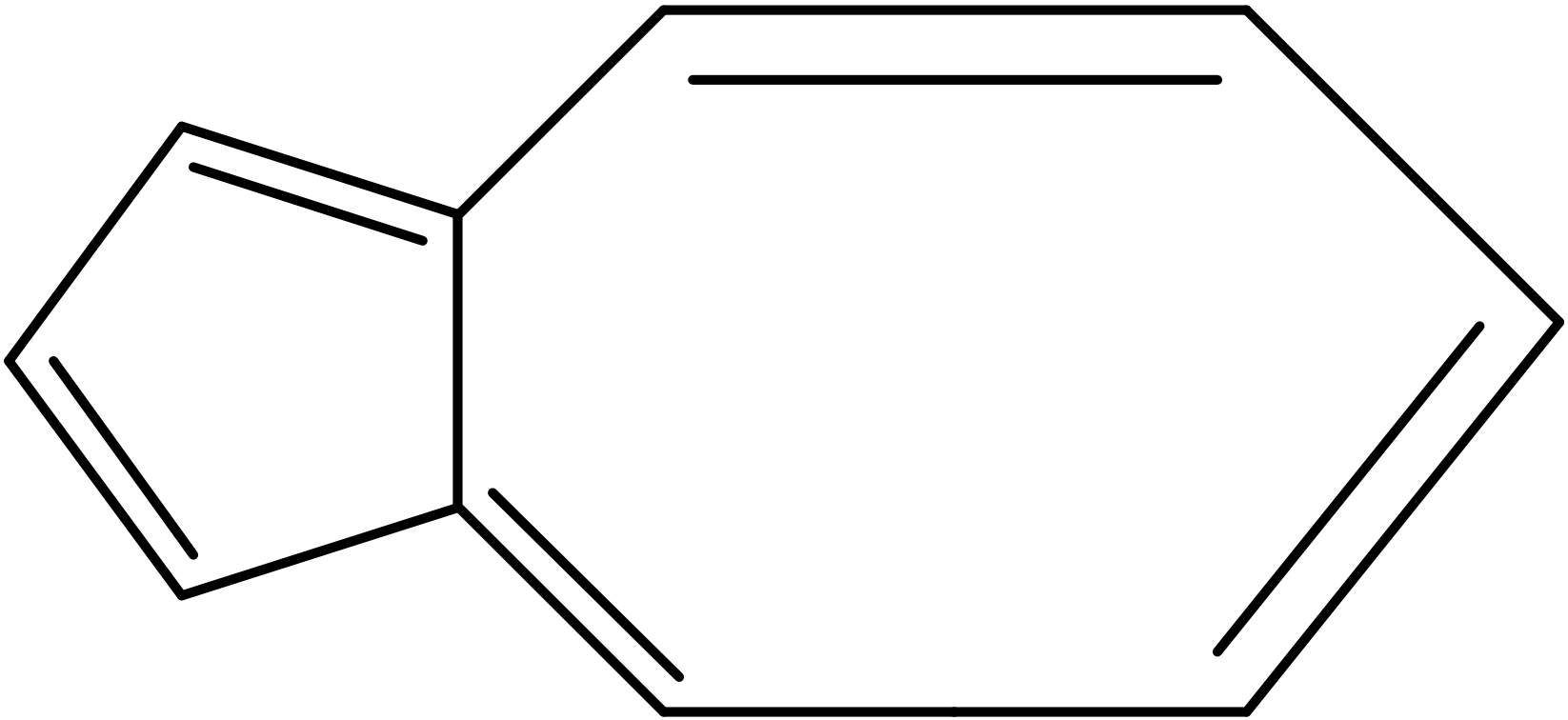
Sesquiterpenes are acyclic, monocyclic and bicyclic. Sesqui-terpenoids are sometimes grouped into bicyclic terpenoids that contain cycles with more than six carbon atoms. They are also called the azulene sesquiterpenoid group.



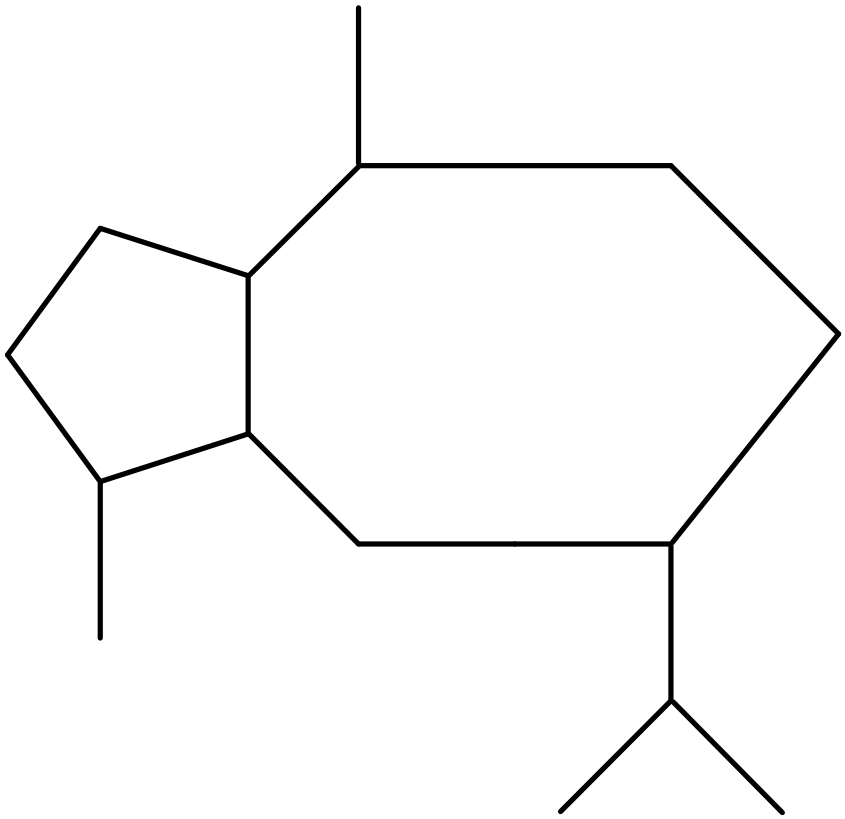
Farnesol



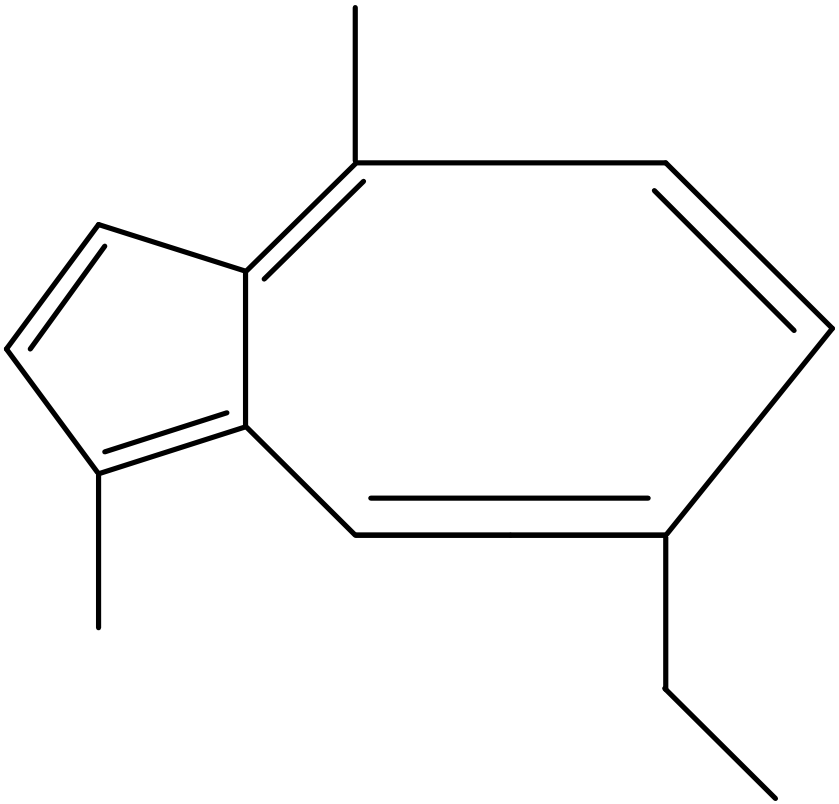
Farnesen



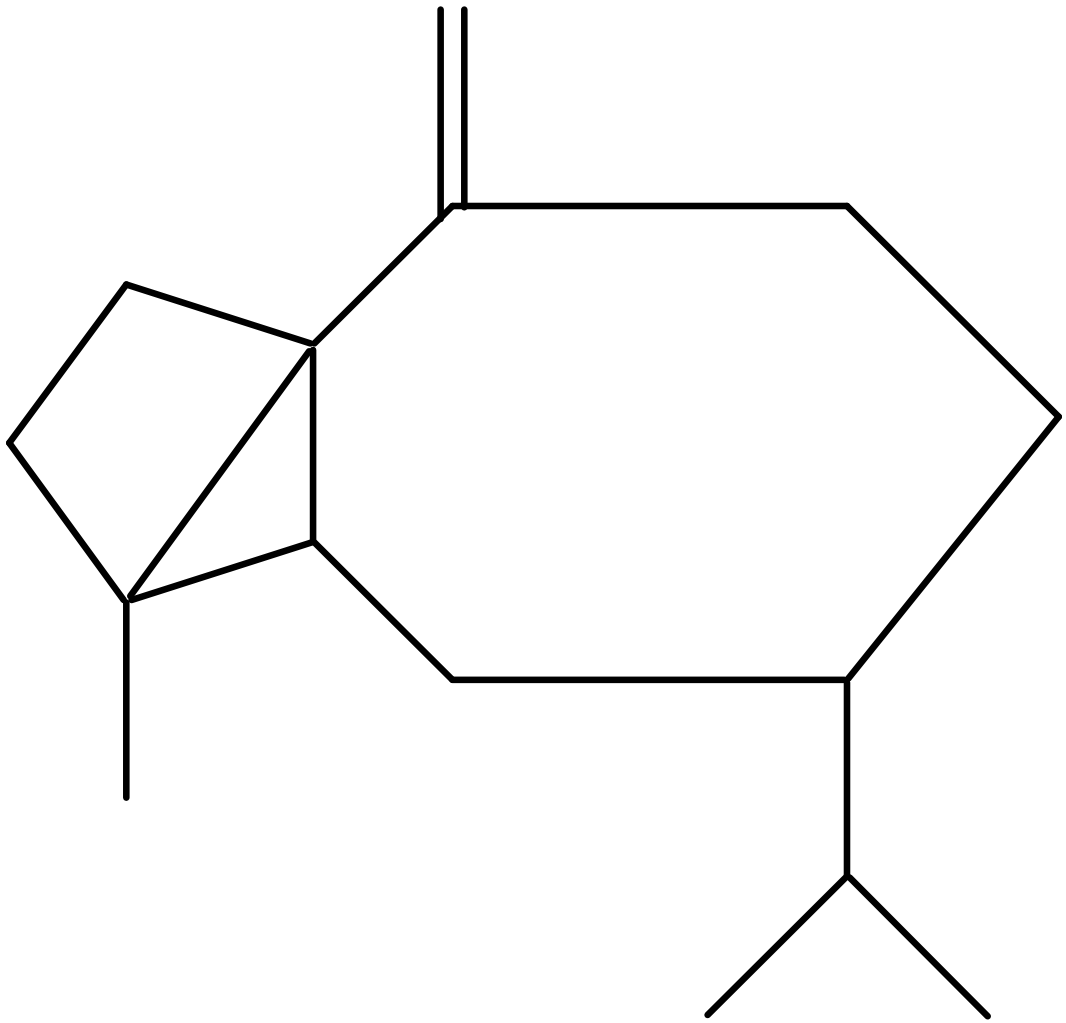
The structure of azulene



Gwaiyan



Hamazulene



Aromadendrene

Sesquiterpenoids are not only part of essential oils but also of a group of biologically active substances called bitters. Bitters have a varied chemical composition, with diterpenoids and triterpenoids in addition to sesquiterpenes. Chemically, a number of bitters are genetically related to sesquiterpenes and are subdivided in their composition into **aromatic bitters** (or bitternutrients), which contain besides bitterness also essential oils, and **pure bitters**, which contain only bitterness.

Wild: **mountain arnica** - *Arnica Montana* L.

Cultivated: **Chamisso arnica** - *A.chamissonis* Less

Family *Asteraceae*

Arnica flowers - *Arnicae flores*

Arnica flowers - *Arnicae flores*

Arnica montana

Arnica foliosa

Arnica chamissonis

Arnica montana

Arnica montana, also known as **wolf's bane**, **leopard's bane**, **mountain tobacco** and **mountain arnica**, is a moderately toxic European flowering plant in the daisy family Asteraceae. It is noted for its large yellow flower head. The names "wolf's bane" and "leopard's bane" are also used for another plant, aconitum, which is extremely poisonous.

Arnica montana

Arnica montana is a flowering plant about 18–60 cm (7.1–23.6 in)
tall aromatic fragrant, herbaceous perennial. Its basal green ovate leaves with rounded tips are bright coloured and level to the ground. In addition, they are somewhat downy on their upper surface, veined and aggregated
in rosettes. By contrast, the upper leaves are opposed, spear-shaped and smaller which is an exception within the Asteraceae.
The hairy flowers are composed of yellow disc florets in the center and orange-yellow ray florets at the external part. The achenes have a one-piece rough pappus which opens in dry conditions.

Arnica chamissonis, the **Chamisso arnica**, is a North American species of plants in the family Asteraceae. It is very similar to Arnica montana. Arnica chamissonis is native to North America and naturalized in parts of Europe while A. montana is indigenous to Europe.

Arnica chamissonis s perennial plant and has yellow flowers with green medium textured foliage. The leaves of the *Arnica chamissonis* are grouped in 4–10 pairs. It produces brown seeds and has an active growth period of the spring and summer. It has rhizomatous growth and grows at a moderate rate. Rizomatous plants have an underground stem with small fiber-like adventitious roots. A. *chamissonis* has a mature height of roughly 76 cm.

Arnica chamissonis is native to western North America, including Alaska, and most of Canada.

Arnica montana

Arnica montana is widespread across most of Europe. It is absent from the Celtic Isles and the Italian and Balkan peninsulas. In addition, it is considered extinct in Hungary. *Arnica montana* grows in nutrient-poor siliceous meadows or clay soils. It mostly grows on alpine meadows and up to nearly 3,000 m.

Chemical composition. Arnica flowers contain essential oil (0.04 - 0.15%), with sesquiterpene lactone arnifolin (0.2%), arnitsin (4%). There are flavonoids (up to 3%) (quercetin, kaempferol, luteolin, apigenin, rutin, etc.), unsaturated phytosterols arnidiol and faradiol, tannins, oxycoumarins (scopoletin, umbelliferon), carotenoids, polysaccharides, organic acids.

Raw materials quality is regulated by GOST 13399-89, the content of the sum of flavonoids converted to rutin not less than 1.5%.

Arnica flowers


1 cm

Pharmacological action.

A hemostatic, choleretic agent.

- Tincture of arnica flowers is used as a styptic in obstetric and gynecological practice. Infusion of flowers is used internally as a hemostatic and choleretic remedy, externally - for bruises, various pustular skin diseases, burns, frostbite, trophic ulcers.
- Arnica flowers also have antisclerotic and sedative properties.

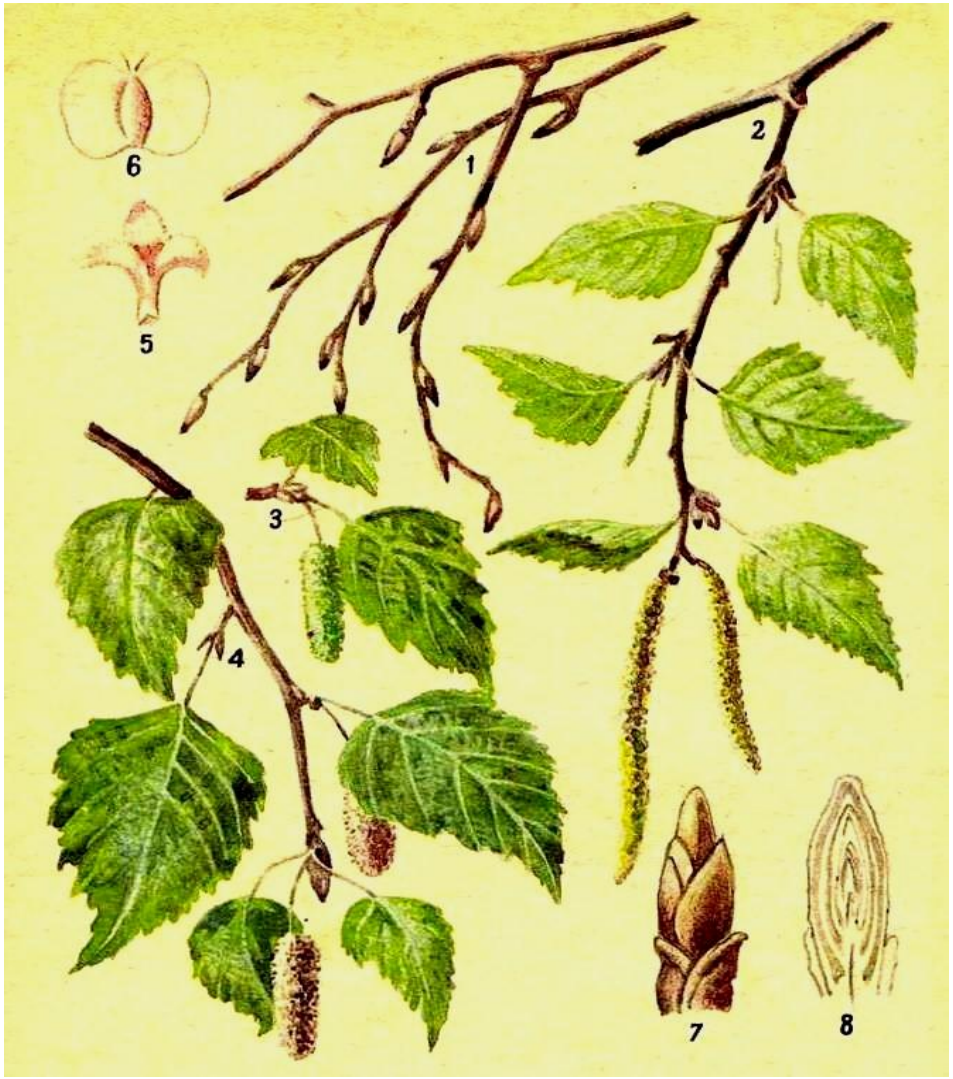
Birch buds – *Betulae gemmae*
Birch leaves - *Betulae folia*

Betula pendula and *Betula pubescens*

Family *Betulaceae*

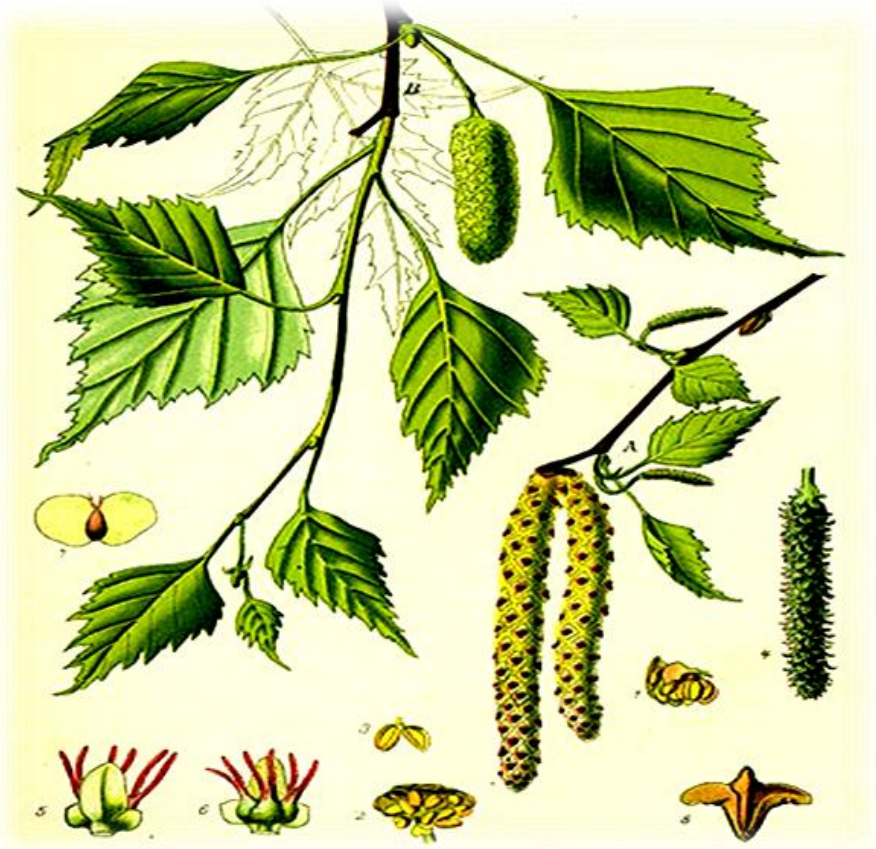
Betula pendula, commonly known as **silver birch**, **warty birch**, **European white birch**, or **East Asian white birch**, is a species of tree in the family Betulaceae, native to Europe and parts of Asia, though in southern Europe, it is only found at higher altitudes. Its range extends into Siberia, China, and southwest Asia in the mountains of northern Turkey, the Caucasus, and northern Iran.

Betula pendula Roth.



The silver birch typically reaches 15 to 25 m tall (exceptionally up to 31 m), with a slender trunk usually under 40 cm (16 in) diameter. The bark on the trunk and branches is golden-brown at first, but later this turns to white as a result of papery tissue developing on the surface and peeling off in flakes.
The leaves have short, slender stalks and are 3 to 7 cm in long, triangular with broad, untoothed, wedge-shaped bases, slender pointed tips, and coarsely double-toothed, serrated margins. They are sticky with resin at first, but this dries as they age, leaving small, white scales. In midsummer, the female catkins mature and the male catkins expand and release pollen, and wind pollination takes place. A catkin of Silver birch could produce an average of 1.66 million pollen grains.The small, 1- to 2-mm winged seeds ripen in late summer on pendulous, cylindrical catkins 2 to 4 cm in long and 7 mm in broad. The seeds are very numerous and are separated by scales, and when ripe, the whole catkin disintegrates and the seeds are spread widely by the wind.[

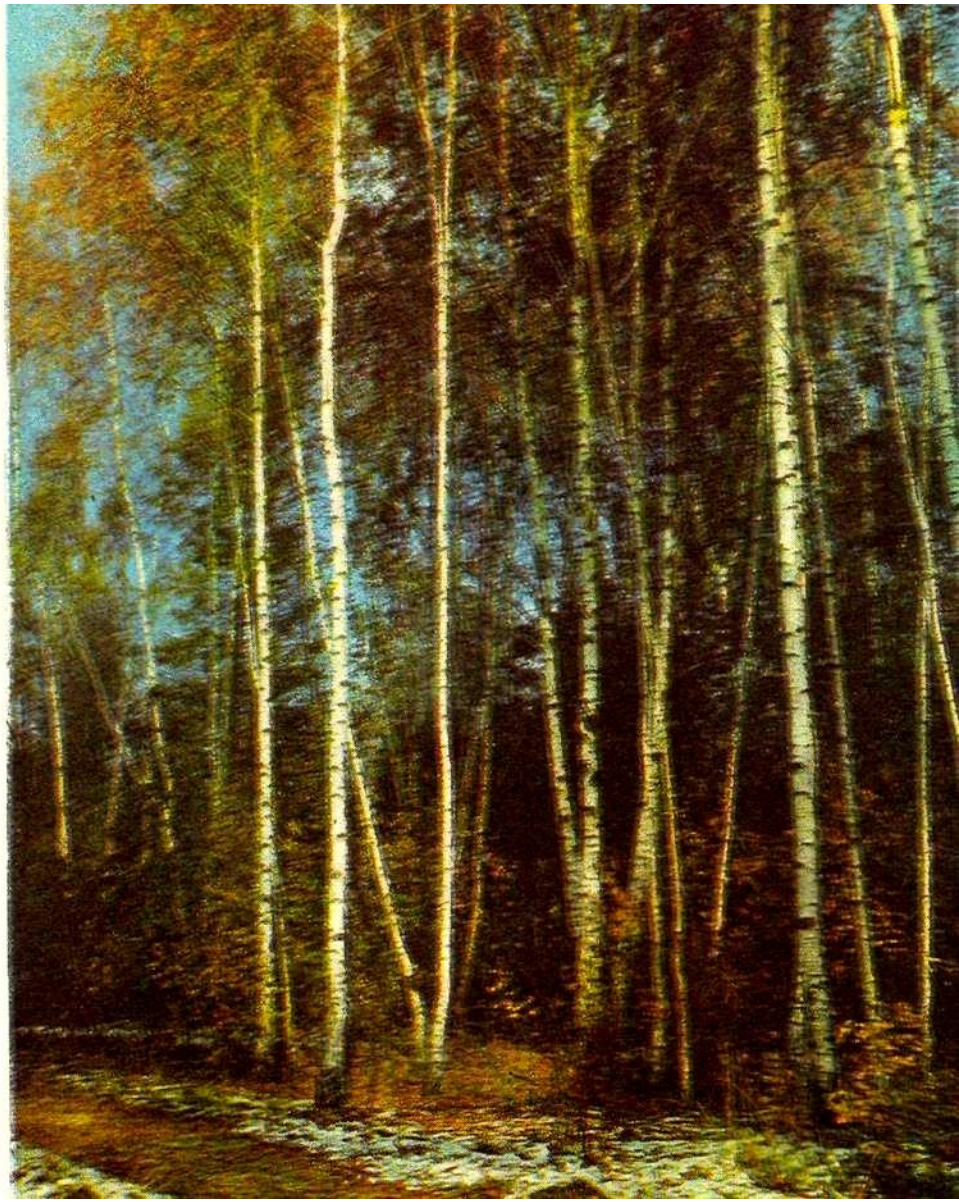
***Betula pendula* Roth.**



***Betula pubescens* Ehrn.**

Silver birch can easily be confused with the similar downy birch (*Betula pubescens*). Yet, downy birches are characterised by hairy leaves and young shoots, whereas the same parts on silver birch are hairless. The leaf base of silver birch is usually a right angle to the stalk, while for downy birches, it is rounded.

Betula pendula Roth.



The birch grove

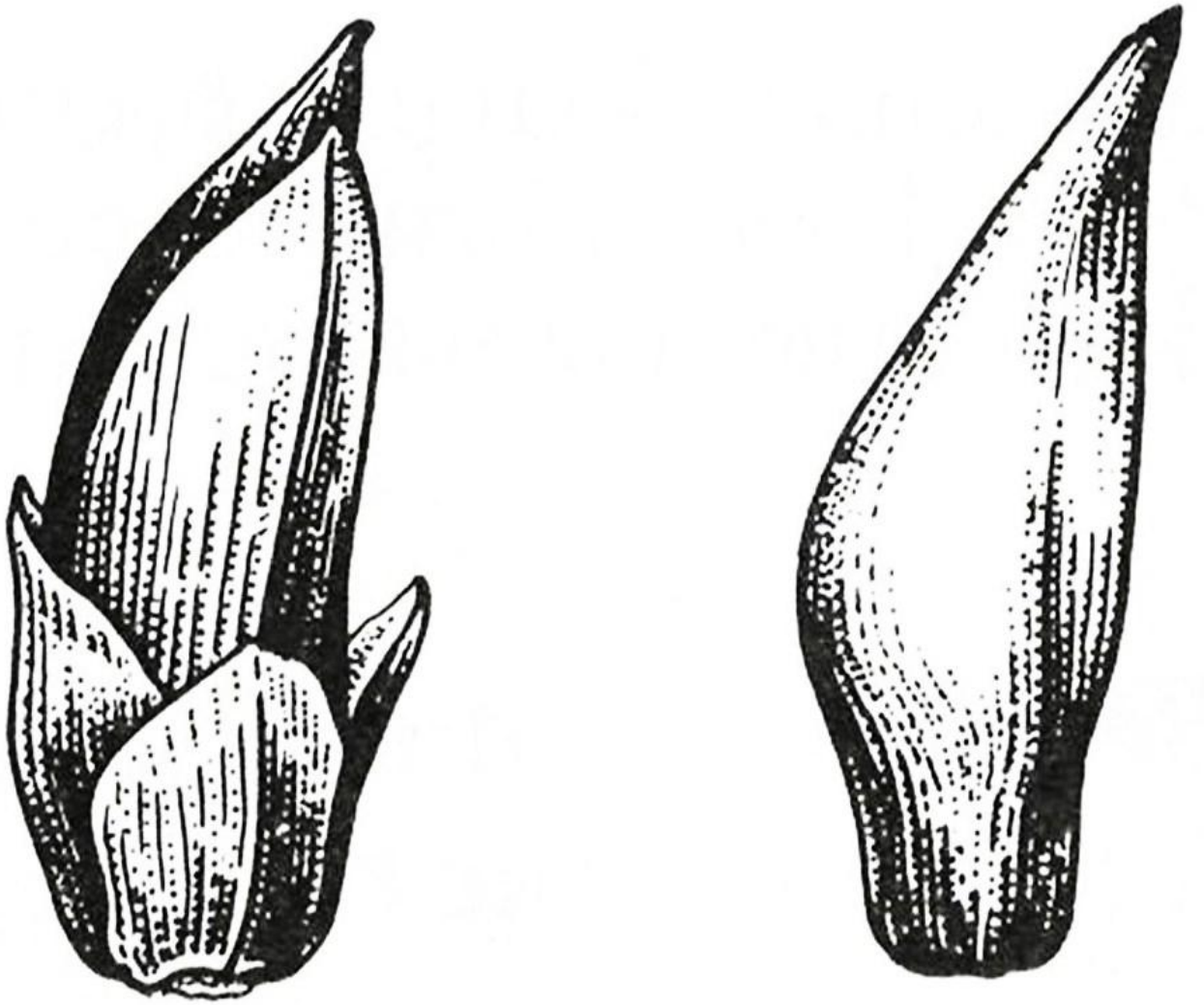
Silver birch has often pendulous twigs, after which the tree has received its scientific name.

- The birch buds contain 5 - 8% of yellow essential oil with a pleasant balsamic smell. Its main components are bicyclic sesquiterpenes - betulin and betulinol alcohol. The latter is found both as free and as an ester with acetic acid.
- The oil is also rich in resins, flavonoids, alkaloids and higher fatty acids.

- The birch leaves contain essential oil (up to 0.1%) with sesquiterpene oxides, a triterpenoid of the dammaran series - betulafolien-triol, phenolcarbonic acids, flavonoids, saponins, and ascorbic acid (up to 2.8%).

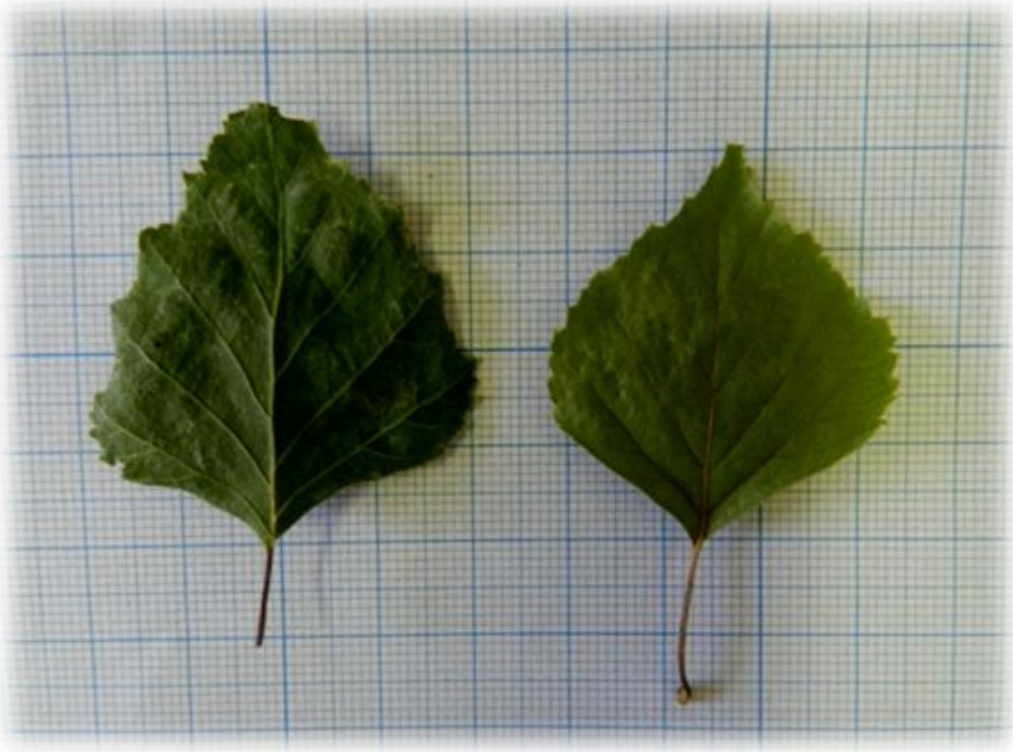
- The quality of birch buds should meet the requirements of GF XIV. In whole birch raw material flavonoid content in terms of luteolin - not less than 2.5%, essential oil - not less than 0.2%.
- In the leaves of the birch (GF XIV): in whole, crushed raw material in powder - the amount of flavonoids in terms of hyperoside - not less than 1.5%.
-

The birch buds

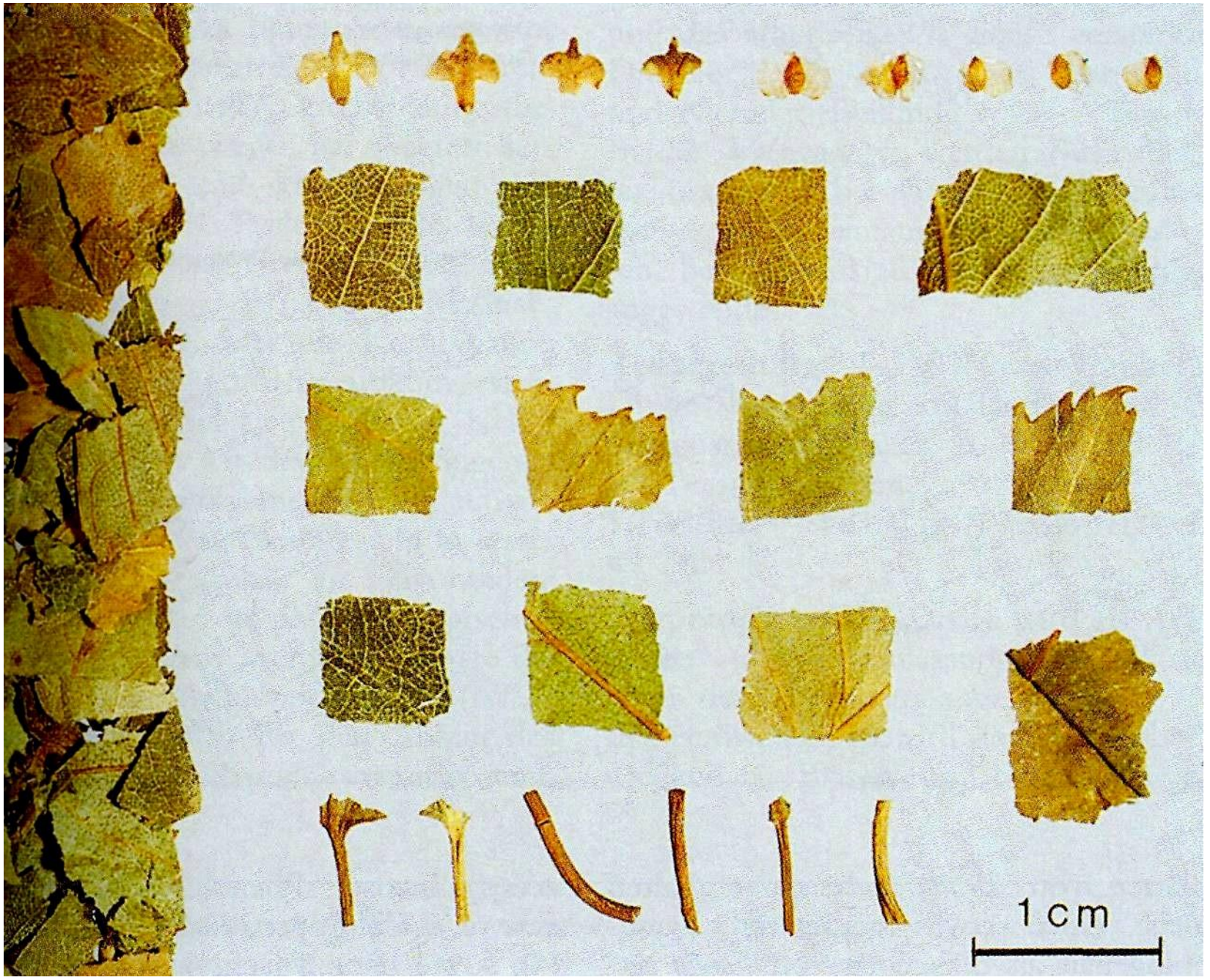


Left image with covering flakes, right image without them

Birch buds and leaves



Betula pendula Roth.


1 cm

Pharmaceutical action. Diuretic.

Apply kidneys and leaves in the form of infusion as a diuretic (mainly in edema of cardiac origin), choleretic and bactericidal agent. Birch leaves have a wider range of biological activity, possessing along with diuretic properties of mild choleretic effect. The buds and leaves of the birch are part of a diuretic collection. Dried birch leaves are used as a choleretic, anti-inflammatory agent.

Dry birch extract is part of the hepatoprotective drug "Sibektan".
The birch leaves are part of the diuretic preparation "Beck-Vorin".
In functional insufficiency of the kidneys to use infusions of birch buds and leaves are not recommended, since they contain resinous substances that have an irritating effect.
Activated carbon and tar are obtained from birch wood.

- **Elecampane inula** - *Inula helenium* L.

- Family *Asteraceae*

- **Elecampane inula rhizomes and roots** - *Inulae helenii rhizomata et radices*

Inula helenium L.

Elecampane is a rather rigid herb, the stem of which attains a height of about 90–150 cm. The leaves are large and toothed, the lower ones stalked, the rest embracing the stem; blades egg-shaped, elliptical, or lance-shaped, as big as 30 cm in long and 12 cm in wide. Leaves are green on the upper side with light, scattered hairs, but whitish on the underside because of a thick layer of wool. The flower heads up to 5 cm broad, each head containing 50-100 yellow ray flowers and 100-250 yellow disc flowers. The root is thick, branching and mucilaginous, and has a bitter taste and a camphoraceous odour with sweet floral (similar to violet) undertones.

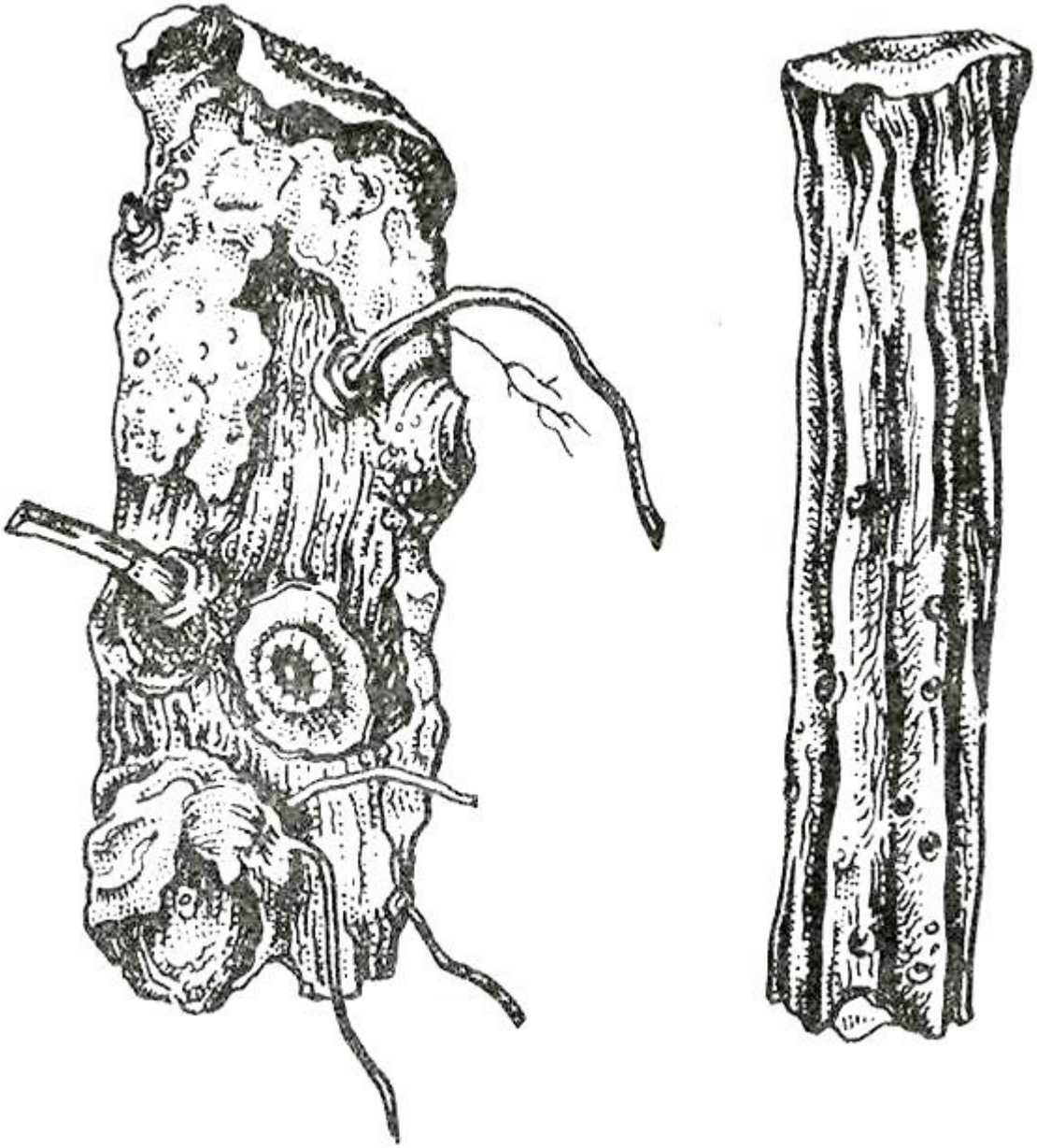
Inula helenium

The rhizomes and roots of elecampane contain 1-3% essential oil, which is called alantha. At room temperature it is an oily, crystalline mass that melts at 30 - 45o C into a brown liquid with a distinctive smell. The essential oil contains bicyclic sesquiterpene lactones, dominated by alantolactone, isoalantolactone and dihydroalantolactone (α-selenene derivatives).

The raw material is also rich in inulin (up to 40%). The rhizomes also contain triterpene compounds and β-sitosterol.

According to GF XIV, in the whole, milled raw material, in powder the sum of fructosans and fructose in terms of inulin should be not less than 25%; extractive substances extracted with water - not less than 35%.

The rhizome and root of elecampane



The rhizome and root of elecampane


Свежий корень
Сушеный корень

- The raw materials are stored separately from other raw materials. Shelf life of raw materials 3 years.
- **Pharm. action.** An expectorant with antiulcer, anti-inflammatory, anti-inflammatory properties.

- **Usage.** Decoction of raw material elecampane is used as an expectorant in diseases of the upper respiratory tract. Part of the anti-cough collection. Used to obtain being the sum of sesquiterpene lactones drug "Alanton", which has anti-inflammatory properties. It is used in peptic ulcer disease of the stomach and duodenum.

- Rhizomes and roots of elecampane, the quality of which meets the requirements of TU 64-4-19-77 and containing not less than 25% inulin, used as raw materials for the production of inulin and D-fructose.

- *Ledum palustre L.*

- ***Rhododendron tomentosum*** (syn. *Ledum palustre*), commonly known as **marsh Labrador tea**, **northern Labrador tea** or **wild rosemary**, is a flowering plant in the subsection *Ledum* of the large genus *Rhododendron* in the family Ericaceae**.**

- *Family Ericaceae*

- **Wild rosemary shoots** - *Ledi palustris cormus*

•

Ledum palustre

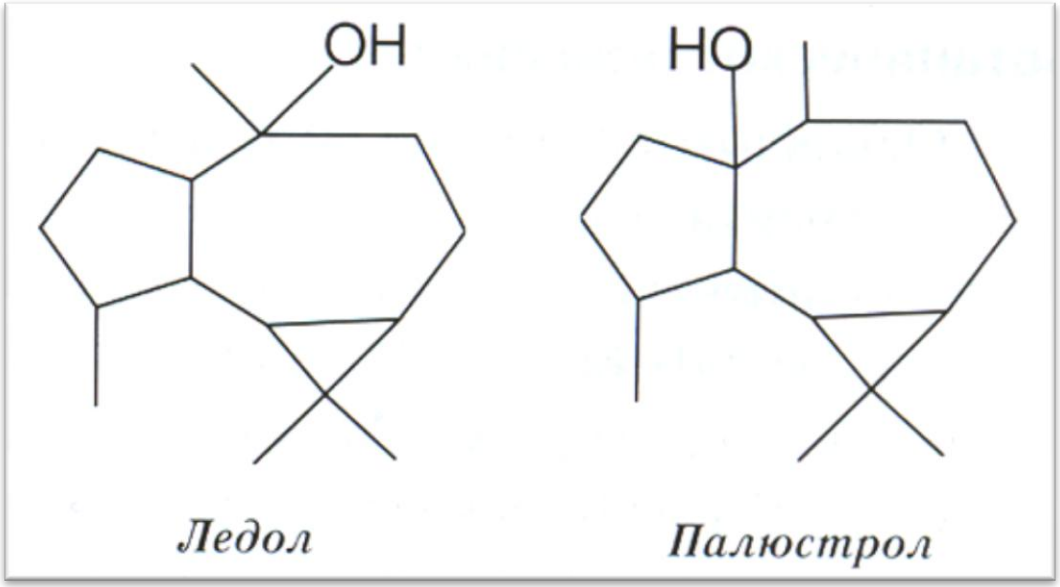
It is a low shrub growing to 50 cm (rarely up to 120 cm) tall with evergreen leaves 12–50 mm long and 2–12 mm broad. The flowers are small, with a five-lobed white corolla, and produced several together in a corymb 3–5 cm diameter. They emit strong smell to attract bees and other pollinating insects.

It grows in northern latitudes in North America, Greenland, Canada, and Alaska, in Europe in the northern and central parts, and in Asia south to northern China, Korea and Japan. It grows in peaty soils, shrubby areas, moss and lichen tundra.

Ledum palustre

- The shoots contain essential oil. The greatest amount (up to 7%) is accumulated in the leaves of the current year.
- According to GF XIV, the whole, crushed raw material should contain at least 0.1% essential oil.
- The essential oil is thick, green in colour and has a strong unpleasant smell. Stearopten precipitates out of it when stored in the cold.

- The oil consists of 50-60% sesquiterpene alcohols, of which the most important are ledol and palustrol, which are tricyclic derivatives. Myrcene and other terpenoids have also been found.



- The shoots also contain tannins, arbutin, flavonoids, coumarins and ursolic acid.
- The plant is an accumulator of radionuclides.
- The essential oil content in the raw material intended for the preparation of Ledinum should not be less than 0.7%, and Ledolum in the oil, determined by GLC method, not less than 17%.

Побеги багульника болотного

- It is an expectorant. It has bronchodilator and antitussive effects associated with inhibition of central cough reflex mechanisms.
- **Usage.** Shoots of rosemary is used in the form of infusion. Infusion and the drug "Ledin" is used as an expectorant and cough medicine for bronchitis, lung diseases, whooping cough only by prescription. Ledinum shoots are part of the chest medicine tea No. 4.

- The essential oil, ice and leaf juice of rosemary have an antidepressant effect on some micro-organisms (Staphylococcus aureus) and protozoa.
- In some areas, rosemary is used to smother rooms with it to kill insects.

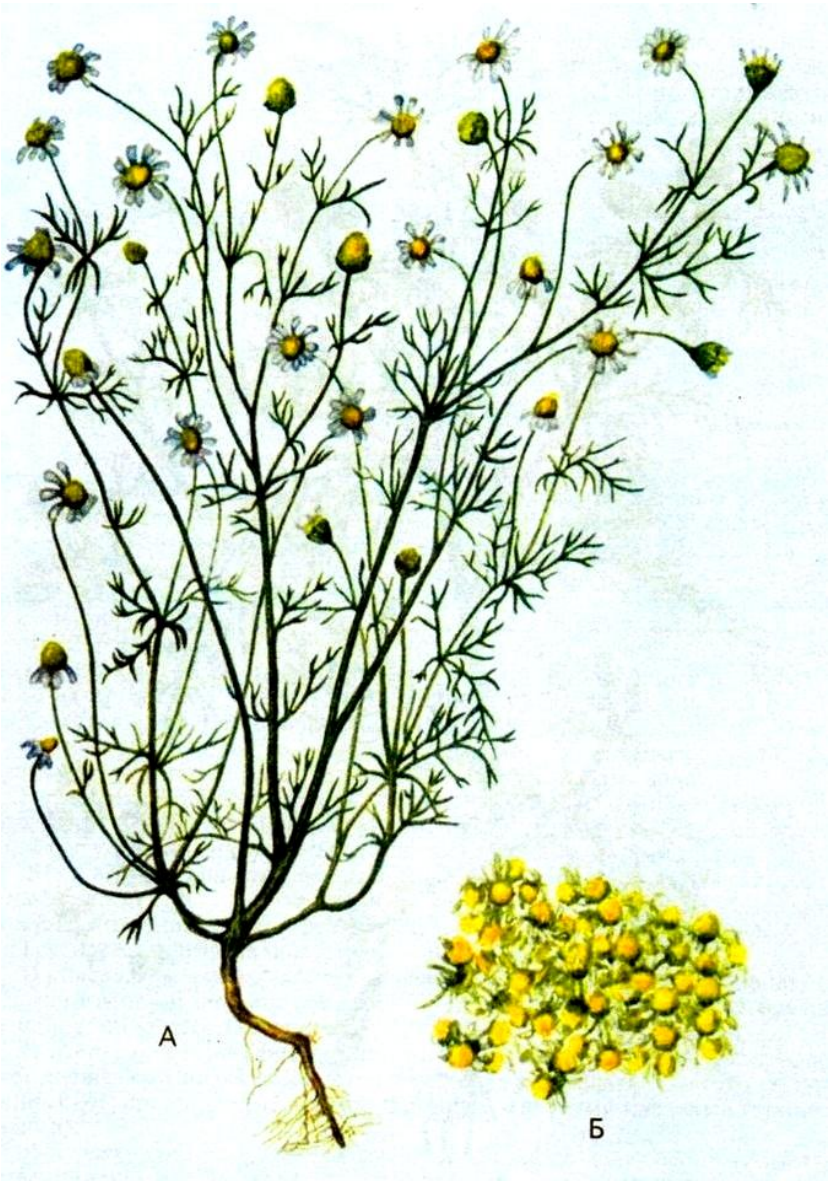
Chamomilla recutita (L.) Rausch. (Matricaria recutita L., Matricaria chamomilla L.)

Matricaria chamomilla (synonym: *Matricaria recutita*), commonly known as **chamomile** (also spelled **camomile**), **German chamomile**, **Hungarian chamomile** (kamilla), **wild chamomile**, **blue chamomile**, or **scented mayweed**, is an annual plant of the composite family Asteraceae.

Family *Asteraceae*

German chamomile flowers - *Chamomillae recutita flores*

Chamomilla recutita

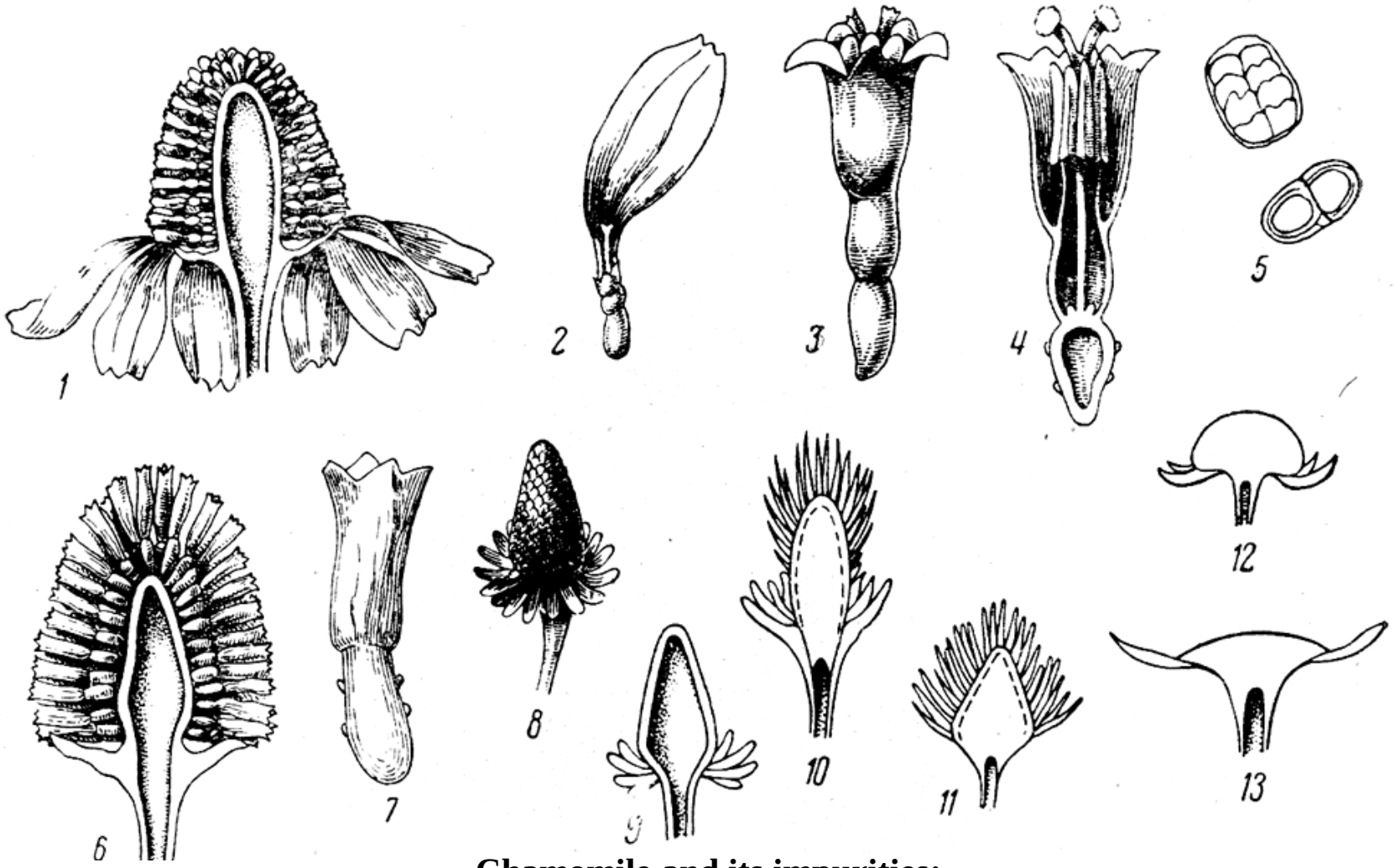


Matricaria chamomilla is a member of the Asteraceae family, native to southern and eastern Europe. Today the plant can be found on all continents. It has a branched, erect and smooth stem, which grows to a height of 15–60 cm (6–23.5 in). The long and narrow leaves are bipinnate or tripinnate. The flowers are borne in paniculate flower heads (capitula). The white ray florets are furnished with a ligule, while the disc florets are yellow. The hollow receptacle is swollen and lacks scales. This property distinguishes German chamomile from corn chamomile (Anthemis arvensis), which has a receptacle with scales. The flowers bloom in early to midsummer, and have a strong, aromatic smell.

The flowers contain a blue essential oil, what gives it the characteristic smell and interesting properties. This colour characteristic of the oil, attributable to the chamazulene it contains, explains why the plant is also known by the common name Blue Chamomile. The fruit is a yellowish-brown achene.

When harvesting wild chamomile, it is possible to mistakenly collect flowers heads from other Asteraceae plants, which are mistakenly called chamomiles in the home.

Matricaria inodora.
Anthemis arvensis.
Anthemis cotula.
Leucanthemum vulgare.

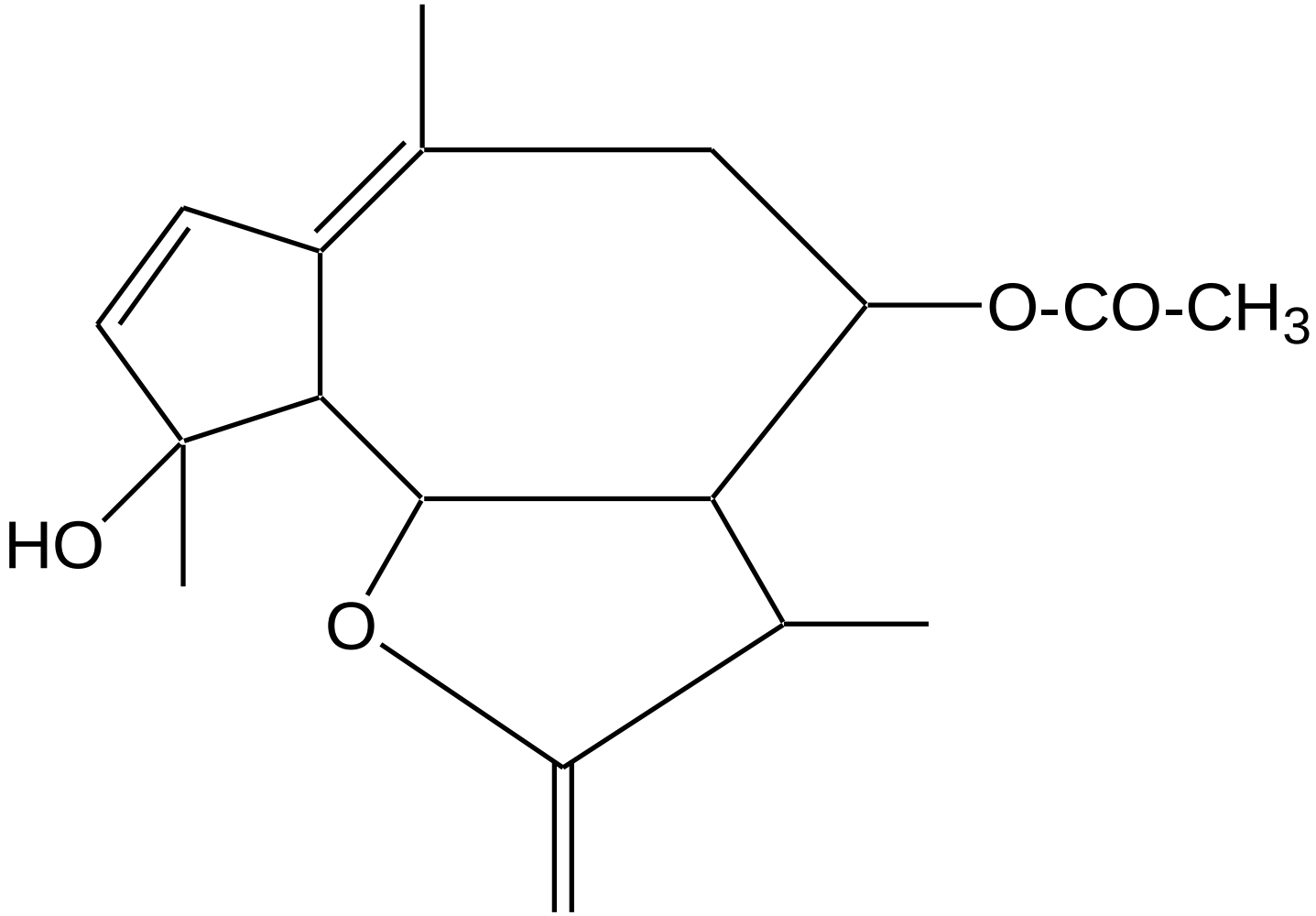


Chamomile and its impurities:

Matricaria recutita: 1 - inflorescence in section; 2 - lingual flower; 3 - tubular flower; 4 - tubular flower in section; 5 - essential oil glands. ***Matricaria discoidea***: 6 - inflorescence in section; 7 - tubular flower; 8 - floral receptacle; 9 - floral receptacle in section. ***Anthemis cotula***: 10 - floral receptacle with bracts in section. ***Anthemis arvensis***: 11 - floral receptacle with bracts in section. ***Tripleurospermum inodorum***: 12 - floral receptacle in section. ***Leucanthemum vulgare***: 13 - floral receptacle in section.

Chamomile flowers contain 0.2-0.8% blue essential oil. The main component of the essential oil is the aromatic sesquiterpene hamazulene (approx. 7%), which is responsible for its anti-inflammatory properties. Chamazulene is formed from the sesquiterpene lactone matricin, which is present in the flowering baskets of chamomile, in the distillation of the essential oil with water vapour. Matricin can be regarded as prochamazulene.

According to GF XIV in a solid, crushed raw material, powder: essential oil must be - not less than 0.3%, the amount of flavonoids in terms of rutin - not less than 1.2%, extractive substances extracted with water - not less than 18%.



Matricin

- In addition to hamazulene, the oil contains other sesquiterpenoids (up to 50%) - farnesene, bisabolol, bisabololoxides A and B, myrcene monoterpene, etc. In the flowers found a significant amount of flavonoids, derived apigenin, luteolin and quercetin, which have anti-inflammatory and anti-viral properties. Coumarins, free organic acids are present.

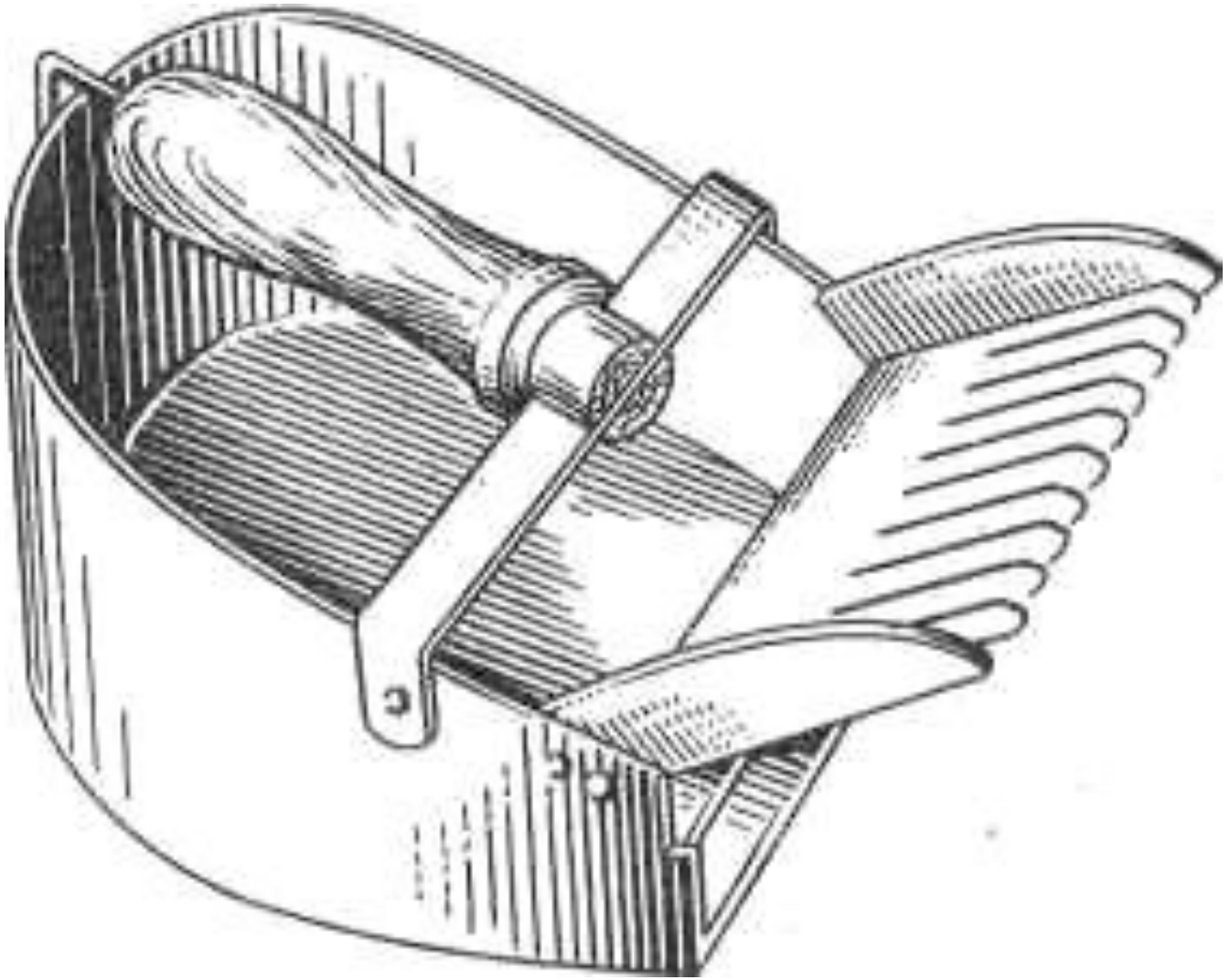
- Chamomile essential oil is blue in colour, but the blue colour changes to green in the air and then to brown. The oil is quite thick, distils very slowly and does not separate well from water


100%
КАЧЕСТВО
МАСЛО
НАТУРАЛЬНОЕ
Matricaria chamomilla L.
МАСЛО
РОМАШКИ
50мл
РОМАШК
50 мл

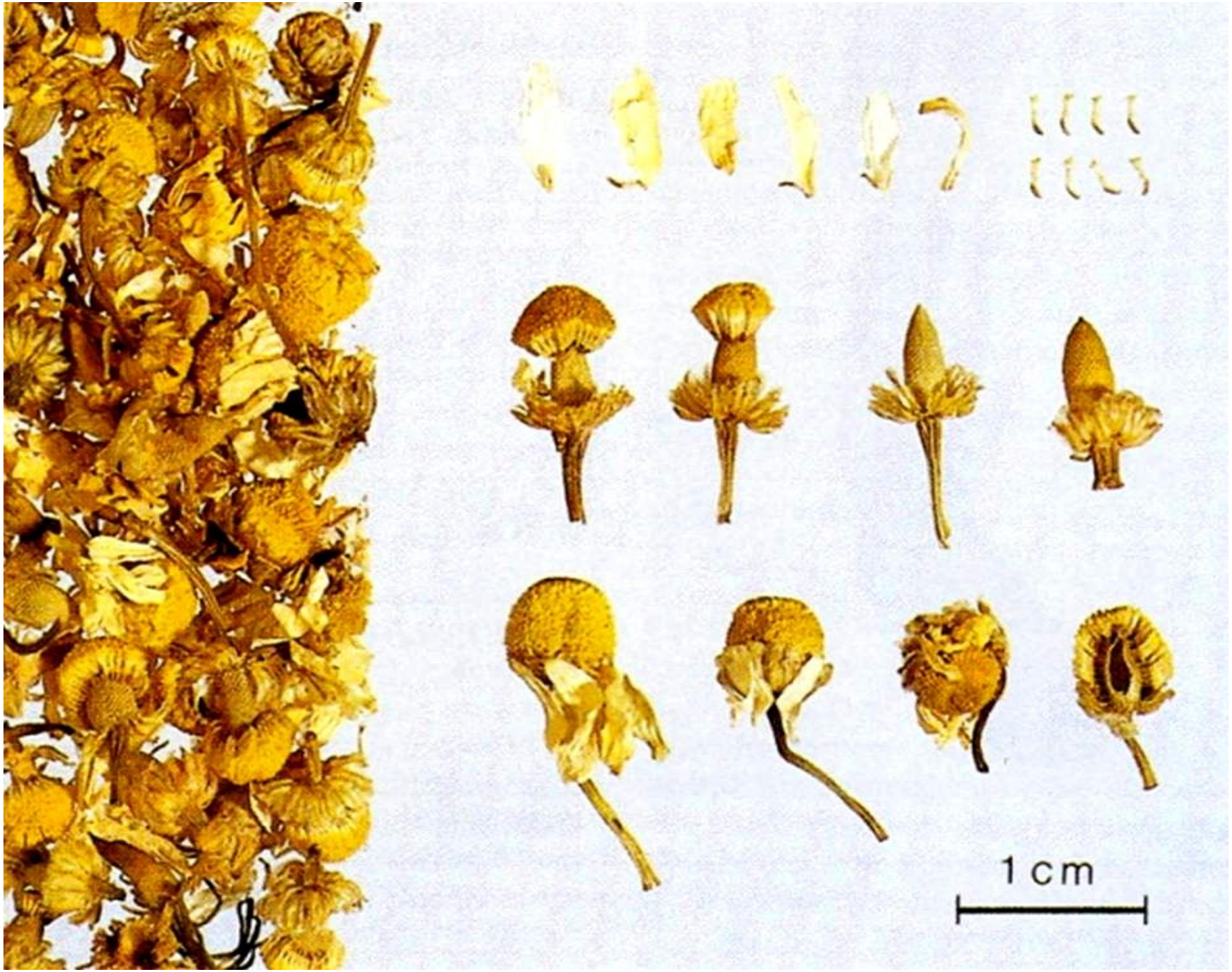

эфирное масло
РОМАШКИ
LONDON, UK
эфирное масло
РОМАШКИ
otvetin.ru

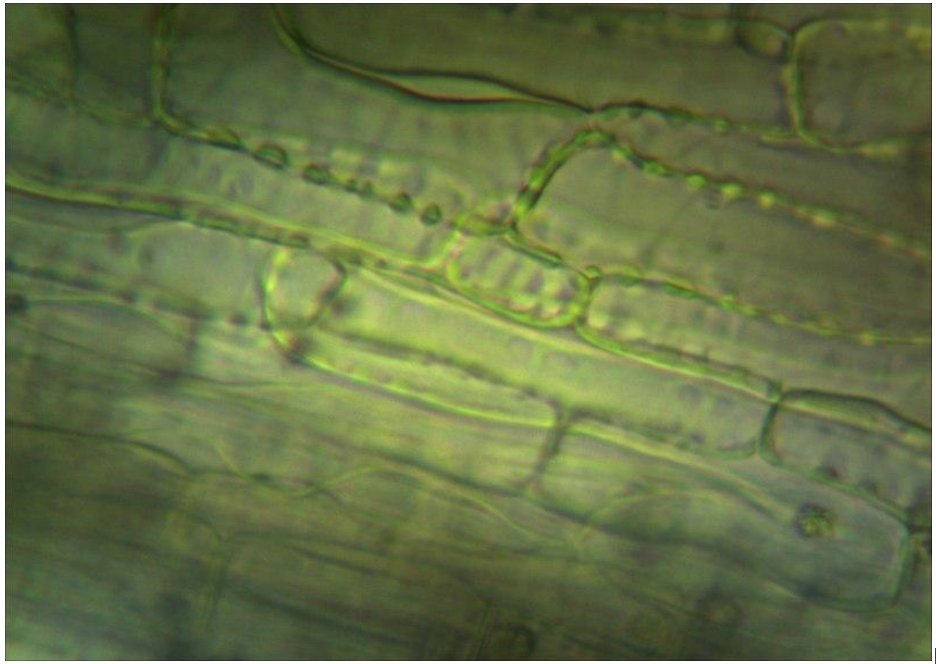

БИАСК
МАСЛО
РОМАШКИ
РИМСКОЙ
ЭФИРНОЕ 100%
10 мл

Flower picking device



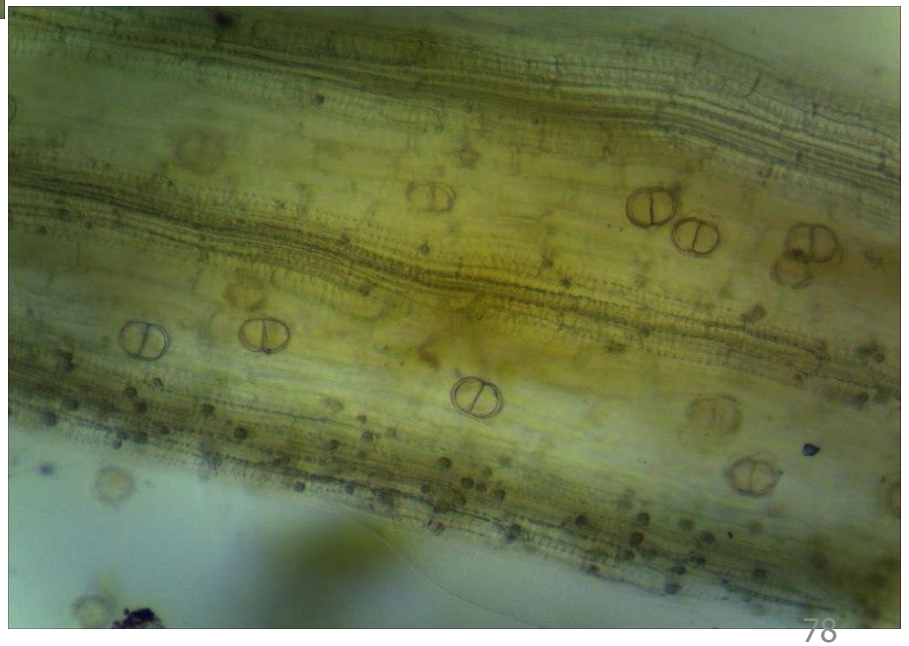
Flores Chamomillae


1 cm



Epidermal cells of tubular flowers elongated with distinctly thickened cell walls (x40)

Chamomile flower essential oil glands (x10)



- **Pharmacological action**
- Anti-inflammatory, antispasmodic agent.

- **Usage.** Chamomile flowers are used in the form of infusion or decoction, as part of gastric and softening collection inside and outside, used to obtain a liquid extract and the drug "Rotokan".

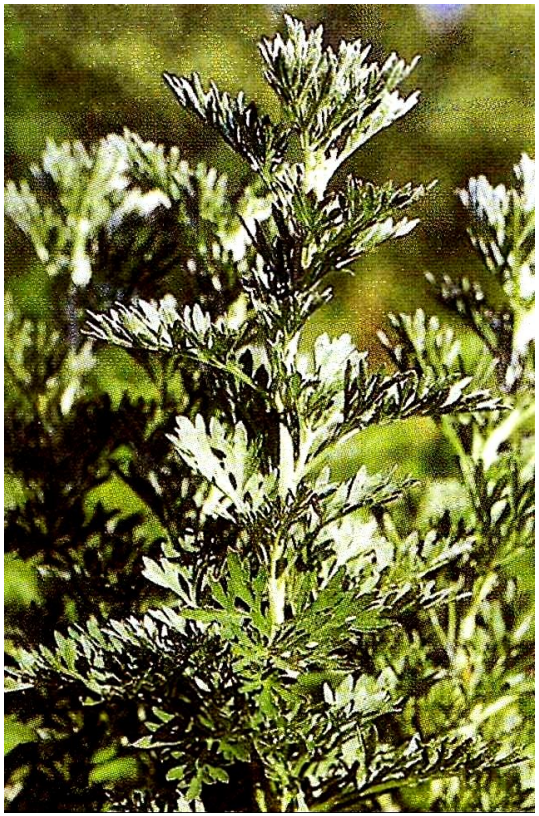
- The preparation is prescribed as an anti-inflammatory, antispasmodic for intestinal spasms, flatulence and other disorders of the gastrointestinal tract.
-
- For external use - to rinse the mouth, for enemas, baths. Relieves allergic reactions.

- Hamazulene and its synthetic analogues are used to treat bronchial asthma, rheumatism, allergic gastritis and colitis, eczema, x-ray burns

Wormwood (**grand wormwood**, **absinthe**, **absinthium**, **absinthe wormwood) -** *Artemisia absinthium* L.

Family *Asteraceae*

Wormwood herb - *Artemisiae absinthii herba*



A. absinthium is a herbaceous perennial plant with fibrous roots. The stems are straight, growing to 0.8–1.2 m and rarely over 1.5 metres in tall, grooved, branched, and silvery-green. Leaves are spirally arranged, greenish-grey colored above, white below, covered with silky silvery-white trichomes, and bearing minute oil-producing glands. The basal leaves are up to 250 mm (10 in) long, bi- to tripinnate with long petioles, with the cauline leaves (those on the stem) smaller, 50–100 mm (2–4 in) long, less divided, and with short petioles. The uppermost leaves can be both simple and sessile (without a petiole).

Flowers are pale yellow, tubular, and clustered in spherical bent-down heads (capitula), which are in turn clustered in leafy and branched panicles. Flowering occurs from early summer to early autumn; pollination is anemophilous. The fruit is a small achene.


1
4
2
A
3
B
5

Artemisia austriaca

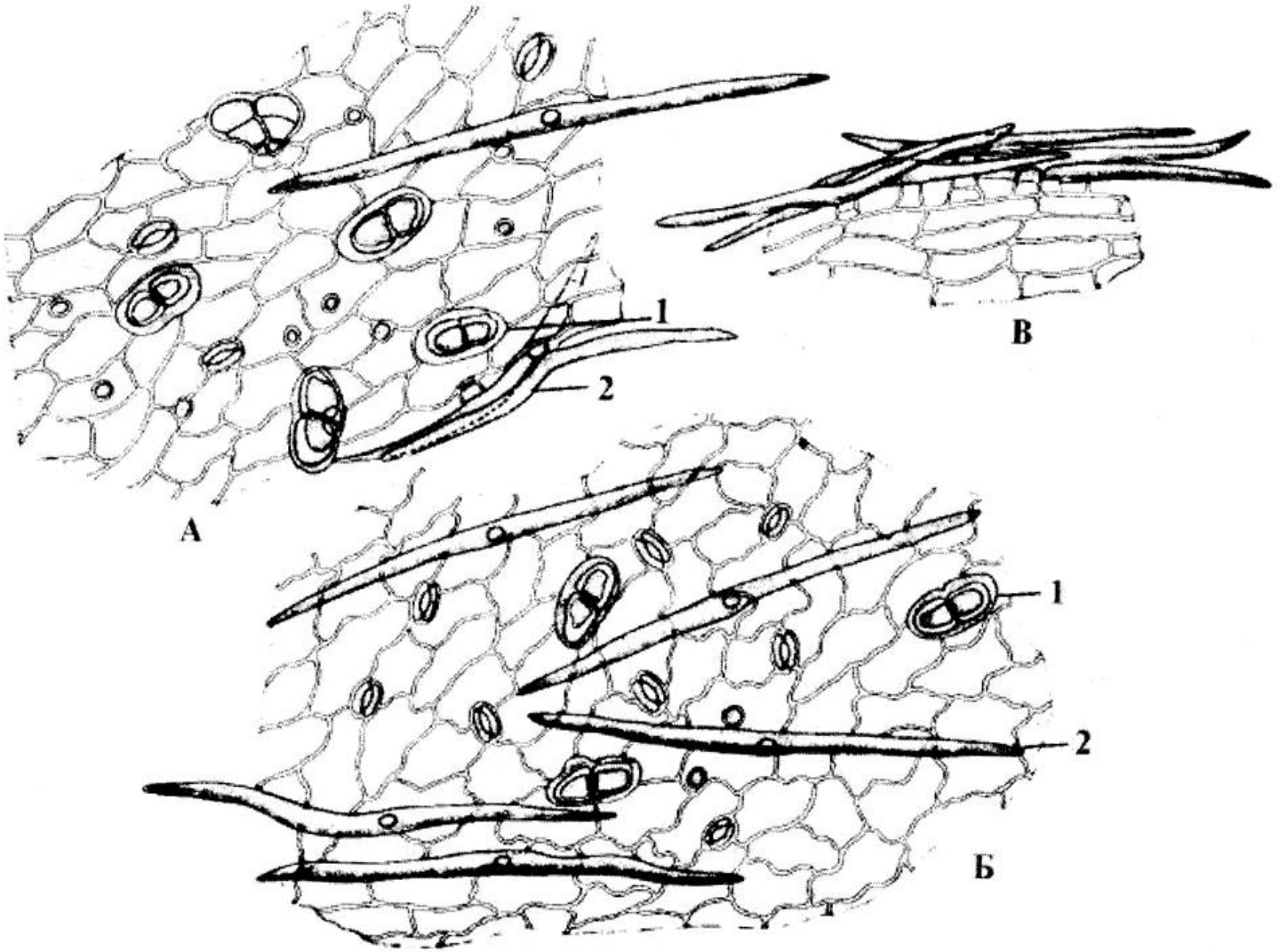
Artemisia vulgaris

A.absintium

The wormwood herb contains various bitter substances and 0.5-1.5% essential oil; it is blue-green in colour, poisonous; its main constituents are thujol (10-25%) and thujone (up to 10%). The colour of the oil indicates the presence of azulene. Ten sesqui-terpene lactones, absintine, anabsintine, artabsin and others, which give the wormwood herb its bitter taste, are isolated from the herb.

- The herb also contains flavonoids, lignans, ascorbic acid, tannins.
- According to GF XIV in the whole, crushed raw material:
- The amount of flavonoids converted to rutin shall be not less than 0.3%;
- essential oil - not less than 0.2%;
- extractive substances extracted in 70% alcohol - not less than 20%.
-


1 cm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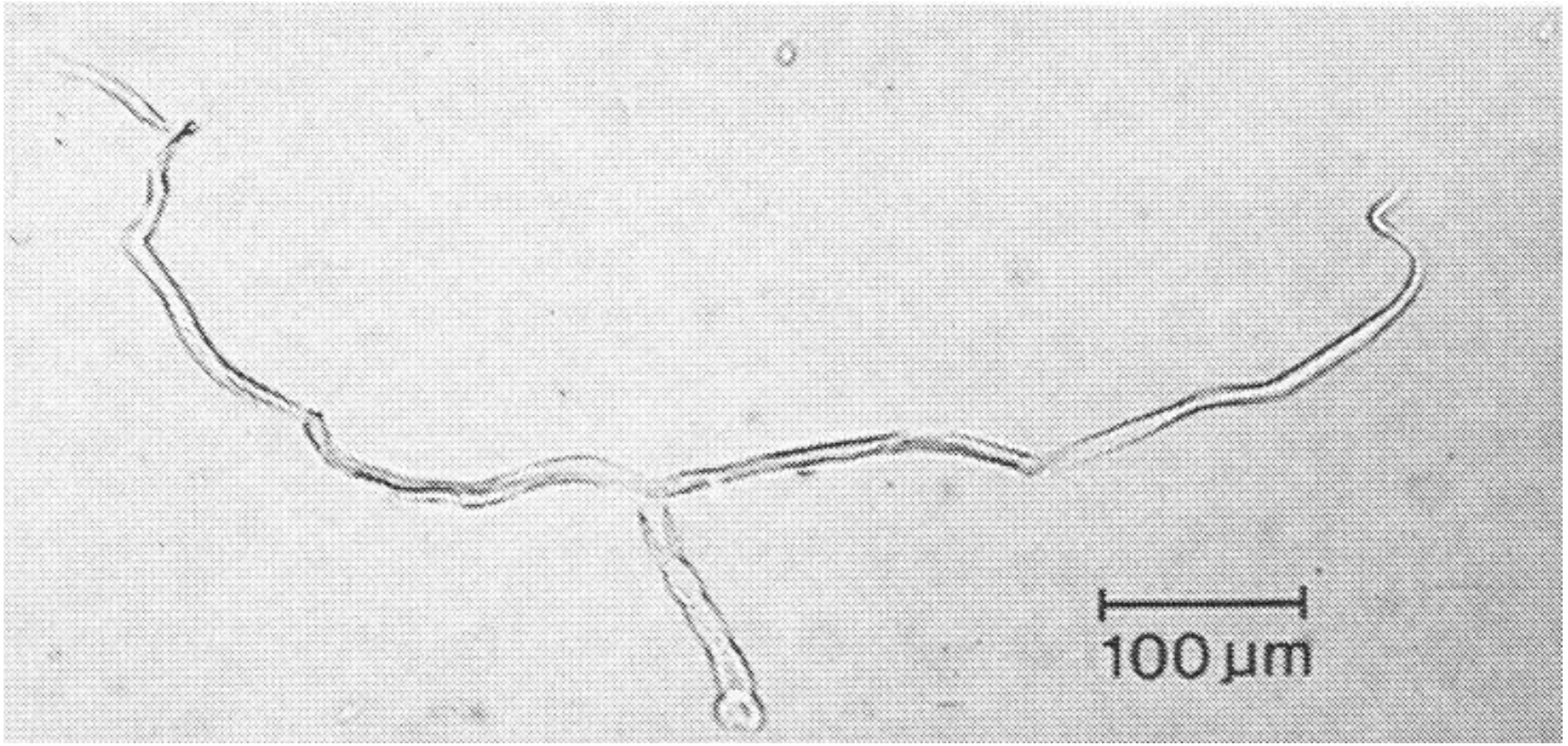

100 µm

It is used in infusion form to stimulate appetite, in liver and gallbladder diseases, in reduced gastrointestinal function; the raw material is part of appetizing and stomachic gatherings, used to produce tincture, extract (thick), bitter tincture. The bitter substances in wormwood stimulate gastrointestinal function by increasing bile secretion.

Prolonged use of wormwood may cause mild poisoning, in severe cases it may be accompanied by general central toxic effects with hallucinations and seizures.

Common yarrow herb - *Achillea millefolii herba*

Common yarrow - *Achillea millefolium*

Family *Asteraceae*

Achillea millefolium

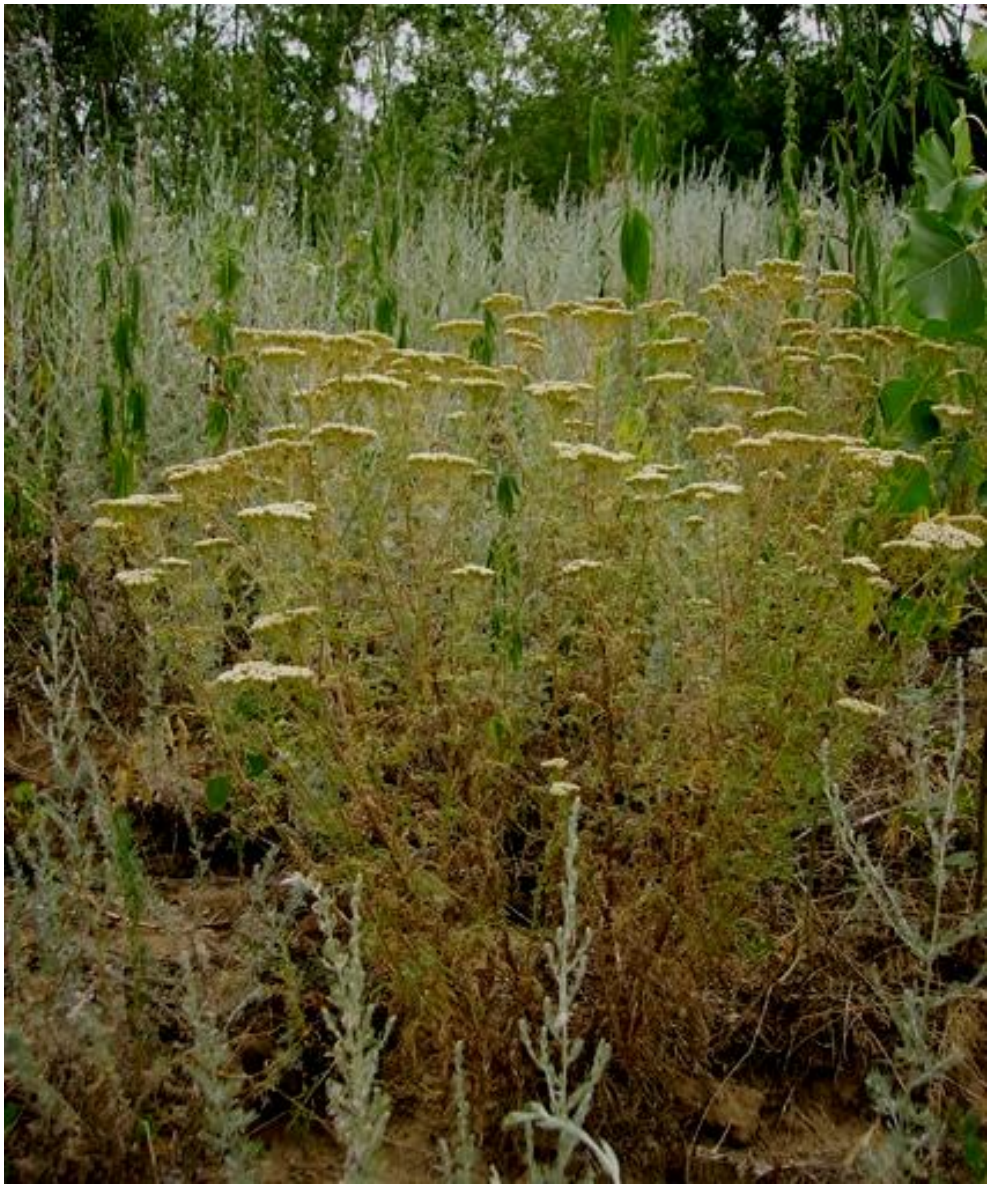
Achillea millefolium is an erect, herbaceous, perennial plant that produces one to several stems 0.2–1 metre (8–40 inches) in height, and has a spreading rhizomatous growth form. Leaves are evenly distributed along the stem, with the leaves near the middle and bottom of the stem being the largest. The leaves have varying degrees of hairiness (pubescence). The leaves are 5–20 centimetres (2–8 in) long, bipinnate or tripinnate, almost feathery, and arranged spirally on the stems. The leaves are cauline, and more or less clasping, being more petiolate near the base.

Achillea millefolium

The inflorescence has 4 to 9 phyllaries and contains ray and disk flowers which are white to pink, blooming from March to October. There are generally 3 to 8 ray flowers, which are 3 millimetres in long and ovate to round. The tiny disk flowers range from 10 to 40. The inflorescence is produced in a flat-topped capitulum cluster and the inflorescences are visited by many insects, featuring a generalized pollination system. The small achene-like fruits are called cypsela.

Achillea nobilis

Achillea nobilis



- Yarrow herb contains from 0.2 to 1% of essential oil consisting of mono- and sesquiterpenoids. The main component of the essential oil is hamazulene, formed from some sesquiterpene lactones (prochamazu-lactones) during the distillation of the essential oil. The content of hamazulene in the oil varies widely from 1% to 50%.

- According to GF XIV in the whole, crushed raw material should be: the sum of flavonoids in terms of luteolin - not less than 0.4% in the whole raw material: essential oil not less than 0.1%: in the crushed raw material essential oil - not less than 0.08%.

The leaves and inflorescences contain 12 sesquiterpene lactones (acetyl balkha-nolide, achillicin, achillin, etc.) in addition to essential oil. The bitter taste of the herb is mainly due to the presence of achilicin, which passes into the aqueous and alcoholic preparations of yarrow. The bitter taste is also due to the alkaloid betonicyne, which is also present in the herb. The styptic effect is due to this alkaloid. Flavonoids (apigenin, luteolin, rutin) and sterols (sitosterol, stigmasterol) were also found.

The herb is included in gatherings to stimulate the appetite, as well as in choleretic, anti-haemorrhoidal and laxative gatherings. Infusion of the herb is used as a styptic, mainly for uterine bleeding due to inflammation and hemorrhoids.

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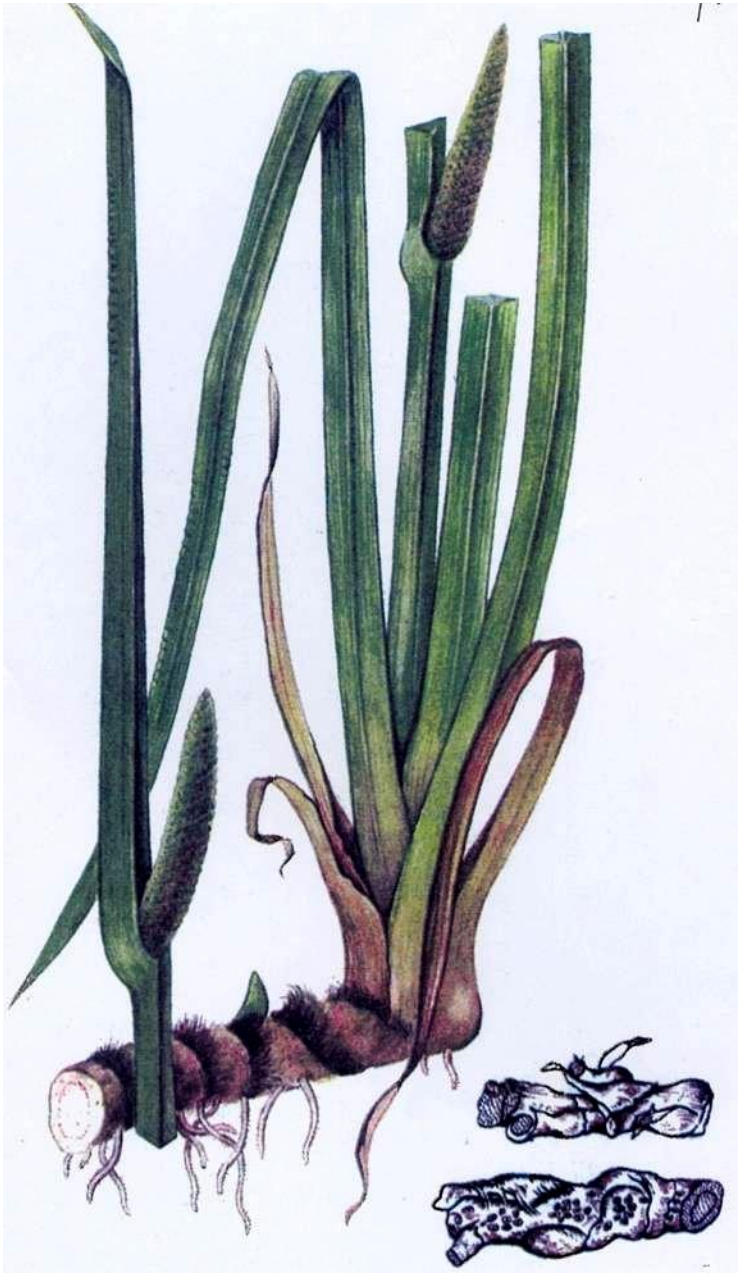
- The liquid extract of yarrow herb is part of Rotokan, which is recommended for mouthwashes for inflammatory diseases of the oral mucosa.

Acorus calamus L. (also called **sweet flag**, **sway** or **muskrat root**, among many common names)

Family *Araceae*

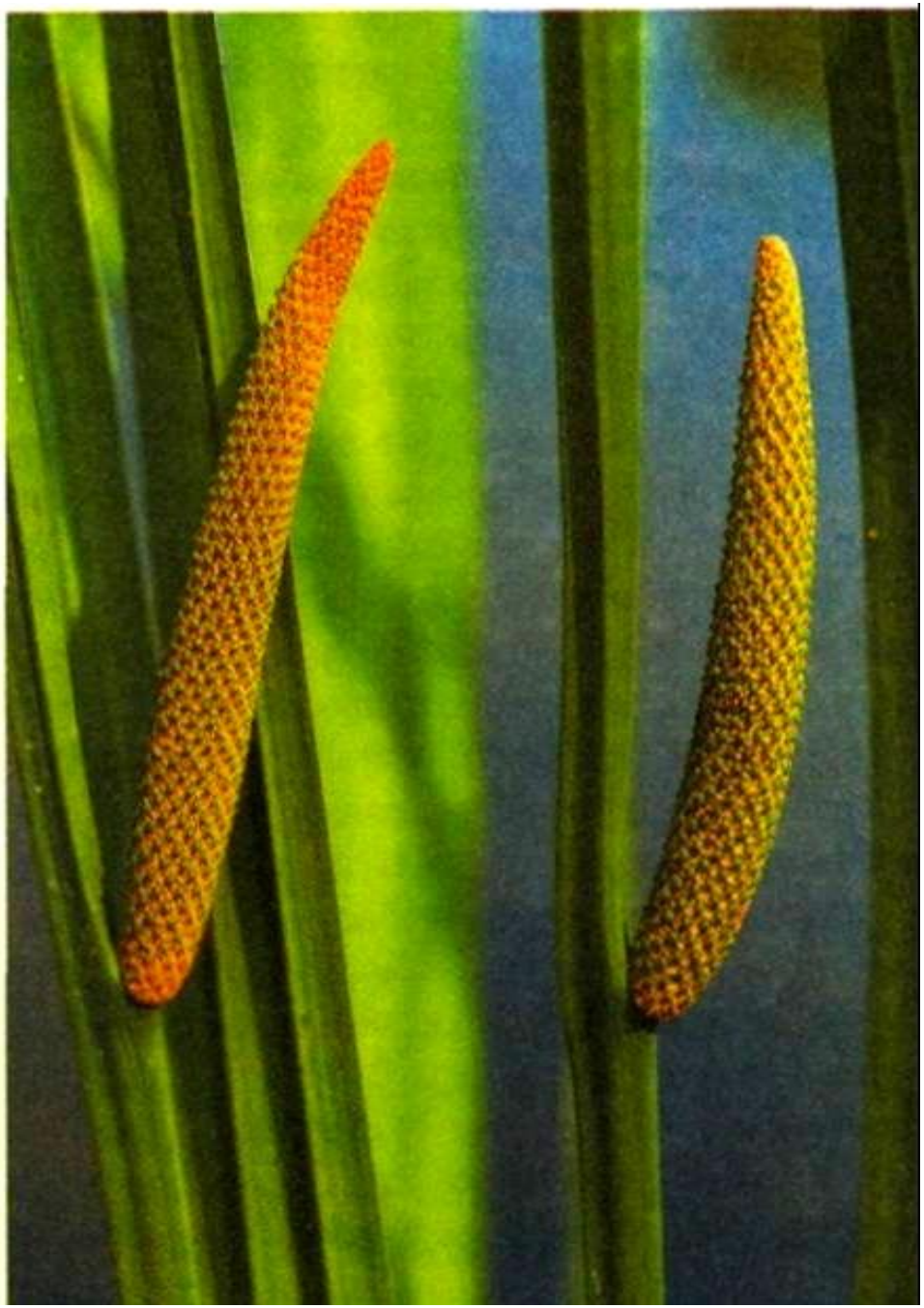
sweet flag rhizomes – *Acori calami rhizomata*



Sweet flag is a herbaceous perennial, 2 m in tall. Sweet flag consists of tufts of basal leaves that rise from a spreading rhizome. The leaves are erect yellowish-brown, radical, with pink sheathing at their bases, sword-shaped, flat and narrow, tapering into a long, acute point, and have parallel veins. The leaves have smooth edges, which can be wavy or crimped. The sweet flag can be distinguished from iris and other similar plants by the crimped edges of the leaves, the fragrant odor it emits when crushed, and the presence of a spadix.

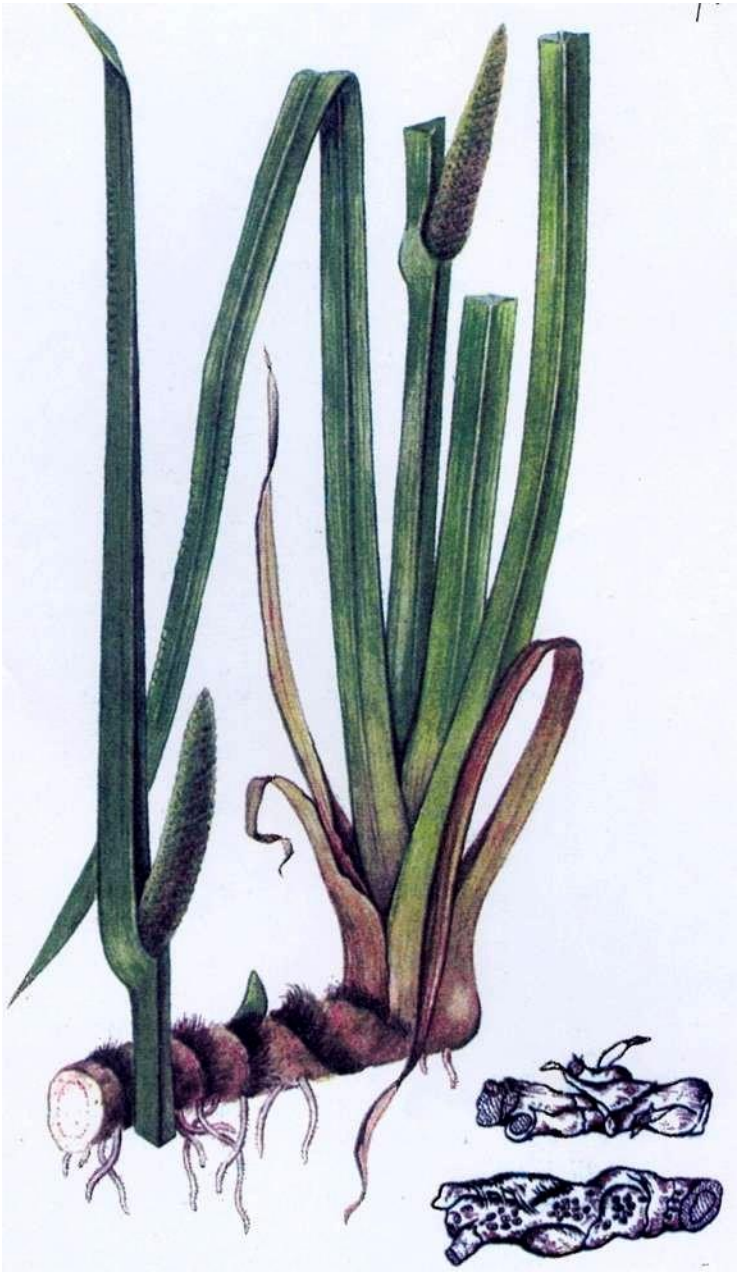
Only plants that grow in water bear flowers. The solid, triangular flower-stems rise from the axils of the outer leaves. A semi-erect spadix emerges from one side of the flower stem. The spadix is solid, cylindrical, tapers at each end, and is 5 to 10 cm in length. A covering spathe, as is usual with Araceae, is absent. The spadix is densely crowded with tiny greenish-yellow flowers. Each flower contains six petals and stamens enclosed in a perianth with six divisions, surrounding a three-celled, oblong ovary with a sessile stigma. The flowers are sweetly fragrant.

In Europe, it flowers for about a month in late spring or early summer, but does not bear fruit. The fruit is a berry filled with mucus, which when ripe falls into the water and disperses by floating. In Asia, it also fruits sparingly, and propagates itself mainly by growth of its rhizome, forming colonies.

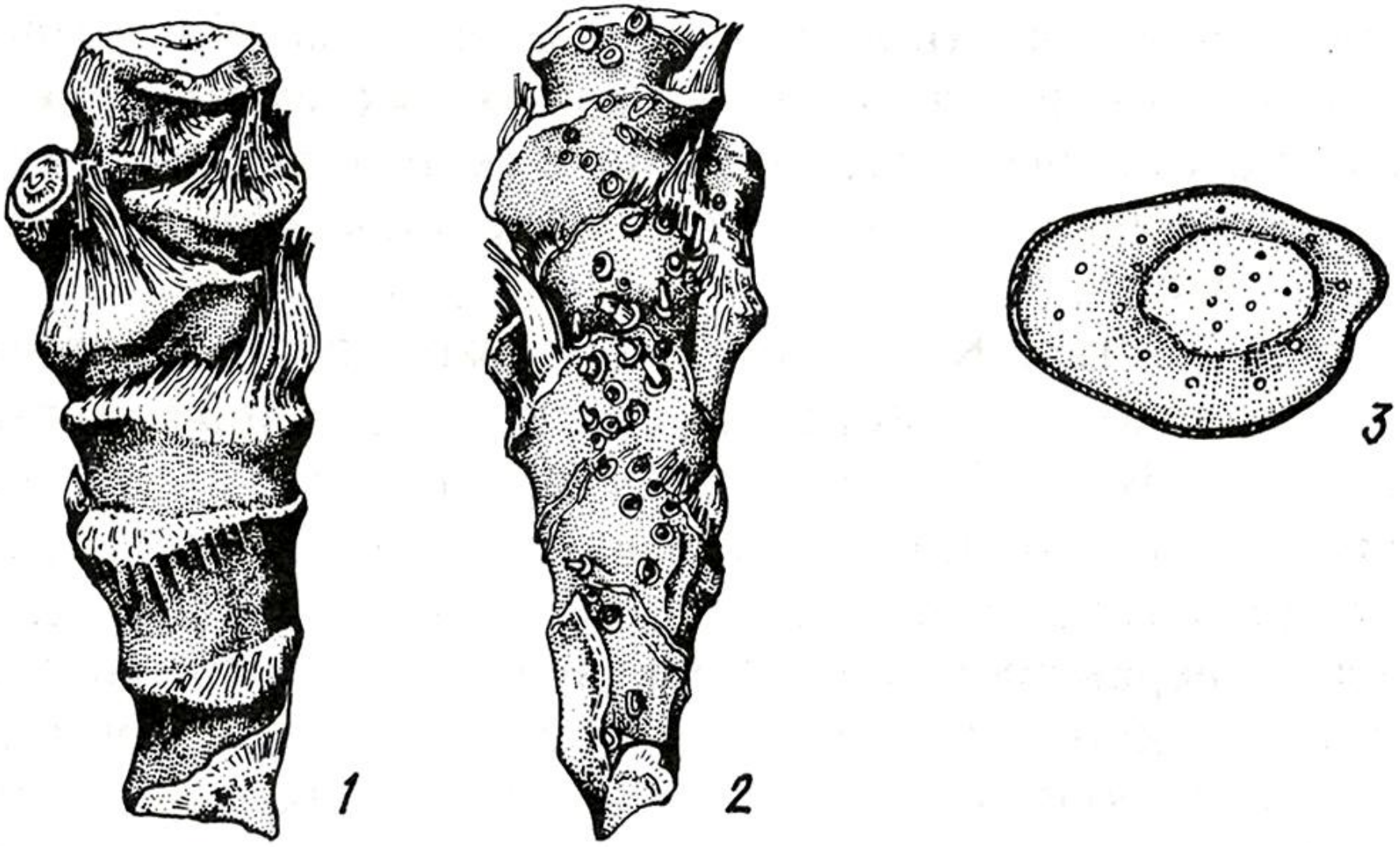


Acorus calamus L.

Iris pseudacurus



Rhizome of the calamus



1 - top view, 2 - bottom view, 3 - cross section

Rhizome of the calamus

Chemical composition. Essential oil up to 6%. Essential oil contains sesquiterpene lactones, bicyclic monoterpenes. Bitter glycoside akorin, tannins, ascorbic acid, etc.

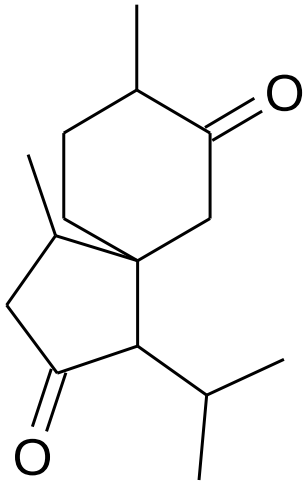
According to GF XIV in the whole raw material essential oil is not less than 2%; in the crushed raw material and powder essential oil is not less than 1.5%.

Pharm. action. Bitterness (appetite stimulant), which also has a choleretic effect.

- It is part of a gastric collection, as well as for making bitter tincture. Air oil is part of the drug "Olimetin" used in urolithiasis and cholelithiasis. Vicinalin and Vicair for gastric and 12-duodenal ulcer.


ЛЕКАРСТВЕННЫЕ ТРАВЫ РОССИИ
АИРА КОРНЕВИЩА
Calami rhizomata


Vicalinum
ВИКАЛИН
Отпускается без рецепта врача
100 таблеток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Акорон


Herbes
живой источник
50г
АИР ОБЫКНОВЕННЫЙ
АИР ОБЫКНОВЕННЫЙ
Acorus calamus
Acorus calamus

Благодарю за внимание