Flos Lavandulae

Definition

Flos Lavandulae consists of the dried flowers of *Lavandula angustifolia* Mill. (Lamiaceae) (*1–3*).

Synonyms

Lavandula officinalis Chaix, *L. spica* Loisel., *L. vera* DC, *L. vulgaris* Lam. (*1, 4, 5*). Lamiaceae are also known as Labiatae. In most formularies and older reference books, *Lavandula officinalis* Chaix is regarded as the correct species name. However, according to the International Rules of Botanical Nomenclature, *Lavandula angustifolia* Mill. is the legitimate name for the species (*5, 6*).

Selected vernacular names

Al birri, alhucema, arva neh, aspic, broad-leaved lavenda, common lavender, Echter Lavendel, English lavender, espi, espic, espliego común, firigla, frigous, garden lavendar, grando, hanan, hanene, hzama, khazama, khirii, khouzamaa, khouzami, khuzama, khuzama fassiya, khuzama zerqua, Kleiner Speik, Lavanda, lavande, lavande femelle, lavande véritable, lavando, lavandula vraie, Lavendel, lavender, lawanda, lófinda, ostoghodous, postokhodous, spigandos, true lavender (*1, 2, 5–9*).

Geographical distribution

Indigenous to the northern Mediterranean region. Cultivated in southern Europe and in Bulgaria, Russian Federation, United States of America and the former Yugoslavia (*5, 10*).

Description

An aromatic shrub, 1–2 m high. Branches grey-brown to dark brown with long flowering and short leafy shoots, bark longitudinally peeling. Leaves clustered on leafy shoots, widely spaced on flowering shoots; petiole very short; blade linear-lanceolate to linear, 17 mm long, 2 mm wide on leafy shoots, 2–6 cm long, 3–6 mm wide on flowering shoots; grey

stellate tomentose, base attenuate, margin entire, revolute, apex obtuse. Inflorescence a crowded, interrupted or nearly continuous spike, 2–8 cm long; verticillasters numerous, with 6–10 flowers, upper ones densely crowded; peduncle about three times longer than the spike; bracts papery, rhombic-ovate, 3–8 mm long, rust coloured when dry; bracteoles absent or up to 2.5 mm long, pedicel 1.0–1.5 mm long; calyx 4–7 mm long, densely grey stellate tomentose outside, with 13 longitudinal ribs, upper lip entire, appendage obcordate, lower lip four-toothed; corolla 10–12 mm long, blue, base subglabrous, throat and limb glandular hairy, upper lips straight, lower lips spreading. Nutlets narrowly cylindrical (*5*).

Plant material of interest: dried flowers

General appearance

Consists mainly of tubular-ovoid, ribbed, bluish-grey calices with five teeth, four of which are short, while the fifth forms an oval or cordate projecting lip. Petals, much crumpled, are fused into a tube with a lower lip consisting of three small lobes and an upper lip comprising two larger erect lobes; the colour varies from deep bluish grey to a discoloured brown. Corolla contains four stamens and a superior ovary (*10*).

Organoleptic properties

Odour: fragrant, aromatic; taste: aromatic, bitter, somewhat camphoraceous (*1, 2*).

Microscopic characteristics

Calyx and corolla bear glandular hairs with a very short unicellular stalk and a head of four to eight cells, of a labiaceous type, and characteristic branching unicellular and multicellular non-glandular hairs with pointed ends and a somewhat streaked or warty cuticle. Corolla bears also, on the inner surface at the throat, characteristic glandular hairs with a unicellular, glandular head and a bicellular stalk, its basal cell being long and knotted and the other cell short and cylindrical. Anthers covered with whip-shaped, unicellular, non-glandular trichomes; pollen grains, almost rounded, with six germ pores (*1*).

Powdered plant material

Grey-blue with fragments of calyx, elongated epidermal cells with wavy anticlinal walls, and multicellular non-glandular covering trichomes. Encapsulated labiate oil glands. Corolla fragments, almost oval and slightly wavy-walled epidermal cells, labiate oil glands and branched covering hairs; unicellular glandular hairs. Pollen grains spherical to ellipsoidal, 24–30 µm in diameter, with six furrows, six germ pores and lines of pits

radiating from the poles. Leaf fragments, almost straight-walled epidermal cells, covering branched trichomes and labiate oil glands, glandular hairs with a unicellular stalk and a bicellular head (*11*).

General identity tests

Macroscopic and microscopic examinations (*1–3*), microchemical tests (*2*), and thin-layer chromatography for the presence of linalyl acetate and linalool (*3*, *12*).

Purity tests

Microbiological

Tests for specific microorganisms and microbial contamination limits are as described in the WHO guidelines on quality control methods for medicinal plants (*13*).

Foreign organic matter

Not more than 2.0% (*3*).

Total ash

Not more than 9.0% (*3*).

Acid-insoluble ash

Not more than 1.0% (*2*).

Water-soluble extractive

Not less than 18.0% (*2*).

Alcohol-soluble extractive

Not less than 12.0% (*2*).

Moisture

Not more than 10.0% (*3*).

Pesticide residues

The recommended maximum limit of aldrin and dieldrin is not more than 0.05 mg/kg (*14*). For other pesticides, see the *European pharmacopoeia* (*14*), and the WHO guidelines on quality control methods for medicinal plants (*13*) and pesticide residues (*15*).

Heavy metals

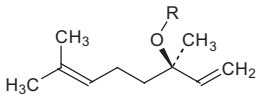
For maximum limits and analysis of heavy metals, consult the WHO guidelines on quality control methods for medicinal plants (*13*).

Radioactive residues
Where applicable, consult the WHO guidelines on quality control methods for medicinal plants for the analysis of radioactive isotopes (*13*).

Other purity tests
Chemical tests to be established in accordance with national requirements.

Chemical assays
Contains not less than 1.3% (v/w) essential oil determined by steam distillation (*3*).

Major chemical constituents
Contains 1.0–3.0% essential oil, of which the major constituents are linalyl acetate (30–55%) and linalool (20–50%). Other constituents include β-ocimene, 1,8-cineole (1,8-cineol, cineol, cineole, eucalyptol), camphor and caryophyllene oxide (*6, 9, 10*). The structures of linalyl acetate and linalool are presented below.



and enantiomer

linalool R = H

linalyl acetate R = CO-CH3

Medicinal uses
Uses supported by clinical data
None.

Uses described in pharmacopoeias and well established documents
Symptomatic treatment of restlessness, insomnia, and as a carminative and antispasmodic for gastrointestinal disorders of nervous origin (*10, 16*). Externally in balneotherapy for the treatment of cardiovascular disorders (*10, 16*).

Uses described in traditional medicine
As a diuretic and an emmenagogue, and for the treatment of burns, diarrhoea, headaches, sore throats and wounds (*10*).

Pharmacology
Experimental pharmacology
Antimicrobial activity
Aqueous, chloroform, hexane and methanol extracts of Flos Lavandulae, 60.0 µg/ml, inhibited the growth of *Streptococcus pneumoniae* in vitro

(*17*). A methanol extract of the flowers inhibited the growth of *Helicobacter pylori* (the bacterium associated with peptic ulcer disease) in vitro, minimum inhibitory concentration 100.0 µg/ml (*18*).

Antioxidant activity
A 50% ethanol extract of the flowers had antioxidant activity in vitro, median effective dose 45.0 mg/ml (*19*).

Antiulcer activity
Intragastric administration of 400.0 mg/kg body weight (bw) of an 80% ethanol extract of the flowers to mice significantly ($P < 0.05$) reduced ethanol-induced gastric ulcerations by 62.9% (*20*).

Uterine stimulating activity
A hot aqueous extract of the flowers (dose not specified) stimulated uterine contractions in isolated pregnant guinea-pig uterus (*21*).

Anticonvulsant and sedative activities
Intraperitoneal administration of 2.5 g/kg bw of linalool to rodents protected against convulsions induced by pentylenetetrazole, picrotoxin and electroshock (*22, 23*). In mice, intraperitoneal administration of 2.5 g/kg bw of linalool interfered with glutamate function and delayed *N*-methyl-D-aspartate-induced convulsions (*24*). Linalool acts as a competitive antagonist of [^{3}H]-glutamate binding and as a non-competitive antagonist of [^{3}H]-dizocilpine binding in mouse cortical membranes, suggesting interference of glutamatergic transmission. The effects of linalool on [^{3}H]-glutamate uptake and release in mouse cortical synaptosomes were investigated. Linalool reduced potassium-stimulated glutamate release (*25*). These data suggest that linalool interferes with elements of the excitatory glutamatergic transmission.

Adverse reactions
No information available.

Contraindications
Flos Lavandulae is contraindicated in cases of known allergy to the plant material. Owing to their traditional use as an emmenagogue and abortifacient, the flowers should not be used during pregnancy (*21, 26*).

Warnings
No information available.

Precautions

Pregnancy: non-teratogenic effects

See Contraindications.

Other precautions

No information available on general precautions or on precautions concerning drug interactions; drug and laboratory test interactions; carcinogenesis, mutagenesis, impairment of fertility; teratogenic effects during pregnancy; nursing mothers; or paediatric use.

Dosage forms

Dried flowers, tablets, capsules, fluidextract, syrup, tincture and tonics (*10*). Store in a well closed container, in a cool, dry place, protected from light (*1*).

Posology

(Unless otherwise indicated)

Internally as a tea, dried flowers, 1–2 teaspoonfuls per cup, three times per day; tincture (1:5) in 60% ethanol, 2–4 ml three times per day (*11*). Externally as bath therapy, dried flowers, 20–100 g per 20 l of water (*16*).

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