
Flos Sambuci

Definition

Flos Sambuci consists of the dried flowers of *Sambucus nigra* L. (Caprifoliaceae) (1–3).

Synonyms

Sambucus arborescens Gilib., *S. medullina* Gilib., *S. vulgaris* Lam. (4).

Selected vernacular names

Aalhornblüten, aghti, agti, American elder bailasan, black elder, bodzavirág, bombardie, boumbardelia, boumbardier, bourtree flower, couloubriquier, elderberry, elder flowers, European elder, fiore di sambuco, fleurs de sureau, Fliederblüten, flor de sabugeiro, flores de sauco, flores sambuci, flos sambuci nigra, Holderblüten, Hollerblüten, Holunderblüten, Hüschenblumen, kabiu sabugah, Kalikenblumen, Khaman kabiv sabubah, okkez sidi musa, patlanguc, petadou, sabugeiro, sahuquier, sahus sambequie, sambuc, sambuco, sammuch, sammuco, sauci, saucio, sauco, sauguer, seic, seiyouniwatoko, sultanotu, sureau, sureau noir, sweet elder (4–8).

Geographical distribution

Indigenous to North Africa, North America, western and central Asia and Europe (6, 7).

Description

A shrub growing in moist soil with stems up to 4 m high; contains abundant white pith. Leaves imparipinnate with 5–11 oblong, glabrous leaflets, the lower leaves often 3-lobed. Inflorescence a flat compound cyme. Flowers small, urn-shaped, white, each with 5 minute calyx lobes; corolla 5-cleft gamopetalous, 5 stamens and a tricarpellate pistil with 3 stigmas. Fruits black-purple, edible, berry-like drupes (6).

Plant material of interest: dried flowers

General appearance

Inflorescence a flat compound cyme. Flowers white, up to 5 mm in diameter, has 3 small bracts (visible with a hand lens) and may have a peduncle. Calyx

minute, 5-lobed; corolla light yellow, with 5 broadly oval petals fused at their bases into a tube, 5 yellow stamens with short filaments and lemon-yellow anthers, and a trilobular inferior ovary; ovary bears a short style with 3 obtuse stigmata; filaments of the 5 stamens alternate with the petals. Corolla often isolated or fused to base of the stamens (1, 2).

Organoleptic properties

Odour: strong, characteristic, aromatic; taste: mucilaginous, sweet but slightly bitter (1, 9).

Microscopic characteristics

Cells of upper epidermis of sepals polygonal with faintly striated cuticle; cells of lower epidermis sinuous-walled with strongly striated cuticle and scattered, rounded, anomocytic stomata; unicellular marginal teeth rounded at the apex occur in the basal region of sepal. Cells of upper epidermis of petals polygonal with slightly thickened, beaded walls and striated cuticle; cells of lower epidermis distinctly sinuous with large, rounded, anomocytic stomata. Numerous small globules of essential oil in the epidermis of sepals and petals. Mesophyll of sepals and petals contains idioblasts of numerous small, sandy crystals of calcium oxalate. Fibrous layer of anthers with characteristic thickening and beading on walls; pollen grains subspherical, 17–24 µm in diameter, with smooth exine, 3 distinct pores and 3 furrows (1).

Powdered plant material

Greenish-yellow. Numerous spherical, sometimes ellipsoidal, pollen grains up to 30 µm in diameter, with 3 germinal pores and very finely pitted exine; calyx epidermal cells with a striated cuticle and occasional unicellular marginal teeth from basal region; corolla fragments with numerous small globules of essential oil; cells of corolla upper epidermis with slightly thickened, beaded walls and striated cuticle; mesophyll cells of sepals and petals with idioblasts containing numerous sandy crystals of calcium oxalate (2).

General identity tests

Macroscopic and microscopic examinations, and thin-layer chromatography for constituent phenolic acids and flavonoids (2).

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 (10).

Foreign organic matter

Not more than 8% fragments of coarse pedicels and other foreign matter; not more than 15% discoloured, brown flowers (2).

Total ash

Not more than 10% (1, 2).

Acid-insoluble ash

Not more than 2% (1).

Water-soluble extractive

Not less than 25% (1).

Loss on drying

Not more than 10% (2).

Pesticide residues

The recommended maximum limit of aldrin and dieldrin is not more than 0.05 mg/kg (11). For other pesticides, see the *European pharmacopoeia* (11) and the WHO guidelines on quality control methods for medicinal plants (10) and pesticide residues (12).

Heavy metals

For maximum limits and analysis of heavy metals, consult the WHO guidelines on quality control methods for medicinal plants (10).

Radioactive residues

Where applicable, consult the WHO guidelines on quality control methods for medicinal plants (10) for the analysis of radioactive isotopes.

Other purity tests

Chemical, sulfated ash and alcohol-soluble extractive tests to be established in accordance with national requirements.

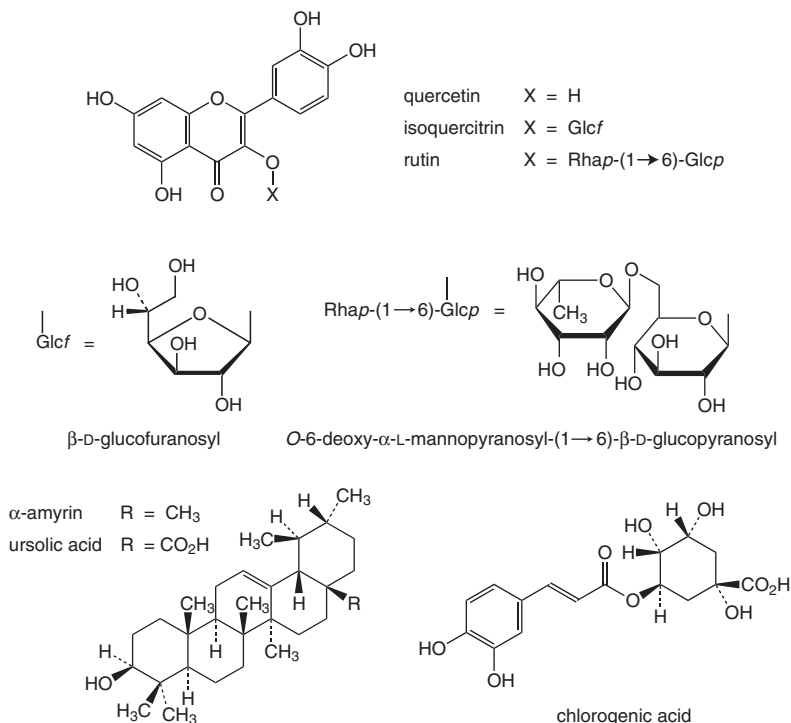
Chemical assays

Contains not less than 0.80% flavonoids, calculated as isoquercitrin, as determined by spectrophotometry at 425 nm (2).

Major chemical constituents

The major characteristic constituents (up to 3.0%) are the flavonoids (kaempferol, astragalinalin, quercetin, rutin, isoquercitrin, hyperoside). Other

major secondary metabolites include about 1% triterpenes (α - and β -amyrin, ursolic acid, oleanolic acid), about 1% sterols (β -sitosterol, campesterol, stigmasterol), about 3% phenolic acids and their corresponding glycosides (chlorogenic, ferulic, caffeic and *p*-coumaric acids), and up to 0.15% essential oil (4, 5, 7, 13). The structures of the representative major constituents are presented below.



Medicinal uses

Uses supported by clinical data

None.

Uses described in pharmacopoeias and in traditional systems of medicine

As a diaphoretic for treatment of fever and chills, and as an expectorant for treatment of mild inflammation of the upper respiratory tract. Also for symptomatic treatment of the common cold (1, 7, 14).

Uses described in folk medicine, not supported by experimental or clinical data

Treatment of conjunctivitis, constipation, diabetes, diarrhoea, dry skin, headaches and rheumatism (5, 13, 15).

Pharmacology

Experimental pharmacology

Anti-inflammatory activity

An 80% ethanol extract of Flos Sambuci had moderate anti-inflammatory activity in rats: it inhibited carrageenan-induced footpad oedema by 27%. The extract was administered intragastrically (100 mg/kg body weight) 1 hour prior to administration of carrageenan. The control drug, indometacin (5 mg/kg body weight) inhibited carrageenan-induced footpad oedema by 45% (16). Intraperitoneal administration of an unsaponifiable fraction of the flowers to mice moderately enhanced phagocytosis at a dose of 0.5 ml/animal (17). A 100% methanol extract of the flowers inhibited the biosynthesis of the inflammatory cytokines interleukin-1 α , interleukin-1 β and tumour necrosis factor- α at a concentration of 30 μ g/ml in human peripheral mononuclear cells in vitro (18).

Diuretic activity

Intragastric administration of an infusion of the flowers (20 ml/kg body weight) or of a potassium- and flavonoid-rich extract of the flowers had a diuretic effect in rats which was greater than that observed with theophylline (5 mg/kg body weight) (19).

Clinical pharmacology

Diaphoretic activity

Flos Sambuci is reported to increase the response of the sweat glands to heat stimuli (7, 20, 21), and increase diaphoresis in healthy subjects (7, 21).

Contraindications

No information available.

Warnings

No information available.

Precautions

No information available on general precautions or precautions concerning drug interactions; drug and laboratory test interactions; carcinogenesis, mutagenesis, impairment of fertility; teratogenic and non-teratogenic effects in pregnancy; nursing mothers; or paediatric use. Therefore, Flos Sambuci should not be administered during pregnancy or lactation or to children without medical supervision.

Adverse reactions

No information available.

Dosage forms

Crude drug for decoctions and infusions (crude drug also available in tea bags); as a component of multi-ingredient products (7). Store in a well-closed container, protected from light (2).

Posology

(Unless otherwise indicated)

Daily dosage: crude drug 3–5 g as an infusion (preferably taken hot) three times daily; 25% ethanol extract 3–5 ml; tincture (1 : 5 in 25% ethanol) 10–25 ml (22).

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