

Elecampane

Species (Family)

Inula helenium L. (Asteraceae/Compositae)

Synonym(s)

Alant, *Aster helenium* (L.) Scop., *Aster officinalis* All., *Helenium grandiflorum* Gilib., Horseheal, Inula, Scabwort, Yellow Starwort

An elecampane extract has been referred to as helenin. Alantolactone is also known as elecampane camphor, alant camphor, helenin and inula camphor.^(G45)

Part(s) Used

Rhizome, root

Pharmacopoeial and Other Monographs

BHC 1992^(G6)

BHP 1996^(G9)

Martindale 32nd edition^(G43)

PDR for Herbal Medicines 2nd edition^(G36)

Legal Category (Licensed Products)

GSL^(G37)

Constituents^(G2,G6,G41,G64)

Carbohydrates Inulin (up to 44%), mucilage.

Terpenoids β - and γ -sitosterols, stigmasterol and damaradienol (sterols), friedelin.

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

Other constituents Resin.

Food Use

Elecampane is listed by the Council of Europe as a natural source of food flavouring (category N2). This category indicates that elecampane can be added to foodstuffs in small quantities, with a possible limita-

tion of an active principle (as yet unspecified) in the final product.^(G16)

In the USA, elecampane is only approved for use in alcoholic beverages.^(G41)

Herbal Use

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.^(G2,G6,G7,G8,G64)

Alantolactone has been used as an anthelmintic in the treatment of roundworm, threadworm, hookworm and whipworm infection.^(G44,G45)

Dosage

Rhizome/root 1.5–4.0 g or by decoction three times daily.^(G6,G7)

Liquid extract 1.5–4.0 mL (1:1 in 25% alcohol) three times daily.^(G6,G7)

Alantolactone 300 mg daily for two courses of 5 days, with an interval of 10 days. Children, 50–200 mg daily.^(G44)

Pharmacological Actions

In vitro and animal studies

Elecampane infusion has exhibited a pronounced sedative effect in mice.^(G41) Alantolactone has been reported to exhibit hypotensive, hyperglycaemic (large doses) and hypoglycaemic (smaller doses) actions in animals.^(G41) Antibacterial properties have also been documented. Alantolactone and isalantolactone have been reported to exhibit high bactericidal and fungicidal properties *in vitro*.^(G41)

The volatile oil has been reported to exert a potent smooth muscle relaxant effect *in vitro* on guinea-pig ileal and tracheal muscle.⁽¹⁾

Various activities have been documented for *Inula racemosa*: an extract lowered plasma insulin and glucose concentrations in rats 75 minutes after oral administration,⁽²⁾ counteracted adrenaline-induced hyperglycaemia in rats,⁽²⁾ exhibited negative inotropic and chronotropic effects on the frog heart,⁽²⁾ and

provided a preventative and curative action against experimentally induced myocardial infarction in rats.⁽³⁾ Pretreatment was found to be most effective.⁽³⁾

Sesquiterpene lactones with antitumour activity have been isolated from *Helenium microcephalum*.^(4,5)

Clinical studies

Alantolactone has been used as an anthelmintic in the treatment of roundworm, threadworm, hookworm and whipworm infection.^(G44,G45)

Inula racemosa has been reported to prevent ST-segment depression and T-wave inversion in patients with proven ischaemic heart disease,⁽²⁾ and to have a beneficial effect on angina pectoris.⁽⁶⁾

Side-effects, Toxicity

Elecampane has been reported to cause allergic contact dermatitis.^(G51) Sensitising properties have been documented for the volatile oil,^(G51,G58) and for alantolactone and isovalantolactone.⁽⁷⁾ *In vitro* cytotoxicity has been reported for alantolactone and isovalantolactone.⁽⁸⁾

Contraindications, Warnings

Elecampane may cause an allergic reaction, particularly in individuals with an existing allergy or sensitivity to other plants in the Asteraceae family. Elecampane may interfere with existing hypoglycaemic and antihypertensive treatment.

Pregnancy and lactation The safety of elecampane taken during pregnancy has not been established. In view of the lack of toxicity data, the use of elecampane during pregnancy and lactation should be avoided.

Pharmaceutical Comment

The pharmacological actions documented for elecampane seem to be attributable to the sesquiterpene lactone constituents, in particular alantolactone and isovalantolactone. The demulcent action of mucilage and reported *in vivo* antispasmodic activity of the volatile oil support the traditional uses of this remedy

in coughs. In addition, alantolactone has been utilised as an anthelmintic. A number of interesting cardiovascular activities have been documented for a related species, *I. racemosa*. Whether the constituents responsible for these actions are also present in elecampane is unclear. In view of the paucity of toxicity data for elecampane, excessive or prolonged use should be avoided.

References

See also General References G2, G6, G9, G16, G31, G36, G37, G41, G43, G48, G51, G58 and G64.

- 1 Reiter M, Brandt W. Relaxant effects on tracheal and ileal smooth muscles of the guinea pig. *Arzneimittelforschung* 1985; 35: 408-414.
- 2 Tripathi YB *et al.* Assessment of the adrenergic beta-blocking activity of *Inula racemosa*. *J Ethnopharmacol* 1988; 23: 3-9.
- 3 Patel V *et al.* Effect of indigenous drug (puskarmula) on experimentally induced myocardial infarction in rats. *Acta Nerv Super (Praha)* 1982; (Suppl 3): 387-394.
- 4 Sims D *et al.* Antitumor agents 37. The isolation and structural elucidation of isohelenol, a new antileukemic sesquiterpene lactone, and isohelenalin from *Helenium microcephalum*. *J Nat Prod* 1979; 42: 282-286.
- 5 Imakura Y *et al.* Antitumor agents XXXVI: Structural elucidation of sesquiterpene lactones microhelenins-A, B, and C, microlenin acetate, and plenolin from *Helenium microcephalum*. *J Pharm Sci* 1980; 69: 1044-1049.
- 6 Tripathi SN *et al.* Beneficial effect of *Inula racemosa* (pushkarmoola) in angina pectoris: a preliminary report. *Indian J Physiol Pharmacol* 1984; 28: 73-75.
- 7 Stampf JL *et al.* The sensitising capacity of helenin and two of its main constituents the sesquiterpene lactones alantolactone and isovalantolactone: a comparison of epicutaneous and intradermal sensitising methods in different strains of guinea pig. *Contact Dermatitis* 1982; 8: 16-24.
- 8 Woerdenbag HJ. *In vitro* cytotoxicity of sesquiterpene lactones from *Eupatorium cannabinum* L. and semi-synthetic derivatives from eupatoriopirin. *Phytother Res* 1988; 2: 109-114.