

Asafoetida

Species (Family)

Ferula species including:

- (i) *Ferula assafoetida* L. (*Ferula rubricaulis* Boiss)
- (ii) *Ferula foetida* (Bunge) Regel (Apiaceae/Umbelliferae)

Synonym(s)

Asafetida, Asant, Devil's Dung, Gum Asafetida

Part(s) Used

Oleo gum resin obtained by incising the living rhizomes and roots.

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^(G6,G41,G46,G48,G58,G59,G62,G64)

Gum fraction 25%. Glucose, galactose, L-arabinose, rhamnose and glucuronic acid.

Resins 40–64%. Ferulic acid esters (60%), free ferulic acid (1.3%), asaresinotannols and farnesiferols A, B and C, coumarin derivatives (e.g. umbelliferone), coumarin–sesquiterpene complexes (e.g. asacoumarin A and asacoumarin B).⁽¹⁾ Free ferulic acid is converted to coumarin during dry distillation.

Volatile oils 3–17%. Sulfur-containing compounds with disulfides as major components, various monoterpenes.⁽¹⁾

The oleo gum resins of different *Ferula* species are not identical and many papers have documented their phytochemistry,^(2–11) reporting polysulfanes,^(2–11) complex acetylenes,⁽³⁾ phenylpropanoids⁽⁷⁾ and many sesquiterpene derivatives.^(2,4,5,6,8,9)

C-3 prenylated 4-hydroxycoumarin derivatives (e.g. ferulenol) are thought to represent the toxic principles in the species *Ferula communis*.⁽¹²⁾

Food Use

Asafoetida is used widely in foods. Asafoetida (essential oil, fluid extract and gomme-oleoresin) is listed by the Council of Europe as a source of natural food flavouring (category 5) (see Appendix 23).^(G17) Asafoetida is approved for food use in the USA.^(G41)

Herbal Use

Asafoetida is stated to possess carminative, antispasmodic and expectorant properties. It has been used for chronic bronchitis, pertussis, laryngismus stridulus, hysteria and specifically for intestinal flatulent colic.^(G6,G7)

Dosage

Powdered resin 0.3–1 g three times daily^(G6,G7)

Tincture of asafoetida (BPC 1949) 2–4 mL

Pharmacological Actions

In vitro and animal studies

Asafoetida has been reported to possess anticoagulant and hypotensive properties.^(G41) Asafoetida is an ingredient of a plant mixture reported to have antidiabetic properties in rats.⁽¹³⁾ However, when the individual components of the mixture were studied asafoetida was devoid of antidiabetic effect with myrrh and aloe gum extracts representing the active hypoglycaemic principles.⁽¹⁴⁾

Oestrogenic activity in rats has been documented for carotane sesquiterpenes and ferujol (a coumarin) isolated from *Ferula jaeschkeana*.^(15,16)

Clinical studies

A protective action against fat-induced hyperlipidaemia has been documented for asafoetida and attributed to the sulfur compounds in the volatile oil fraction of the resin.⁽¹⁷⁾ Two double-blind studies have reported the efficacy of asafoetida in the treatment of irritable bowel syndrome to be just below the 5% significance level in one study⁽¹⁸⁾ and at 1% in the other.⁽¹⁹⁾

Side-effects, Toxicity

Asafoetida is documented to be relatively non-toxic; ingestion of 15 g produced no untoward effects.^(G45) A report of methaemoglobinaemia has been associated with the administration of asafoetida (in milk) to a five-week-old infant for the treatment of colic.⁽²⁰⁾ Asafoetida was found to exert an oxidising effect on fetal haemoglobin but not on adult haemoglobin.

Toxic coumarin constituents of a related species, *Ferula communis*, have been documented to reduce prothrombin concentrations and to cause haemorrhaging in livestock.^(21,G51)

Two other species, *Ferula galbaniflua* and *Ferula rubicaulis*, are stated to contain a gum that is rubefacient and irritant, causing contact dermatitis in sensitive individuals.^(G51,G58)

A weak sister chromatid exchange-inducing effect in mouse spermatogonia⁽²²⁾ and clastogenicity in mouse spermatocytes⁽²³⁾ has been documented for asafoetida. Chromosomal damage by asafoetida has been associated with the coumarin constituents.

Contra-indications, Warnings

Asafoetida should not be given to infants because of the oxidising effect on fetal haemoglobin resulting in methaemoglobinaemia.⁽²⁰⁾ The gum of some *Ferula* species is reported to be irritant and therefore may cause gastrointestinal irritation or induce contact dermatitis in some individuals. Excessive doses may interfere with anticoagulant therapy and with hypertensive and hypotensive therapy.

Pregnancy and lactation Asafoetida has a folkloric reputation as an abortifacient and an emmenagogue.^(G30) However the use of asafoetida during pregnancy is probably acceptable, provided doses do not exceed amounts normally ingested in foods. In view of the toxic effect to infants (e.g. methaemoglobinaemia), asafoetida should be avoided during breast feeding.

Pharmaceutical Comment

Asafoetida is a complex oleo gum resin consisting of many constituents that vary according to the different species used. Asafoetida is commonly used in foods but little scientific evidence is available to justify the herbal uses. In view of the known pharmacologically active constituents, asafoetida should not be taken in amounts exceeding those used in foods.

References

See also General References G6, G7, G9, G16, G19, G30, G36, G37, G41, G43, G46, G48, G51, G58, G59, G62 and G64.

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