

Pennyroyal

Species (Family)

- (i) *Mentha pulegium* L. (Labiatae)
- (ii) *Hedeoma pulegoides* (L.) Pers.

Synonym(s)

- Pulegium
- (i) European Pennyroyal
- (ii) American Pennyroyal

Part(s) Used

Herb

Pharmacopoeial and Other Monographs

- BHP 1983^(G7)
- Martindale 32nd edition^(G43)
- PDR for Herbal Medicines 2nd edition^(G36)

Legal Category (Licensed Products)

Pennyroyal is not included in the GSL.^(G37)

Constituents^(G22,G48,G64,G58)

Volatile oils 1–2%. Pulegone is the principal component (60–90%); others include menthone, *iso*-menthone, 3-octanol, piperitenone and *trans*-*iso*-pulegone.

Food Use

Pennyroyal is not commonly used in foods. It is listed by the Council of Europe as a natural source of food flavouring (category N3).^(G16) This category indicates that there is insufficient information available for an adequate assessment of toxicity (*but see* Side-effects, Toxicity). In the USA, pennyroyal is permitted for use in foods.^(G65)

Herbal Use

Pennyroyal is stated to possess carminative, antispasmodic, diaphoretic and emmenagogue properties, and has been used topically as a refrigerant, antiseptic and insect repellent. Traditionally, it has been used for flatulent dyspepsia, intestinal colic, common cold, delayed menstruation, and topically for cutaneous eruptions, formication and gout.^(G7)

Dosage

Herb 1–4 g or as infusion three times daily.^(G7)

Liquid extract 1–4 mL (1:1 in 45% alcohol) three times daily.^(G7)

Pharmacological Actions

None documented.

Side-effects, Toxicity

The toxicity of pennyroyal oil is well recognised and human fatalities following its ingestion as an abortifacient have been reported.^(1–3) Symptoms reported following ingestion of the oil include abdominal pain, nausea, vomiting, diarrhoea, lethargy and agitation, pyrexia, raised blood pressure and pulse rate, and generalised urticarial rash. Generally, doses required for an abortifacient effect are also toxic and fatalities have involved both nephrotoxicity and hepatotoxicity.^(2, 3, 4,) Doses of one ounce and 30 mL^(1–3) have proved fatal, whereas individuals have recovered following unsuccessful abortion attempts involving the ingestion of 7.5 mL oil.⁽³⁾ The mechanism of hepatotoxicity for pennyroyal is not known.⁽²⁾ A direct hepatotoxic action has been suggested for the ketone component, pulegone.⁽²⁾ Alternatively, metabolic conversion of pulegone to a reactive intermediate, a furan or epoxide, has been proposed.⁽²⁾

Acute LD₅₀ values for pennyroyal oil are documented as 0.4 g/kg (oral, rats) and 4.2 g/kg (dermal, rabbits).⁽⁴⁾ The oil is non- or moderately irritating, non-sensitising and non-phototoxic.⁽⁴⁾ Acute LD₅₀ values documented for pulegone, the principal oil component, are, not surprisingly, similar to those for the oil: 0.47 g/kg (oral, rats), 3.09 g/kg (dermal, rabbits).⁽⁵⁾ Steroid (pregnenolone-16 α -carbonitrile) treatment has reduced hepatotoxicity observed in female rats fed pulegone, whereas triamcinolone has increased it.⁽⁵⁾ Toxicity of pulegone is unaffected by partial hepatectomy or ligation of the common bile duct, while partial nephrectomy intensified toxicity.⁽⁵⁾

Contra-indications, Warnings

Pennyroyal oil is irritant and instances of hepatotoxicity and nephrotoxicity have been documented

following its ingestion. Both the internal and external use of pennyroyal oil has been contra-indicated.^(G5S)

Pregnancy and lactation Pennyroyal is contra-indicated in pregnancy.^(G7) Traditionally, it has been employed as an abortifacient, this use probably resulting from the irritant action of the oil on the genito-urinary tract. Fatalities have resulted from the doses of oil required to exert an abortifacient effect.

Pharmaceutical Comment

Interest in pennyroyal has focused on the toxicity associated with the volatile oil. No documented reports of the pharmacological actions exhibited by the herb were located. Pennyroyal herb teas have been reported to be used without side-effects,⁽²⁾ presumably due to lower amounts of oil ingested. In view of its potential toxicity, excessive ingestion of

the oil should be avoided. Pennyroyal oil is not suitable for internal or external use.

References

See also General References G7, G19, G22, G31, G32, G36, G37, G43, G48, G58 and G64.

- 1 Vallance WB. Pennyroyal poisoning. A fatal case. *Lancet* 1955; ii: 850-851.
- 2 Sullivan JB *et al.* Pennyroyal oil poisoning and hepatotoxicity. *JAMA* 1979; 242: 2873.
- 3 Gunby P. Plant known for centuries still causes problems today. *JAMA* 1979; 241: 2246-2247.
- 4 Opdyke DLJ. Pennyroyal oil european. *Food Cosmet Toxicol* 1974; 12: 949-950.
- 5 Opdyke DLJ. Fragrance raw materials monographs: d-pulegone. *Food Cosmet Toxicol* 1978; 16: 867-868.