

Ground Ivy

Species (Family)

Nepeta hederacea (L.) Trev. (Labiatae)

Synonym(s)

Glechoma hederacea L.

Part(s) Used

Herb

Pharmacopoeial and Other Monographs

BHC 1992^(G6)

BHP 1996^(G9)

PDR for Herbal Medicines 2nd edition^(G36)

Legal Category (Licensed Products)

GSL^(G37)

Constituents^(G6,G22,G48,G64)

Amino acids Asparagic acid, glutamic acid, proline, tyrosine and valine.

Flavonoids Flavonol glycosides (e.g. hyperoside, isoquercitrin, rutin) and flavone glycosides (e.g. luteolin diglucoside, cosmosyin).⁽¹⁾

Steroids β -Sitosterol.

Terpenoids Oleanolic acid, α -ursolic acid, β -ursolic acid.⁽²⁾

Volatile oils 0.03–0.06%. Various terpenoid components including *p*-cymene, linalool, limonene, menthone, α -pinene, β -pinene, pinocamphone, pulegone and terpineol; glechomafuran (a sesquiterpene).⁽³⁾

Other constituents Palmitic acid, rosmarinic acid, succinic acid, bitter principle (glechomin), choline, gum, diterpene lactone (marrubiin), saponin, tannin and wax.

Food Use

Ground ivy is listed by the Council of Europe as a natural source of food flavouring (category N3). This category indicates that ground ivy can be added to foodstuffs in the traditionally accepted manner, although there is insufficient information available for an adequate assessment of potential toxicity.^(G16)

Herbal Use

Ground ivy is stated to possess mild expectorant, anticatarrhal, astringent, vulnerary, diuretic and stomachic properties. Traditionally, it has been used for bronchitis, tinnitus, diarrhoea, haemorrhoids, cystitis, gastritis, and specifically for chronic bronchial catarrh.^(G6,G7,G8,G49,G64)

Dosage

Dried herb 2–4 g or by infusion three times daily.^(G6,G7)

Liquid extract 2–4 mL (1:1 in 25% alcohol) three times daily.^(G6,G7)

Pharmacological Actions

In vitro and animal studies

In vivo anti-inflammatory activity has been reported for an ethanolic extract of ground ivy, which was stated to exhibit a moderate inhibition (27%) of carrageenan-induced rat paw oedema.⁽⁴⁾

Ursolic acid analogues, 2 α - and 2 β -hydroxyursolic acid, have been documented to provide significant ulcer-protective activity in mice.⁽⁵⁾

The astringent activity documented for ground ivy has been attributed to rosmarinic acid, a polyphenolic acid.⁽⁶⁾

Glechomin and marrubiin are stated to be bitter principles, and α -terpineol is known to be an antiseptic component of volatile oils.^(G48,G49)

Anti-inflammatory and astringent properties are generally associated with flavonoids and tannins, respectively. Anti-inflammatory properties have been documented for rosmarinic acid (*see* Rosemary).

In vitro antiviral activity against the Epstein-Barr virus has been documented for ursolic acid.⁽⁷⁾ Both

oleanolic and ursolic acids were found to inhibit tumour production by TPA in mouse skin, with activity comparable to that of retinoic acid, a known tumour-promoter inhibitor.⁽⁷⁾

Significant cytotoxic activity has also been reported for ursolic acid in lymphocytic leukaemia (P-388, L-1210) and human lung carcinoma (A-549), and marginal activity in KB cells, human colon (HCT-8), and mammary (MCF-7) tumour cells.⁽⁸⁾

Side-effects, Toxicity

Poisoning in cattle and horses has been documented in Eastern Europe.⁽⁹⁾ Symptoms include accelerated weak pulse, difficulty in breathing, conjunctival haemorrhage, elevated temperature, dizziness, spleen enlargement, dilation of the caecum, and gastroenteritis revealed at post-mortem. Antitumour and cytotoxic activities have been reported for oleanolic and ursolic acids (*see In vitro* and animal studies).

Ground ivy volatile oil contains many terpenoids and terpene-rich volatile oils are irritant to the gastrointestinal tract and kidneys. Pulegone is an irritant, hepatotoxic, and abortifacient principle of the volatile oil of pennyroyal. However, in comparison with pennyroyal the overall yield of volatile oil is much less (0.03–0.06% in ground ivy and 1–2% in pennyroyal).

Contra-indications, Warnings

Ground ivy is contra-indicated in epilepsy ^(G7) although no rationale for this statement has been found. Excessive doses may be irritant to the gastrointestinal mucosa and should be avoided by individuals with existing renal disease.

Pregnancy and lactation The safety of ground ivy has not been established. In view of the lack of toxicity data and the possible irritant and abortifacient action of the volatile oil, the use of ground ivy during pregnancy and lactation should be avoided.

Pharmaceutical Comment

The chemistry of ground ivy is well studied. Documented pharmacological activities support some of the herbal uses, although no references to human studies were located. In view of the lack of toxicity data and the reported cytotoxic activity of ursolic acid, excessive use of ground ivy should be avoided.

References

See also General References G6, G9, G16, G22, G31, G36, G37, G48, G49 and G64.

- 1 Zieba J. Isolation and identification of flavonoids from *Glechoma hederacea*. *Pol J Pharmacol Pharm* 1973; 25: 593–597.
- 2 Zieba J. Isolation and identification of nonheteroside triterpenoids from *Glechoma hederacea*. *Pol J Pharmacol Pharm* 1973; 25: 587–592.
- 3 Stahl E, Datta SN. New sesquiterpenoids of the ground ivy (*Glechoma hederacea*). *Justus Liebigs Ann Chem* 1972; 757: 23–32.
- 4 Mascolo N *et al.* Biological screening of Italian medicinal plants for anti-inflammatory activity. *Phytother Res* 1987; 1: 28–31.
- 5 Okuyama E *et al.* Isolation and identification of ursolic acid-related compounds as the principles of *Glechoma hederacea* having an antiulcerogenic activity. *Shoyakugaku Zasshi* 1983; 37: 52–55.
- 6 Okuda T *et al.* The components of tannic activities in Labiatae plants. I. Rosmarinic acid from Labiatae plants in Japan. *Yakugaku Zasshi* 1986; 106: 1108–1111.
- 7 Tokuda H *et al.* Inhibitory effects of ursolic and oleanolic acid on skin tumor promotion by 12-O-tetradecanoylphorbol-13-acetate. *Cancer Lett* 1986; 33: 279–285.
- 8 Lee K-H *et al.* The cytotoxic principles of *Prunella vulgaris*, *Psychotria serpens*, and *Hyptis capitata*: Ursolic acid and related derivatives. *Planta Med* 1988; 54: 308.
- 9 MAFF. *Poisonous Plants in Britain*. London: HMSO, 1984: 139.