

Shepherd's Purse

Species (Family)

Capsella bursa-pastoris (L.) Medic (Cruciferae)

Synonym(s)

Capsella

Part(s) Used

Herb

Pharmacopoeial and Other Monographs

BHP 1996^(G9)

Complete German Commission E^(G3)

PDR for Herbal Medicines 2nd edition^(G36)

Legal Category (Licensed Products)

GSL^(G37)

Constituents^(G2,G7,G40,G41,G64)

Amines Acetylcholine, choline, amino acids 2.33% (major component proline), histamine, tyramine and unidentified crystalline alkaloids.⁽¹⁾

Flavonoids Quercetin, diosmetin, luteolin, hesperetin and their glycosides (e.g. rutin, diosmin, hesperidin).⁽²⁾

Volatile oils 0.02%. Camphor (major); at least 74 components identified.^(3,4)

Other constituents Carotenoids, fumaric acid, sinigrin (mustard oil glucoside), ascorbic acid (vitamin C) and vitamin K.^(4,5,G2)

Food Use

Shepherd's purse is not used in foods.

Herbal Use

Shepherd's purse is stated to possess antihemorrhagic and urinary antiseptic properties. Traditionally, it has been used for menorrhagia, haematemesis,

haematuria, diarrhoea and acute catarrhal cystitis.^(G2,G7,G64)

Dosage

Dried herb 1–4 g or by infusion three times daily^(G7)

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

Pharmacological Actions

In vitro and animal studies

A variety of actions have been documented for an ethanolic extract of shepherd's purse in various animal models.^(6–9) Anti-inflammatory activity has been exhibited versus carrageenan-induced and dextran-induced rat paw oedema.⁽⁷⁾ A reduction in capillary permeability in the guinea-pig, induced by histamine and serotonin, has also been observed,⁽⁷⁾ and flavonoid components isolated from shepherd's purse have been reported to reduce blood vessel permeability in mice.⁽²⁾ Anti-ulcer activity has been documented in rats following intraperitoneal injection. The extract did not affect gastric secretion, but accelerated recovery from stress-induced ulcers.⁽⁷⁾ A hypotensive effect observed in cats, dogs, rabbits and rats, following intravenous injection, was inhibited by a β -adrenoceptor blocker but not by atropine, thus dismissing earlier reports that this action was attributable to cholinergic compounds present in shepherd's purse.^(8,9)

Diuresis has been reported in mice, following oral or intraperitoneal administration of shepherd's purse. The mode of action was stated to involve an increase in the glomerular filtration rate.⁽⁷⁾

Documented cardiac actions include increased coronary blood flow in dogs following intra-arterial administration, and a slight inhibitory effect on ouabain-induced ventricular fibrillation in the rat following intraperitoneal injection, together with a negative chronotropic effect.⁽⁹⁾ Studies on the isolated heart have reported negative chronotropic and inotropic actions in the guinea-pig and rabbit and coronary vasodilatation.⁽⁹⁾

A CNS-depressant action in mice has been demonstrated (potentiation of barbiturate-induced sleeping time).⁽⁹⁾

Weak antibacterial activity mainly towards Gram-positive organisms has been reported.⁽¹⁰⁾

Antineoplastic activity in rats has been documented for fumaric acid, which prevented the development of hepatic neoplasms when co-administered with the carcinogen 3-MeDAB.⁽¹¹⁾

Shepherd's purse seeds are stated to possess rubefacient and vesicant properties because of their isothiocyanate-yielding components.^(G51)

In vitro studies have documented stimulatory action in various smooth muscle tissues. Induced contractions of the small intestine in the guinea-pig were reported to be unaffected by atropine and diphenhydramine, but were inhibited by papaverine.^(8,9) Induced utero-activity in the rat, equivalent to the effect of oxytocin 0.1 i.u., was unaffected by atropine, but inhibited by competitive inhibitors of oxytocin.⁽⁸⁾ Two unidentified alkaloid components of shepherd's purse have also been stated to elicit a physiological activity on the uterus.⁽¹⁾ Induced tracheal contractions in the guinea-pig were unaffected by adrenaline, which did inhibit acetylcholine-induced contractions.⁽⁹⁾ These studies concluded that the active substance(s) in shepherd's purse responsible for the observed actions on smooth muscle were neither acetylcholine nor histamine.^(8,9)

Side-effects, Toxicity

Shepherd's purse extracts have been reported to exhibit low toxicity in mice. LD₅₀ values reported are 1.5g/kg body weight (mice, intraperitoneal injection) and 31.5g/kg (mice, subcutaneous injection).⁽⁹⁾ Signs of toxicity were described as sedation, enlargement of pupils, paralysis of hind limbs, difficulty in respiration, and death by respiratory paralysis.⁽⁹⁾ Following hydrolysis, the constituent sinigrin yields allyl isothiocyanate which is an extremely powerful irritant and produces blisters on the skin.^(G41) Isothiocyanates have been implicated in endemic goitre (hypothyroidism with thyroid enlargement) and have been reported to produce goitre in experimental animals.^(G41)

Contra-indications, Warnings

Prolonged or excessive use of the herb may interfere with existing therapy for hyper- or hypotension, thyroid dysfunction or cardiac disorder, and may potentiate sedative actions.

Pregnancy and lactation Shepherd's purse is reputed to act as an abortifacient and to affect the

menstrual cycle, and tyramine is documented as a utero-active constituent.^(G30) In view of this and the reported oxytocin-like activity, the use of shepherd's purse during pregnancy should be avoided. Excessive use should be avoided during lactation.

Pharmaceutical Comment

The chemistry of shepherd's purse is well documented and although a number of actions affecting the circulatory system have been observed in animal studies, these actions do not relate to the traditional herbal uses. Limited toxicity data are available. In view of this together with the demonstrated pharmacological activity of the herb, excessive use of shepherd's purse should be avoided.

References

See also General References G2, G3, G9, G30, G31, G36, G37, G40, G41, G51 and G64.

- 1 Kuroda K, Kaku T. Pharmacological and chemical studies on the alcohol extract of *Capsella bursa-pastoris*. *Life Sci* 1969; 8: 151-155.
- 2 Jurisson S. Flavonoid substances of *Capsella bursa-pastoris*. *Farmatsiya (Moscow)* 1973; 22: 34-35.
- 3 Miyazawa M *et al.* The constituents of the essential oils from *Capsella bursa-pastoris* Medik. *Yakugaku Zasshi* 1979; 99: 1041-1043.
- 4 Park RJ. The occurrence of mustard oil glucosides in *Lepidium hyssopifolium*, *L. bonariense*, and *Capsella bursa-pastoris*. *Aust J Chem* 1967; 20: 2799-2801.
- 5 Jurisson S. Vitamin content of shepherd's purse. *Farmatsiya (Moscow)* 1976; 25: 66-67.
- 6 Kuroda K, Takagi K. Studies on *Capsella bursa-pastoris*. I. General pharmacology of ethanol extract of the herb. *Arch Int Pharmacodyn Ther* 1969; 178: 382-391.
- 7 Kuroda K, Takagi K. Studies on *Capsella bursa-pastoris*. II. Diuretic, anti-inflammatory and anti-ulcer action of ethanol extracts of the herb. *Arch Int Pharmacodyn Ther* 1969; 178: 392-399.
- 8 Kuroda K, Takagi K. Physiologically active substance in *Capsella bursa-pastoris*. *Nature* 1968; 220: 707-708.
- 9 Jurisson S. Determination of active substances of *Capsella bursa-pastoris*. *Tartu Riiliku Ulikooli Toim* 1971; 270: 71-79.
- 10 Moskalenko SA. Preliminary screening of far-eastern ethnomedicinal plants for antibacterial activity. *J Ethnopharmacol* 1986; 15: 231-259.
- 11 Kuroda K. Neoplasm inhibitor from *Capsella bursa-pastoris*. *Japan Kokai* 1977; 41: 207.