

Cowslip

Species (Family)

Primula veris L. (Primulaceae)

Synonym(s)

Paigle, Peagle, Primula, *Primula officinalis* (L.) Hill.

Part(s) Used

Flower

Pharmacopoeial and Other Monographs

BHP 1983^(G7)

Complete German Commission E (Primrose flower)^(G3)

ESCOP 1997^(G52)

PDR for Herbal Medicines 2nd edition^(G36)

Legal Category (Licensed Products)

GSL^(G37)

Constituents^(G2,G40,G49,G59,G62,G64)

Carbohydrates Arabinose, galactose, galacturonic acid, glucose, rhamnose, xylose and water-soluble polysaccharide (6.2–6.6%).

Flavonoids Apigenin, isorhamnetin, kaempferol, luteolin and quercetin.⁽¹⁾

Phenols Glycosides primulaveroside (primulaverin) and primveroside.

Quinones Primin and other quinone compounds.

Saponins Primula acid in sepals but saponins absent from other parts of the flower.

Tannins Condensed (e.g. proanthocyanidin B2), pseudotannins (e.g. epicatechin, epigallocatechin).⁽¹⁾

Other constituents Silicic acid and volatile oil (0.1–0.25%).

Other plant parts Saponins have been documented for the underground parts.⁽¹⁾ 'Primulic acid' is a collective term for the saponin mixture.⁽²⁾ Primulic

acid A glycoside (5–10%) yields primulagenin A as aglycone together with arabinose, galactose, glucose, glucuronic acid, rhamnose and xylose.^(3,4) The saponin content of the roots is stated to peak at two years.⁽⁵⁾ After five years of storage the saponin content was reported to have decreased by 45%.

Food Use

Cowslip is not commonly used in foods. A related species, *Primula eliator*, is listed by the Council of Europe as a natural source of food flavouring (category N2). This category indicates that *Primula eliator* can be added to foodstuffs, provided that the concentration of coumarin does not exceed 2 mg/kg.^(G16) Coumarins, however, are not documented as constituents of *Primula veris*, the subject of this monograph.

Herbal Use

Cowslip is stated to possess sedative, antispasmodic, hypnotic, mild diuretic, expectorant and mild aperient properties. It has been used for insomnia, nervous excitability, hysteria and specifically for anxiety states associated with restlessness and irritability.^(G2,G7,G64)

Dosage

Dried flowers 1–2 g as an infusion three times daily.^(G7)

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

Pharmacological Actions

In vitro and animal studies

The saponin fraction has been reported to cause an initial hypotension followed by a long-lasting hypertension in anaesthetised animals.⁽⁶⁾

In vitro, the saponins have been documented to inhibit prostaglandin (PG) synthetase, but to a lesser extent than aspirin because of insignificant protein binding; to exhibit a slight anti-inflammatory effect against carrageenan rat paw oedema; to contract

isolated rabbit ileum; and to possess analgesic and antigranulation activity.⁽⁶⁾

Flavonoid and tannin constituents have been documented for cowslip. A variety of activities has been reported for flavonoids including anti-inflammatory and antispasmodic effects. The tannins are known to be astringent.

Side-effects, Toxicity

Allergic contact reactions to related *Primula* species have been documented; quinone compounds are stated to be the allergenic principles with primin described as a strong contact allergen.⁽⁷⁾ Two positive patch test reactions to cowslip have been recorded, although allergenicity was not proven.^(G51) An LD₅₀ value (mice, intraperitoneal injection) for the saponin fraction is documented as 24.5 mg/kg body weight compared to a value of 9.5 mg/kg for reparil (aescin). Haemolytic activity has been reported for the saponins, and an aqueous extract of cowslip is stated to contain saponins that are toxic to fish. Saponins are stated to be irritant to the gastrointestinal tract.

The toxicity of cowslip seems to be associated with the saponin constituents. However, these compounds have only been documented for the underground plant parts, and not for the flowers which are the main plant parts used in the UK.

Contra-indications, Warnings

Cowslip may cause an allergic reaction in sensitive individuals. Excessive doses may interfere with hypotensive therapy or cause gastrointestinal irritation.

Pregnancy and lactation The safety of cowslip has not been established. In view of the lack of toxicity

data, use of cowslip during pregnancy and lactation should be avoided.

Pharmaceutical Comment

The chemistry of cowslip is not well documented and it is unclear whether saponins reported as constituents of the underground plant parts are also present in the flowers. Little pharmacological information has been documented to justify the herbal uses of cowslip. In view of the lack of toxicity data, excessive use of cowslip should be avoided.

References

See also General References G2, G3, G7, G15, G16, G36, G37, G40, G44, G49, G51, G52, G59, G62 and G64.

- 1 Karl C *et al.* Die flavonoide in den blüten von *Primula officinalis*. *Planta Med* 1981; 41: 96–99.
- 2 Grecu L, Cucu V. Saponine aus *Primula officinalis* und *Primula elatior*. *Planta Med* 1975; 27: 247–253.
- 3 Kartnig T, Ri CY. Dünnschichtchromatographische untersuchungen an den zuckerkomponenten der saponine aus den wurzeln von *Primula veris* und *P. elatior*. *Planta Med* 1973; 23: 379–380.
- 4 Grecu L, Cucu V. Primulic acid aglycone from the roots of *Primula officinalis*. *Farmacia (Bucharest)* 1975; 23: 167–170.
- 5 Jentzsch K *et al.* Saponin level in the radix of *Primula veris*. *Sci Pharm* 1973; 41: 162–165.
- 6 Cebo B *et al.* Pharmacological properties of saponin fractions from Polish crude drugs. *Herb Pol* 1976; 22: 154–162.
- 7 Hausen BM. On the occurrence of the contact allergen primin and other quinoid compounds in species of the family of Primulaceae. *Arch Dermatol Res* 1978; 261: 311–321.