Gentian

Species (Family)

Gentiana lutea L. (Gentianaceae)

Synonym(s)

Bitter Root, Gentiana, Yellow Gentian

Part(s) Used

Rhizome, root

Pharmacopoeial and Other Monographs

BHC 1992[G6]
BHP 1996[G9]
BP 2001[G15]
Complete German Commission E[G3]
ESCOP 1997[G52]
Martindale 32nd edition[G43]
PDR for Herbal Medicines 2nd edition[G36]
Ph Eur 2002[G28]

Legal Category (Licensed Products)

GSL[G37]

Constituents[G2,G6,G22,G41,G60,G62,G64]

Alkaloids Pyridine-type. Gentianine 0.6–0.8%, gentialutine.

Bitters Major component is secoiridoid glycoside gentiopicroside (also known as gentiamarin and gentiopicrin) 2%, with lesser amounts of amarogentin (0.01–0.04%) and swertiamarine.[1] Gentianose (a trisaccharide bitter principle). The glycosides amaropanin and amaroswerin are reported to be present in the related species *Gentiana pannonica*, *Gentiana punctata* and *Gentiana purpurea*, but are absent from *Gentiana lutea*.

Xanthones Gentisein, gentisin (gentianin), isogentisin and 1,3,7-trimethoxyxanthone.

Other constituents Carbohydrates (e.g. gentiobiose, sucrose and other common sugars), pectin, tannin (unspecified), triterpenes (e.g. β-amyrin, lupeol) and volatile oil (trace).

Food Use

Gentian (root, herbs and preparations) is listed by the Council of Europe as a natural source of food flavouring (category 4, with limits on xanthones) (*see* Appendix 23).[G17] In the USA, gentian is approved for food use.[G41]

Herbal Use[G2,G4,G6,G8,G32,G43,G52,G54,G56,G60,G64]

Gentian is stated to possess bitter, gastric stimulant, sialogogue and cholagogue properties. Traditionally, it has been used for anorexia, atonic dyspepsia, gastrointestinal atony, and specifically for dyspepsia with anorexia. The German Commission E approved use for digestive disorders such as loss of appetite, fullness and flatulence.[G3] Gentian is used in combination with angelica root and caraway fruit or with ginger and wormwood for loss of appetite and peptic discomfort.[G3]

Dosage

Dried rhizome/root 0.6–2 g or by infusion or decoction three times daily.[G6]

Tincture 1–4 mL (1 : 5 in 45% alcohol) three times daily.[G6]

Pharmacological Actions

In vitro and animal studies

The pharmacological activites of gentian root have been reviewed.[G52] A summary of this information is provided below.

Root extracts have antifungal activity, and are reported to stimulate phagocytic activity of human lymphocytes, indicating immunostimulant activity.[G52] Choleretic properties have been documented for gentian,[G41] and gentianine has been reported to possess anti-inflammatory activity.[G22] The bitter principles stimulate secretion of gastric juices and bile, thus aiding appetite and digestion. Elevation of gastric secretion by up to 30% has been reported following the administration of gentian tincture to dogs. An infusion given orally to sheep as a single daily dose (5 g) stimulated enzyme secretion in the small intestine. A root extract (12 mg/kg/day) applied by gavage to rats for three days elevated bronchose-

cretion. A standardised extract perfused into the stomachs of anaesthetised rats increased gastric secretion in a dose-dependent manner. Lower doses caused no changes in gastric pH, whereas higher doses increased pH from 4.25 to 4.85. A dose of 0.5 mL/kg did not affect the incidence of gastric ulceration in rats.

Clinical studies

In an open, uncontrolled study, a single dose of an alcoholic extract of gentian (equivalent to 0.2 g), given to 10 healthy volunteers, was reported to result in a stimulation of gastric juice secretion.[2] Gall-bladder emptying was increased and prolonged whilst protein and fat digestion was enhanced. Nineteen patients with inflammatory conditions of the gastrointestinal tract (colitis, Crohn's disease, non-specific inflammation) and elevated secretory immunoglobulin A (IgA) concentrations and eight healthy individuals were treated with gentian tincture (3 × 20 drops/day) for eight days.[G52] IgA concentrations decreased in both groups.[G52]

Side-effects, Toxicity

Extracts of gentian are considered to be non-toxic, and are generally well-tolerated.[G52]

An acute oral LD_{50} value in mice was reported to be 25 mL/kg of extract (37% ethanol, bitterness value: 200 Swiss Pharmacopoeia units/g), and was the same as that of 37% ethanol. Rabbits treated with gentian extract (12.6 mg/day for three days) showed no toxic or abnormal concentration of serum parameters, with the exception of slightly higher erythrocyte concentrations in treated animals. Gentian may occasionally cause headache in some individuals.[G3] Mutagenic activity in the Ames test (*Salmonella typhimurium* TA100 with S9 mix) has been documented for gentian, with gentisin and isogentisin identified as mutagenic components.[3] Gentian root 100 g was reported to yield approximately 100 mg total mutagenic compounds, of which gentisin and isogentisin comprised approximately 76 mg.[3]

Contra-indications, Warnings

Gentian is stated to be contra-indicated in individuals with high blood pressure,[G60] although no rationale is given for this statement, and in individuals with hyperacidity, gastric or duodenal ulcers.[G52,G3].

Pregnancy and lactation Gentian is reputed to affect the menstrual cycle,[G22,G60] and it has been stated that gentian should not be used in pregnancy.[G60] In view of this and the documented mutagenic activity, gentian is best avoided in pregnancy and lactation.

Pharmaceutical Comment

The major constituents of pharmacological importance in gentian are the bitter principles; limited information is available on the other compounds present. The herbal uses of gentian are supported by the known properties of the bitter principles present in the root. Excessive doses should be avoided in view of the lack of toxicity data.

References

See also General References G2, G3, G6, G9, G12, G13, G15, G16, G22, G24, G25, G29, G31, G32, G36, G37, G41, G43, G52, G54, G56, G60, G62 and G64.

1 Verotta L. Isolation and HPLC determination of the active principles of *Rosmarinus officinalis* and *Gentiana lutea*. *Fitoterapia* 1985; 56: 25–29.
2 Glatzel vonH, Hackenberg K. Röntgenologische untersuchungen der wirkungen von bittermitteln auf die verdauunogsorgane. *Planta Med* 1967; 15: 223–232.
3 Morimoto I *et al.* Mutagenic activities of gentisin and isogentisin from Gentianae radix (Gentianaceae). *Mutat Res* 1983; 116: 103–117.