Motherwort

Species (Family)

Leonurus cardiaca L. and various other *Leonurus* species (Labiatae)

Synonym(s)

Leonurus

Part(s) Used

Herb

Pharmacopoeial and Other Monographs

BHC 1992[G6]
BHP 1996[G9]
Complete German Commission E[G3]
Martindale 32nd edition[G43]
PDR for Herbal Medicines 2nd edition[G36]

Legal Category (Licensed Products)

GSL[G37]

Constituents[G6,G22,G40,G49,G64]

Alkaloids 0.35%. Stachydrine (a pyrrolidine-type alkaloid), betonicine and turicin (stereoisomers of 4-hydroxystachydrine), leonurine 0.0068% (a guanidine derivative),[1] leonuridin, leonurinine. The presence of leonurine in *L. cardiaca* has been disputed, although it has been documented for other *Leonurus* species.

Flavonoids Glycosides of apigenin, kaempferol, and quercetin (e.g. hyperoside, kaempferol-3-D-glucoside, genkwanin, quinqueloside, quercitrin and rutin).[2,3]

Iridoids Ajugol, ajugoside, galiridoside, leonurid and three or four more unidentified glycosides.[4]

Tannins 2–8%. Type not specified. Pseudotannins (e.g. pyrogallol, catechins).

Terpenoids Volatile oil 0.05%, resin, wax, ursolic acid, leocardin (a labdane diterpene)[5] as an epimeric mixture, and a diterpene lactone similar to marrubiin.[2] Cardiac glycosides (bufadienolide/bufanolide type) have been documented although their presence in motherwort has not been confirmed.

Other constituents Citric acid, malic acid, oleic acid, bitter principles,[6,7] carbohydrates 2.89%, choline and a phenolic glycoside (caffeic acid 4-rutinoside).[8]

A *Cad*-specific lectin has been isolated from the seeds.[9]

Food Use

Motherwort is not used in foods. In the USA, motherwort is listed by the Food and Drugs Administration (FDA) as a Herb of Undefined Safety.[G22]

Herbal Use

Motherwort is stated to possess sedative and antispasmodic properties. Traditionally, it has been used for cardiac debility, simple tachycardia, effort syndrome, amenorrhoea, and specifically for cardiac symptoms associated with neurosis.[G6,G7,G8,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]

Tincture 2–6 mL (1 : 5 in 45% alcohol) three times daily.[G6,G7]

Pharmacological Actions

In vitro and animal studies

The uterotonic principle in motherwort is unclear, although leonurine is reported to be the utero-active constituent in various *Leonurus* species. In addition, oxytocic activity documented for *L. cardiaca* has been attributed to another alkaloid constituent, stachydrine.[G30] Uterotonic activity has been reported for leonurine in various *in vitro* preparations including human myometrial strips and isolated rat uterus.[10,11]

In vitro cardioactivity has been documented for motherwort.[12] An alcoholic extract was found to have a direct inhibitory effect on myocardial cells:

antagonistic action towards calcium chloride (provided that the extract was administered before calcium chloride), and towards both α- and β-adrenoceptor stimulation was observed. No significant effect on the cardiac activity of the isolated guinea-pig heart was noted for caffeic acid 4-rutinoside.[8]

A related species, *Leonurus heterophyllus*, has been stated to prevent platelet aggregation, although no such documented action was located for motherwort.[13]

Ursolic acid has been reported to possess antiviral, tumour-inhibitory and cytotoxic activities.[14,15] Ursolic acid was found to inhibit the Epstein–Barr virus *in vitro* and to inhibit tumour production by 12-O-tetradeconoyl phorbol (TPA) in mouse skin, with activity comparable to that of retinoic acid, a known tumour-promoter inhibitor.[15] *In vitro* cytotoxicity was documented in lymphocytic leukaemia (P-388, L-1210), human lung carcinoma (A-549), KB cells, human colon (HCT-8) and mammary tumour (MCF-7).[14]

Side-effects, Toxicity

It has been stated that the leaves of motherwort may cause contact dermatitis and that the lemon-scented oil may result in photosensitisation.[G51] No documented toxicity studies were located. Cytotoxic activities have been reported for ursolic acid (*see In vitro* and animal studies).

Contra-indications, Warnings

Excessive use may interfere with existing therapy for a cardiac disorder (cardiac glycoside constituents, *in vitro* activity). Sensitive individuals may experience an allergic reaction.

Pregnancy and lactation Motherwort is reputed to affect the menstrual cycle.[G22] In view of the lack of toxicity data and the documented *in vitro* uterotonic activity,[G30] the use of motherwort during pregnancy and lactation should be avoided.

Pharmaceutical Comment

The common name motherwort may be applied to one of many *Leonurus* species. *L. cardiaca* is the typical European species utilised, whereas *Leonurus artemisia* is commonly used in traditional Chinese medicine. Other species referred to as motherwort include *Leonurus sibirious* and *L. heterophyllus*. The chemistry of *L. cardiaca* is well studied although the presence of the uterotonic principle leonurine has been disputed. Cardioactive properties in animals have been reported for motherwort (*L. cardiaca*), which thus support some of the stated herbal uses. However, any symptoms of cardiac disorder are not suitable for self-diagnosis and treatment with a herbal remedy. In view of the lack of toxicity data and possible cardioactivity, excessive use of motherwort should be avoided.

References

See also General References G3, G6, G9, G22, G30, G31, G36, G37, G40, G43, G49, G51 and G64.

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15 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.