Uva-Ursi

Species (Family)

Arctostaphylos uva-ursi (L.) Spreng (Ericaceae)

Synonym(s)

Bearberry

Part(s) Used

Leaf

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]
Mills and Bone[G50]
PDR for Herbal Medicines 2nd edition[G36]
Ph Eur 2002[G28]

Legal Category (Licensed Products)

GSL[G37]

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

Flavonoids Flavonols (e.g. myricetin, quercetin) and their glycosides including hyperin, isoquercitrin, myricitrin and quercitrin.

Iridoids Asperuloside (disputed), monotropein.[1]

Quinones Total content at least 6%, mainly arbutin (5–15%) and methyl-arbutin (glycosides), with lesser amounts of piceoside[2] (a glycoside), free hydroquinone and free *p*-methoxyphenol.[3]

Tannins 6–7% (range 6–40%). Hydrolysable-type (e.g. corilagin pyranoside); ellagic and gallic acids (usually associated with hydrolysable tannins).

Terpenoids α-Amyrin, α-amyrin acetate, β-amyrin, lupeol, uvaol, ursolic acid, and a mixture of mono- and di-ketonic α-amyrin derivatives.[4,5]

Other constituents Acids (malic, quinic), allantoin, resin (e.g. ursone), volatile oil (trace) and wax.

Other plant parts The root is reported to contain unedoside (iridoid glucoside).[6]

Food Use

Uva-ursi is not used in foods.

Herbal Use

Uva-ursi is stated to possess diuretic, urinary antiseptic, and astringent properties. Traditionally, it has been used for cystitis, urethritis, dysuria, pyelitis, lithuria, and specifically for acute catarrhal cystitis with dysuria and highly acidic urine.[G2,G6,G7,G8,G64]

Dosage

Dried leaves 1.5–4.0 g or by infusion three times daily.[G6,G7]

Liquid extract 1.5–4.0 mL (1:1 in 25% alcohol) three times daily.[G6,G7]

Concentrated Infusion of Bearberry (BPC 1934) 2–4 mL.

Fresh Infusion of Bearberry (BPC 1934) 15–30 mL.

Pharmacological Actions

In vitro and animal studies

Uva-ursi has exhibited antimicrobial activity towards a variety of organisms including *Staphylococcus aureus*, *Bacillus subtilis*, *Escherichia coli*, *Mycobacterium smegmatis*, *Shigella sonnei* and *Shigella flexneri*.[7] The antimicrobial activity of arbutin towards bacteria implicated in producing urinary tract infections, has been found to be directly dependent on the β-glucosidase activity of the infective organism.[8] Highest enzymatic activity was shown by *Enterobacter*, *Klebsiella* and *Streptococcus* genera, and lowest by *Escherichia coli*.[8] The minimum inhibitory concentration for arbutin is reported to be 0.4–0.8% depending on the micro-organism.[8] Aqueous and methanolic extracts have demonstrated molluscicidal activity against *Biomphalaria glabrata*,

at a concentration of 50 ppm.[9] The activity was attributed to the tannin constituents (condensed and hydrolysable).

Anti-inflammatory activity (rat paw oedema tests) has been documented for uva-ursi against a variety of chemical inducers such as carrageenan, histamine and prostaglandins.[10]

Uva-ursi failed to exhibit any *in vitro* uterotonic action when tested on rabbit and guinea-pig uteri.[11]

Hydroquinone has been reported to show a dose-dependent cytotoxic activity on cultured rat hepatoma cells (HTC line); arbutin was not found to inhibit growth of the HTC cells.[12] It was stated that hydroquinone appeared to have greater cytotoxic activity towards rat hepatoma cells than agents like azauridin or colchicine, but less than valtrate from valerian (*Valeriana officinalis*). The cytoxicity of hydroquinone has also been tested on L1210, CA-755 and S-180 tumour systems.[12]

Clinical studies

A herbal preparation, whose ingredients included uva-ursi, hops and peppermint, has been used to treat patients suffering from compulsive strangury, enuresis and painful micturition.[13] Of 915 patients treated for six weeks, success was reported in about 70%. The antiseptic and diuretic properties claimed for uva-ursi can be attributed to the hydroquinone derivatives, especially arbutin. The latter is absorbed from the gastro-intestinal tract virtually unchanged and during renal excretion is hydrolysed to yield the active principle, hydroquinone, which exerts an antiseptic and astringent action on the urinary mucous membranes.[14,15] The crude extract is reported to be more effective than isolated arbutin as an astringent and antiseptic.[G48] This may be due to the other hydroquinone derivatives, in addition to arbutin, that are present in the crude extract and which will also yield hydroquinone. Furthermore, it has been stated that the presence of gallic acid in the crude extract may prevent β-glucosidase cleavage of arbutin in the gastrointestinal tract before absorption, thereby increasing the amount of hydroquinone released during renal excretion.[G48]

Side-effects, Toxicity

No reported side-effects were located. Hydroquinone is reported to be toxic if ingested in large quantities: 1 g (equivalent to 6–20 g plant material) has caused tinnitus, nausea and vomiting, sense of suffocation, shortness of breath, cyanosis, convulsions, delirium and collapse.[G48] A dose of 5 g (equivalent to 30–100 g of plant material) has proved fatal.[G48] In view of the high tannin content, prolonged use of uva-ursi may cause chronic liver impairment.[G41]

Cytotoxic activity has been documented for hydroquinone (*see In vitro* and animal studies).

Uva-ursi herb can sometimes be adulterated with box leaves (*Buxus sempervirens*), which contain toxic steroidal alkaloids. However, no cases of poisoning as a result of such adulteration have been reported.[G33]

Contra-indications, Warnings

Uva-ursi requires an alkaline urine for it to be effective as a urinary antiseptic; an alkaline reaction is needed to yield hydroquinone from the inactive esters such as arbutin.[14] Patients have been advised to avoid eating highly acidic foods, such as acidic fruits and their juices.[14] The presence of hydroquinone may impart a greenish-brown colour to the urine, which darkens following exposure to air due to oxidation of hydroquinone.

Excessive use of uva-ursi should be avoided in view of the high tannin content and potential toxicity of hydroquinone.

Prolonged use of uva-ursi to treat a urinary tract infection is not advisable. Patients in whom symptoms persist for longer than 48 hours should consult their doctor.

Pregnancy and lactation Large doses of uva-ursi are reported to be oxytocic,[G22] although *in vitro* studies have reported a lack of utero-activity. In view of the potential toxicity of hydroquinone, the use of uva-ursi during pregnancy and lactation is best avoided.

Pharmaceutical Comment

The chemistry of uva-ursi is well documented with hydroquinone derivatives, especially arbutin, identified as the major active constituents. Documented pharmacological actions justify the herbal use of uva-ursi as a urinary antiseptic. However, clinical information is lacking and further studies are required to determine the true usefulness of uva-ursi in the treatment of urinary tract infections. Although hydroquinone has been reported to be toxic in large amounts, concentrations provided by the ingestion of therapeutic doses of uva-ursi are not thought to represent a risk to human health.[G42]

References

See also General References G2, G3, G5, G6, G9, G10, G22, G25, G31, G32, G33, G36, G37, G41, G42, G43, G48, G50, G52, G56, G62 and G64.

1 Jahodár L *et al.* Investigation of iridoid substances in *Arctostaphylos uva-ursi*. *Pharmazie* 1978; 33:

536–537.
2 Karikas GA *et al.* Isolation of piceoside from *Arctostaphylos uva-ursi. Planta Med* 1987; 53: 307–308.
3 Jahodár L, Leifertová I. The evaluation of *p*-methoxyphenol in the leaves of *Arctostaphylos uva-ursi. Pharmazie* 1979; 34: 188–189.
4 Droliac A. Triterpenes of *Arctostaphylos uva-ursi* Spreng. *Plant Méd Phytothér* 1980; 14: 155–158.
5 Malterud KE. The non-polar components of *Arctostaphylos uva-ursi* leaves. *Medd Nor Farm Selsk* 1980; 42: 15–20.
6 Jahodár L *et al.* Unedoside in *Arctostaphylos uva-ursi* roots. *Pharmazie* 1981; 36: 294–296.
7 Moskalenko SA. Preliminary screening of far-Eastern ethnomedicinal plants for antibacterial activity. *J Ethnopharmacol* 1986; 15: 231–259.
8 Jahodár L *et al.* Antimicrobial action of arbutin and the extract from the leaves of *Arctostaphylos uva-ursi in vitro. Ceskoslov Farm* 1985; 34: 174–178.
9 Schaufelberger D, Hostettmann K. On the molluscicidal activity of tannin containing plants. *Planta Med* 1983; 48: 105–107.
10 Shipochliev T, Fournadjiev G. Spectrum of the antiinflammatory effect of *Arctostaphylos uva ursi* and *Achillea millefolium*, L. *Probl Vutr Med* 1984; 12: 99–107.
11 Shipochliev T. Extracts from a group of medicinal plants enhancing the uterine tonus. *Vet Med Nauki* 1981; 18: 94–98.
12 Assaf MH *et al.* Preliminary study of the phenolic glycosides from *Origanum majorana*; quantitative estimation of arbutin; cytotoxic activity of hydroquinone. *Planta Med* 1987; 53: 343–345.
13 Lenau H *et al.* Wirksamkeit und Verträglichkeit von Cysto Fink bei Patienten mit Reizblase und/oder Harninkontinenz. *Therapiewoche* 1984; 34: 6054–6059.
14 Frohne D. Untersuchungen zur Frage der Harndesinfizierenden Wirkungen von Bärentraubenblatt-Extrakten. *Planta Med* 1970; 18: 23–25.
15 Natural drugs with glycosides. In: Stahl E, ed. *Drug Analysis in Chromatography and Microscopy*. Ann Arbor: Ann Arbor Scientific Publishers, 1973: 97.