Dandelion

Species (Family)

Taraxacum officinale Weber (Asteraceae/Compositae)

Synonym(s)

Lion's Tooth, *Taraxacum palustre* (Lyons) Lam & DC., *Leontodon taraxacum* L., Taraxacum

Part(s) Used

Leaf, root

Pharmacopoeial and Other Monographs

BHC 1992[G6]
BHP 1996[G9]
Complete German Commission E[G3]
ESCOP 1996[G52]
Martindale 32nd edition[G43]
PDR for Herbal Medicines 2nd edition[G36]

Legal Category (Licensed Products)

GSL[G37]

Constituents[G2,G6,G8,G22,G41,G48,G52,G57,G64]

Acids Caffeic acid, *p*-hydroxyphenylacetic acid, chlorogenic acid,[1] cichoric acid, monocaffeyl tartaric acids[2] linoleic acid, linolenic acid, oleic acid and palmitic acid.

Coumarins Cichoriin and aesculin.[2]

Flavonoids Luteolin-7-glucoside and luteolin-7-diglucosides.[2]

Minerals Potassium 4.5% in leaf, 2.45% in root.[3]

Resin Undefined bitter complex (taraxacin).

Terpenoids Sesquiterpene lactones taraxinic acid (germacranolide) esterified with glucose,[4] and eudesmanolides.[5]

Vitamins Vitamin A 14 000 iu/100 g leaf (compared with 11 000 iu/100 g carrots).

Other constituents Carotenoids, choline, inulin, pectin, phytosterols (e.g. sitosterol, stigmasterol, taraxasterol, homotaraxasterol), sugars (e.g. fructose, glucose, sucrose), triterpenes (e.g. β-amyrin, taraxol, taraxerol).

Food Use

Dandelion is used as a food, mainly in salads and soups. The roasted root and its extract have been used as a coffee substitute.[G41] Dandelion is listed by the Council of Europe as a natural source of food flavouring (category N2). This category indicates that dandelion can be added to foodstuffs in small quantities, with a possible limitation of an active principle (as yet unspecified) in the final product.[G16] In the USA, dandelion is listed as GRAS (Generally Recognised As Safe).[G41]

Herbal Use[G2,G4,G6,G7,G8,G32,G43,G52,G54,G56,G60,G64]

Dandelion is stated to possess diuretic, laxative, cholagogue and antirheumatic properties. It has been used for cholecystitis, gallstones, jaundice, atonic dyspepsia with constipation, muscular rheumatism, oliguria, and specifically for cholecystitis and dyspepsia. The German Commission E approved use of root and herb for disturbance of bile flow, stimulation of diuresis, loss of appetite and dyspepsia.[G3] Root is used in combination with celandine herb and artichoke for epigastric discomfort due to functional disorders of the biliary system.[G3]

Dosage

Dried leaf 4–10 g or by infusion three times daily.[G6,G7]

Leaf, liquid extract 4–10 mL (1 : 1 in 25% alcohol) three times daily.[G6,G7]

Leaf tincture 2–5 mL.[G3]

Leaf, fresh juice 5–10 mL.[G52]

Dried root 2–8 g or by infusion or decoction three times daily.[G6,G7]

Root, tincture 5–10 mL (1 : 5 in 45% alcohol) three times daily.[G6,G7]

Liquid Extract of Taraxacum (BPC 1949) 2–8 mL.

Juice of Taraxacum (BPC 1949) 4–8 mL.

Pharmacological Actions

In vitro and animal studies

A diuretic effect in rats and mice has been documented for dandelion extracts, following oral administration.[6] Herb extracts were found to produce greater diuresis than root extracts; a dose of 50 mL (equivalent to 2 g dried herb/kg body weight) produced an effect comparable to that of frusemide 80 mg/kg. By contrast, no significant increases in urine volume or sodium excretion were observed in mice following oral administration of either leaf or root extracts, or of purified fractions.[3] Similarly, oral and intravenous administration of an ethanolic extract of dandelion root failed to produce a diuretic effect in laboratory animals.[7]

Moderate anti-inflammatory activity against carrageenan-induced rat paw oedema has been documented for a dandelion root extract.[8] An 80% ethanol extract of root (100 mg/kg orally) inhibited oedema by 43% in the carrageenan-induced rat paw oedema test at 3 hours.[7]

Bile secretion was doubled in dogs by a decoction of fresh root (equivalent to 5 g dried plant); similar activity has been observed for rats.[G52]

Hypoglycaemic activity has been described in normal, but not in diabetic rabbits, following oesophageal administration of dandelion.[9] Doses greater than 500 mg/kg produced a significant blood glucose concentration which had returned to normal after 24 hours. The maximum decrease produced by a dose of 2 g/kg was reported to be 65% of the effect produced by tolbutamide 500 mg/kg. Sulphonylureas (e.g. tolbutamide) act by stimulating pancreatic beta-cells and a similar mechanism was proposed for dandelion.

In vitro antitumour activity has been documented for an aqueous extract of dandelion, given by intraperitoneal injection, in the tumour systems ddY-Ehrlich and C3H/He-MM46.[10] The mechanism of action was thought to be similar to that of tumour polysaccharides such as lentinan.

Clinical studies

There is a lack of well-designed clinical studies investigating the effects of dandelion.

Side-effects, Toxicity

Contact allergic reactions to dandelion have been documented[11,G51] and animal studies have reported dandelion to have a weak sensitising capacity.[12] Sesquiterpene lactones are thought to be the allergenic principles in dandelion.[4] These compounds contain an exocyclic α-methylene β-lactone moiety, which is thought to be a prerequisite for allergenic activity of sesquiterpene lactones.

The acute toxicity of dandelion appears to be low, with LD_{50} values (mice, intraperitoneal injection) estimated at 36.8 g/kg and 28.8 g/kg for the root and herb, respectively.[6] No visible signs of toxicity were observed in rabbits administered dandelion 3, 4, 5 and 6 g/kg body weight by mouth for up to seven days.[9] In addition, no behavioural changes were recorded.

Contra-indications, Warnings

Treatment with dandelion is contraindicated for patients with occlusion of bile duct, gall bladder empyema and obstructive ileus.[G3,G52] Dandelion may precipitate an allergic reaction in susceptible individuals, although no reports following the ingestion of dandelion have been documented. Dandelion may potentiate the action of other diuretics and may interfere with existing hypoglycaemic activity.

Pregnancy and lactation There are no known problems with the use of dandelion during pregnancy, provided that doses do not greatly exceed the amounts used in foods.

Pharmaceutical Comment

Dandelion is a well-known traditional herbal remedy, although limited scientific information, particularly clinical research, is available to justify the reputed uses. Several investigations have failed to demonstrate significant diuretic effects in laboratory animals and have proposed that any diuretic activity is due to the high potassium content of the leaf and root. Dandelion has also been used in foods for many years. Animal studies indicate dandelion to be of low toxicity. However, excessive ingestion of dandelion, particularly in amounts exceeding those normally consumed in foods, should be avoided.

References

See also General References G2, G3, G5, G6, G9, G11, G16, G19, G20, G22, G29, G31, G32, G36, G37, G41, G43, G48, G51, G52, G54, G56, G57, G60 and G64.

1 Clifford MN *et al.* The chlorogenic acids content of coffee substitutes. *Food Chem* 1987; 24: 99–107.
2 Williams CA *et al.* Flavonoids, cinnamic acids and coumarins from the different tissues and medicinal preparations of *Taraxacum officinale*. *Phytochem* 1996; 42: 121–127.
3 Hook I *et al.* Evaluation of dandelion for diuretic activity and variation in potassium content. *Int J Pharmacog* 1993; 31: 29–34.
4 Hausen BM. Taraxinsäure-1′-O-β-D-glucopyranosid, das kontaktallergen des löwenzahns (*Taraxacum officinale* Wiggers). *Dermatosen* 1982; 30: 51–53.
5 Hänsel R *et al.* Sequiterpenlacton-β-d-glucopyranoside sowie ein neues eudesmanolid aus *Taraxacum officinale*. *Phytochem* 1980; 19: 857–861.
6 Rácz-Kotilla *et al.* The action of *Taraxacum officinale* extracts on the body weight and diuresis of laboratory animals. *Planta Med* 1974; 26: 212–217.
7 Tita B *et al.* *Taraxacum officinale* W.: Pharmacological effect of ethanol extract. *Pharmacol Res* 1993; 27: 23–24.
8 Mascolo N *et al.* Biological screening of Italian medicinal plants for anti-inflammatory activity. *Phytother Res* 1987; 1: 28–29.
9 Akhtar MS *et al.* Effects of *Portulaca oleracae* (kulfa) and *Taraxacum officinale* (dhudhal) in normoglycaemic and alloxan-treated hyperglycaemic rabbits. *J Pak Med Assoc* 1985; 35: 207–210.
10 Baba K *et al.* Antitumor activity of hot water extract of dandelion, *Taraxacum officinale* – correlation between antitumor activity and timing of administration. *Yagugaku Zasshi* 1981; 101: 538–543.
11 Hausen BM, Schulz KH. Allergische kontaktdermatitis durch löwenzahn (*Taraxacum officinale* Wiggers). *Dermatosen* 1978; 26: 198.
12 Davies MG, Kersey PJW. Contact allergy to yarrow and dandelion. *Contact Dermatitis* 1986; 14: 256–257.