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Review Article

REVIEW ON *GLYCYRRHIZA GLABRA* (LIQUORICE)

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ABSTRACT
Liquorice is a plant of ancient origin in history. Liquorice extracts and its principle component, glycyrrhizin, have extensive use in foods, tobacco and in both traditional and herbal medicine. As a result, there is a high level of use of Liquorice and glycyrrhizin approved for use in foods and treatments of various diseases such as including anti-ulcer, anti-viral, anti-inflammatory and hepatoprotective responses etc. Traditional applications across diverse cultures include as both a demulcent and an anti-inflammatory, often used to soothe respiratory or gastrointestinal (GI) symptoms. Modern botanical applications of the herb continue this tradition with recommendations including the treatment of gastric ulcers, bronchitis, cough, and dyspepsia. While Liquorice is indispensable in these and many other herbal applications, it comes with a slight but measurable risk of side effects when used as a whole-root extract.
KEYWORDS: Liquorice, Glycyrrhizin, toxicity, Traditional & Pharmacological uses.

INTRODUCTION

Glycyrrhiza glabra, also known as Liquorice and sweet wood, belonging to family Leguminaceae is native to the Mediterranean and certain areas of Asia. Liquorice has been used in medicine for more than 4000 years. The earliest record of its use in medicine is found in 'code Humnubari' (2100 BC). It was also one of the important plants mentioned in Assyrian herbal (2000BC). Hippocrates (400BC) mentioned its use as a remedy of ulcers and quenching of thirds. The drug was also mentioned by Theophrastus and Dioscorides. In traditional Siddha system of medicine, liquorice is used as a demulcent, expectorant, anti-tussive, laxative and sweetener. Historically, the dried rhizome and root of this plant were employed medicinally by the Egyptian, Chinese, Greek, Indian, and Roman civilizations as an expectorant and carminative. In modern medicine, Liquorice extracts are often used as a flavoring agent to mask bitter taste in preparations and as an expectorant in cough and cold preparations. Liquorice extracts have been used for more than 60 years in Japan to treat chronic hepatitis, and also have therapeutic benefit against other viruses, including human immunodeficiency virus (HIV), cytomegalovirus (CMV) and *Herpes simplex*. Deglycyrrhizinated Liquorice (DGL) preparations are useful in treating various types of ulcers, while topical Liquorice preparations have been used to sooth and heal skin eruptions, such as psoriasis and herpetic lesions.

CLASSIFICATION

Kingdom: Plantae
Division: Angiospermae
Class: Dicotyledonae
Order: Rosales
Family: Leguminosae
Genus: Glycyrrhiza
Species: glabra Linn

VERNACULAR NAMES

Sanskrit: Yashti-madhuh. Madhuka
Kannada: Yastimadhuka, atimaddhura
Bengali: Jashtimadhu, Jaishbomodhu
Gujarat: Jethimadhu
Hindi: Jothi-madh, Mulhatti
Malayalam: Iratimadhuram
Marathi: Jeshtamadha
Oriya: Jatimadhu
Tamil: Atimaduram
Telugu: Atimadhuranu, Yashtimadhukam
English: Licorice, Liquorice, Sweet wood
Arab: Aslussiesa
Persia: Ausareha mahaka
France: Boisdoux
Germany: Sussholz

HABITAT

Glycyrrhiza glabra is a hard herb or under shrub attaining a height up to 6ft. leaves multifoliate, imparipinnate, flowers in axillary spikes, papilionaceous, lavender to violet in colour, pods compressed, and containing reniform seeds. The dried, peeled or unpeeled underground stems and roots constitute the drug, known in the trade as Liquorice. Flowers in March and fruits in August.

PART USED- Root and Rhizomes

ACTIVE CONSTITUENTS

A number of components have been isolated from licorice, including a water-soluble, biologically active complex that accounts for 40-50 percent of total dry material weight. This complex is composed of triterpene saponins, flavonoids, polysaccharides, pectins, simple sugars, amino acids, mineral salts, and various other substances. Glycyrrhizin a triterpenoid compound, accounts for the sweet taste of Liquorice root. This compound represents a mixture of potassium-calcium-magnesium salts of glycyrrhizic acid that varies within a 2-25 percent range. Among the natural saponins, glycyrrhizic acid is a molecule composed of a hydrophilic part, two molecules of glucuronic acid, and a hydrophobic fragment, glycyrrhetic acid. The yellow color of Liquorice is due to the flavonoid content of the plant, which includes liquiritin, isoliquiritin (a chalcone), and other compounds. The isoflavones glabridin and hispaglabridins A and B have significant antioxidant activity and both glabridin and glabrene possess estrogen-like activity.

ACTIONS

Tonic, demulcent, expectorant, diuretic, mild laxative, anti-arthritic, anti-inflammatory, anti-biotic, anti-viral, anti-ulcer, memory stimulant (being MAO inhibitor), anti-tussive, aphrodisiac, anti-mytotic, estrogenic, anti-oxidant, anti-caries agent, anti-neoplastic, anti-cholinergic, anti diuretic, hypolipidemic activity etc.

TRADITIONAL USES

- A decoction of madhuka or its powder was prescribed with honey in anemia.
- Yashti mixed with cow's milk was prescribed for promoting lactation.
- 10g madhuka powder mixed with 10g sugar, pounded with rice water was prescribed in men-metrorrhagia.
- A confection of rice-milk, prepared with yashtimadhu, was prescribed in hoarseness of voice.
- Charaka prescribed 10g madhuka powder mixed with honey, followed by intake of milk, as an aphrodisiac and as an intellect-promoting tonic.
- Charaka also prescribed a paste of liquorice and Picrorhiza kurroa with sugar-water as a cardiac tonic.
- Charaka datta prescribed yashtimadhu and santalum album, powdered with milk, in haematemisis.
- Sushruta prescribed the paste of yashtimadhu 10g, in intrinsic haemorrhage.
- In oedema, the paste of licorice, sesamum indicum and milk mixed with butter was prescribed.
- Warm clarified butter mixed with licorice, was applied topically on wounds, bruises and burns.
- A decoction of madhuka was applied on erysipelas.
- Yashti is an important ingredient in Narikelanjana (IMCOPS) eye-drops, prescribed in both acute and chronic conjunctivitis, and also in blepharitis.
- A decoction of the root is a good wash for falling and greying of hair.

EXPERIMENTAL PHARMACOLOGY

Glycyrrhiza has the following, experimentally proved activities: Anti-bacterial activity, anti hepato toxic activity, estrogenic activity, anti fungal activity, anti hemorrhoid activity, anti hyper glycemic activity, anti malarial activity, anti oxidant activity, Anti ulcer activity, Immuno stimulatory & anti viral activity.

CLINICAL PHARMACOLOGY

Glycyrrhiza has the following, clinically proved Pharmacological activities such as anti ulcer activity, anti asthmatic activity, anti diuretic activity, anti hepato toxic activity, eczema, psoriasis and herpes simplex. The beneficial effects of Liquoric can be attributed to a number of mechanisms. Glycyrrhizin and glycyrrhizic acid have been shown to inhibit growth and cytopathology of numerous RNA and DNA viruses, including hepatitis A9 and C, herpes zoster, HIV, *Herpes simplex* and CMV. Glycyrrhizin and its metabolites inhibit hepatic metabolism of aldosterone and suppress 5-ßreductase, properties responsible for the well-documented pseudoaldosterone syndrome. The similarity in structure of glycyrrhetic acid to the structure of hormones secreted by the adrenal cortex accounts for the mineralocorticoid and glucocorticoid activity of glycyrrhizic acid. Liquorice constituents also exhibit steroid like anti-inflammatory activity, similar to the action of hydrocortisone. This is due, in part, to inhibition of phospholipase A2 activity, an enzyme critical to numerous inflammatory processes.

In vitro research has also demonstrated glycyrrhizic acid inhibits cyclooxygenase activity and prostaglandin formation (specifically prostaglandin E2), as well as indirectly inhibiting platelet aggregation, all factors in the inflammatory process. Certain Liquorice constituents possess significant antioxidant and hepatoprotective properties. Glycyrrhizin and glabridin inhibit the generation of reactive oxygen species (ROS) by neutrophils at the site of inflammation. *In vitro* studies have demonstrated Liquorice isoflavones, hispaglabridins A and B, inhibit Fe3+-induced mitochondrial lipid peroxidation in rat liver cells.

Other research indicates glycyrrhizin lowers lipid peroxide values in animal models of liver injury caused by ischemia reperfusion. Liquorice constituents also exhibit hepatoprotective activity by lowering serum. Although the exact mechanisms are still under investigation, research has demonstrated they inhibit liver enzyme levels and improving tissue pathology in hepatitis patients. Glycyrrhizin and other Liquorice components appear to possess anticarcinogenic properties as well. Abnormal cell proliferation, as well as tumor formation and growth in breast, liver and skin cancer. Deglycyrrhizinated licorice formulations used in the treatment of ulcers do not suppress gastric acid release like other anti-ulcer medications rather; they promote healing by increasing mucous production and blood supply to the damaged stomach mucosa, thereby enhancing mucosal healing.

SIDE EFFECTS

The use of liquorice extract in the treatment of peptic ulcer sometimes appeared to invoke oedema and other side effects. Many investigations were carried out and it was shown that glycyrrhizin and glycyrrhetinic acid decreased the output of ACTH, reduced urinary excretion of sodium and chloride, increased potassium excretion, reduced rennin activity and serum aldosterone, elevated blood pressure and induce metabolic alkalosis with severe hypokalaemia and hypernatremia, capable of causing cardiac arrest. Clinical investigations revealed sodium retention to be connected to an aberration in cortisol metabolism in the kidneys, which interferes with 11-β-hydroxy steroid dehydrogenase. Consumption of Liquorice or glycyrrhizin in excessive amounts and over a long period produces pseudo

aldostronism leading to oedema, hypertension, and weight gain.

CAUTION

The intake of higher doses (above50g/day) over an extended period (>6weeks) may cause sodium retention, potassium depletion, hyper tension, cardiac complaints, kidney disease, obesity, disorders associated with pregnancy and hypo kalaemic alkalosis. It should not be taken concurrently with cortico steroid treatment. The drug is contra indicated in patients with a history of hypertension, renal failure and using digitalis preparations. It should not be used for longer than 4-6 weeks without medical advice.

DRUG INTERACTION

Because it increases potassium loss, it should not be administered for prolonged use with thiazide and loop diuretics or cardiac glycosides. Because it reduces sodium and water excretion, the effectiveness of drugs used in the treatment of hypertension may be reduced. It should not be administered in conjunction with spiranolactone or amiloride.

CONCLUSION

Glycyrrhiza glabra, also known as Liquorice and sweet wood, belonging to family Leguminaceae is native to the Mediterranean and certain areas of Asia. . Glycyrrhizin a triterpenoid compound, accounts for the sweet taste of Liquorice root. This compound represents a mixture of potassium-calcium-magnesium salts of glycyrrhizic acid that varies within a 2-25 percent range. Traditional applications across diverse cultures include as both a demulcent and an anti-inflammatory, often used to soothe respiratory or gastrointestinal (GI) symptoms.

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