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Review Article

PHARMACOLOGICAL ACTIVITIES ON *GLYCYRRHIZA GLABRA* –A REVIEW

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ABSTRACT

Indisputably the third millennium is witnessing the worldwide changes in healthcare. Ayurvedic system of healthcare has gained good popularity. Ayurveda is a profound and comprehensive system of health care that originated in India. This system endeavors to rationalize the all phenomena governing empirical experiences with natural products in medicine. Ayurvedic medicare system has attained popularity at global level to replace the synthetic chemicals as they have shown less adverse reactions. Numbers of plants have been mentioned in classical text of Ayurveda for the management of several diseases. Numbers of plants have been mentioned in classical text of Ayurveda for the management of several diseases. No dought that several researcher had given their contributions for the renaissance of hidden therapeutic potential of number of ayurvedic drugs, But still number of plants need a thorough work on them. Therefore the present study is focused on the review on *Glycyrrhiza glabra*.

Keywords: Ayurvedic, Renaissance, Therapeutic potential, *Glycyrrhiza glabra*

INTRODUCTION

The licorice shrub is a member of the pea family and grows in subtropical climates in rich soil to a height of four or five feet. It has oval leaflets, white to purplish flower clusters, and flat pods. Below ground, the licorice plant has an extensive root system with a main taproot and numerous runners. The main taproot, which is harvested for medicinal use, is soft, fibrous, and has a bright yellow interior. Glycyrrhiza is derived from the ancient Greek term glykos, meaning sweet, and rhiza, meaning root[1]. Glycyrrhiza glabra Linn (Fam. Leguminosae) consists of dried, unpeeled, stolon and root .The plant is a tall perennial herb, upto 2 m high found cultivated in Europe. Persia, Afghanistan and to little extent in some parts of India[2] In India the plant is cultivated in Punjab and sub Himalyan tract[3,4].The plant is meant to hold glycyrrhizin, glycyrrhizic acid, glycyrrhetinic acid, asparagine, sugars, resin and starch as main constituents[2,5]. *G.glabra* or liquorice has been known in pharmacy for thousands of years. In old Chinese pharmacy, it was considered to belong to the drug of first class and to it was ascribed the property of rejuvenating those who consume it for long periods. It was used to allay thirst, feverishness, pain, cough and distress of breathing. For many centuries China has used large quantities of liquorice, and,many preparations of it are still in Chinese apothecary shops. Glycyrrhiza plays an important parts in Hindu medicine and is one of the principle drugs of the 'susruta'. In ancient Egypt, Greece and Rome Glycyrrhiza was also frequently used. Liquorice is reffered to by Theophrastus. It is interesting to find that even to this day liquorice is maintaining its place in medicine and pharmacy[5].Licorice continues to be used as a pharmacological agent as well as an ingredient in tobacco and confectionery throughout India in the East and West. Studies over the past 50 years have yielded information which has prompted new interest in the pharmacological and physiological effects of this plant. This research has revealed that the chemical structure of one of the principle agents in the root of the licorice plant is a glycoside of a triterpene called glycyrrhetinic acid. Originally its structure and activity were thought to be similar to adrenal steroid hormones such as aldosterone and cortisol, since ingestion of licorice mimicked hyperaldosteronism and was suggested as a treatment for Addison's disease[6,7] .

Taxonomy-Kingdom :Plantae

Division-Magnoliophyta

Order-Fabales

Family-Fabaceae

Genus-Glycyrrhiza

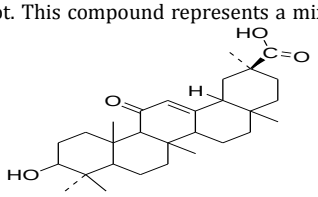
Species-glabra

Botanical name-*Glycyrrhiza glabra*[8]

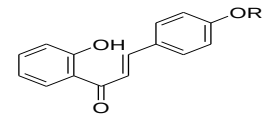
CHEMICAL CONSTITUENTS

Active Constituents

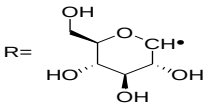
A number of components have been isolated from licorice, including a water-soluble, biologically active complex that accounts for 40-50 percent of total dry material weight. This complex composed of triterpene saponins, flavonoids, polysaccharides, pectins, simple sugars, amino acids, mineral salts, and various other substances.Glycyrrhizin, a triterpenoid compound, accounts for the sweet taste of licorice 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 licorice 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.[9-13]



Glycyrrhizinic Acid

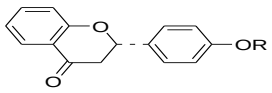


Isoliquirtigenin, R= H

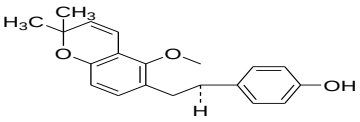


Glucosyl

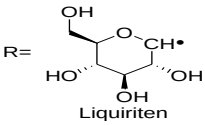
Isoliquiriten



Liquirtigenin, R= H

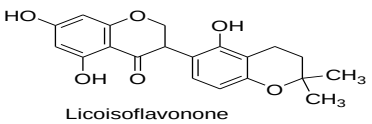


Glabridin

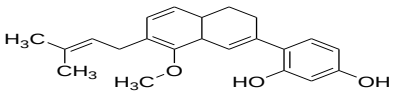


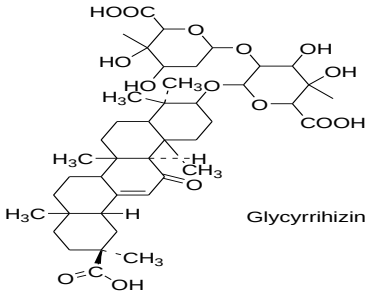
Glucosyl

Liquiriten



Licoisoflavonone





Glycyrrihizin

PHARMACOLOGICAL ACTIVITIES

1. **Chronic Hepatitis[14]**: In Japan, glycyrrhizin has been used for more than 60 years as a treatment for chronic hepatitis C. Stronger Neo-Minophagen C (SNMC), a glycyrrhizin preparation, has been extensively used with considerable success. In two clinical trials, SNMC has been shown to significantly lower aspartate transaminase (AST), alanine transaminase (ALT), and gammaglutamyltransferase (GGT) concentrations, while simultaneously ameliorating histologic evidence of necrosis and inflammatory lesions in the liver[(15,16)].In recent years, several studies have been performed supporting this action[(17,18)].Presently, interferon (IFN) therapy is a predominant treatment for chronic hepatitis. Because its efficacy is limited, an alternative treatment is desirable. SNMC has profound effects on the suppression of liver inflammation and is effective in improving chronic hepatitis and liver cirrhosis. It also appears to have considerably fewer side effects than IFN[19].

2. **Antitussive and Antidemulcent activity[20]: The** extract of the powdered drug in water was found to be effective in the treatment of sore throat cough bronchial catarr. It is antitussive and expectorant loosening tracheal mucus secretion[20].The demulcent action is attributed to glycyrrhizin.

3. **Peptic Ulcer Disease[21]**: the peptic ulcer activity was reported in systematically study on licorice extract. In an unblended and uncontrolled study 45 patients with confirmed gastric ulcers were administered 10 g/day of powdered licorice extract.The ulcers were reported to disappear in 17 of the cases, were diminished in 22 cases, and were unchanged in six of the cases. Patients with duodenal ulcers did not react as favorably. Approximately 20% of the patients were noted to develop edema, some with complications, including violent headache, dizziness, upper right quadrant pain, compression in the chest, and hypertension. A reduction of the dosage to 3 g/day reduced the occurrence of edema, although not in all cases. Crude fractionation of the licorice extract revealed that glycyrrhizin was the probable agent responsible for the edematous effect and an unknown component was therefore considered to be the active anti-ulcerogenic agent.

4. Biological study of the effect of licorice roots extract on serum lipid profile, liver enzymes and kidney function tests in albino mice was studied[22]. G. glabra root extract at low dose was reported to act as anti-lipidaemic agent, hepatoprotective activity for liver cell, prevents renal failure and is an anti-hyperglycemic agent.

5. Licorice as a treatment for canker sores- In a study G. glabra extract was administered to subjects in the form of a mouth wash, 15 of 20 patients had 50-75% pain relief within 24 hours and by day 3 there was complete healing of ulcers[23].

6. Hepatoprotective and antioxidant effects of licorice extract against CCL -induced oxidative damage in rats was reported[24].

7. Biological study of the effect of licorice roots extract on serum lipid profile, liver enzymes and kidney function tests in albino mice was examined. This study was carried out to elucidate the effects of oral administration of Glycyrrhiza glabra root extract on serum lipid profile, liver enzymes, kidney function test, and glucose concentration in albino mice when compared with ten male mice used as control. G. glabra root extract was reported to act as an anti-lipidaemic agent, as hepatoprotective activity for liver cell, prevents renal failure and as an anti-hyperglycemic agent[22].

8. Risk and safety assessment on the consumption of Licorice root (Glycyrrhiza sp.), its extract and powder as a food ingredient, with emphasis on the pharmacology and toxicology of glycyrrhizin was reported. Biochemical studies indicated that glycyrrhizinates inhibit 11-hydroxysteroid dehydrogenase, the enzyme responsible for inactivating cortisol. The continuous, high level exposure to glycyrrhizin compounds were reported to produce hypermineralocorticoid like effects in both animals and humans. These effects were found to be reversible upon withdrawal of licorice or glycyrrhizin. Other in vivo and clinical studies have reported beneficial effects of both licorice and glycyrrhizin consumption including anti-ulcer, anti-viral, and hepatoprotective responses[25].

Side Effects and Cautions[26]

- In large amounts, licorice containing glycyrrhizin can cause high blood pressure, salt and water retention, and low potassium levels,which could lead to heart problems. DGL products are thought to cause fewer side effects.
- The safety of using licorice as a supplement for more than 4 to 6 weeks has not been thoroughly studied.
- Taking licorice together with diuretics (water pills), corticosteroids, or other medicines that reduce the body's potassium levels could cause dangerously low potassium levels.
- People with heart disease or high blood pressure should be cautious about using licorice. When taken in large amounts, licorice can affect the body's levels of a hormone called cortisol and related steroid drugs, such as prednisone.
- Pregnant women should avoid using licorice as a supplement or consuming large amounts of licorice as food, as some research suggests it could increase the risk of preterm labor.

Oral Lichen Planus

Patients with chronic hepatitis C often experience oral lichen planus, an inflammatory disease characterized by lymphocytic hyperkeratosis of the oral mucosa. It is rarely cured and effective treatments are limited. In an open clinical trial, 17 hepatitis C-positive patients with oral lichen planus were given either routine dental care or 40 mL IV glycyrrhizin daily for one month. Among nine patients taking glycyrrhizin, six (66.7%) noted improved clinical symptoms, such as decreased redness, fewer white papules, and less erosion of the mucosa. In the non-glycyrrhizin group of eight patients, only one (14.3%) reported any improvement.[27]

CONCLUSION

The present study was focused to bring the pharmacological activities of Glycyrrhiza glabra in the consideration of all concern rersearchers. The study would further help for the renaissance of other pharmacological activities on the plant.

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