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Glycyrrhiza glabra Linn as a remedy to reduce the Impact of Diseases – A pharmacological perspective

Iketalu Kelvin Kosisochukwu
Final Year, Bachelor of Pharmacy
SRM Institute of Science and Technology, Chennai

Abstract

Glycyrrhiza glabra is a conventional medicinal herb that has been documented across the globe for its pharmacological efficacy within the remedy variety of illnesses[2]. Licorice roots include glycyrrhizin, one of the maximum extensively used active substances in natural treatments for treating and managing persistent issues[2-3]. Glycyrrhizin has shown undeniably witnessed global adjustments within the healthcare machine. The Ayurvedic scientific method has grown in popularity, Ayurveda is a historic Indian healthcare device this is profound and comprehensive. This paper ambitions to explain all of the blessings of glycyrrhiza glabra. although various researchers have contributed to the resurrection of the hidden medicinal capability of numerous ayurvedic medications, several vegetation nonetheless requires massive studies. As a result, the contemporary studies are targeted on the overview of Glycyrrhiza glabra relating to its pharmacology benefit.

key-word: Licorice root, Glycyrrhizin, pharmacological efficacy, Glycyrrhiza glabra.

Introduction:

Glycyrrhiza glabra Linn belongs to the Fabaceae family[4] and has been used for pharmacological purposes from historical times. Glycyrrhizin, 18β-glycyrrhetinic acid, obtrusive A and B, and isoflavones are a number of the phytocompounds found on this plant that has been proven to have a pharmacological hobby[9].

Pharmacological assessments have proven that this species' diverse extracts and pure chemicals have a huge variety of organic residences, inclusive of antibacterial, antiviral, antioxidant, and anti-diabetic properties[4-7]. The Greek glycol (candy) and rhizome (root) integrate into the genus Glycyrrhiza (root).

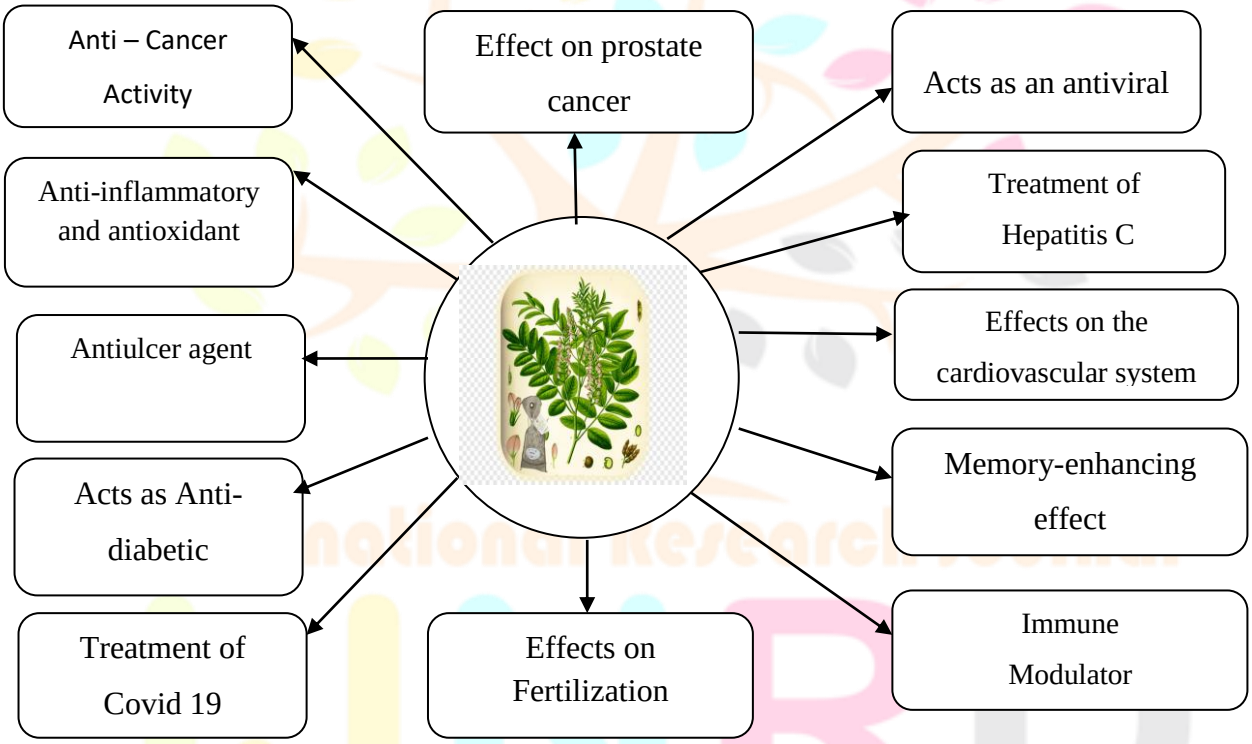
In English, its miles are referred to as sweet wood[5]. This species has currently spread to India, Russia, and China, however, is endemic to the Mediterranean region. It is found in a few areas in the Asia continent like

Bangladesh, Bhutan, India, and Pakistan[33]. Moreover, it is said that Glycyrrhiza glabra is favorably grown in hot temperate countries[34,33]. Apart from its pharmacological effect, it has beneficial and medicinal uses recorded in the past years.[33]

Glycyrrhiza glabra Linn is also known as licorice or multi or yashtimado[12]. Because of its sweetness, this plant is normally used as a flavoring agent [14]. Glycyrrhiza glabra is a

critical element of Ayurveda and Siddha (Indian conventional medicinal drug systems) medicinal drug combos that work as ulcer protectants, demulcents, expectorants, antitussives, and purgatives[7-9]. several traditional healers have claimed the usefulness of Glycyrrhiza species as a diuretic, choleretic, pesticide, and traditional medicinal drug for coughs, colds, and uncomfortable swellings for a ramification of pathological disorders[13,14,15]

The pharmacological activity of Glycyrrhiza glabra Linn



Anticancer activity

The main active constituent that induces anticancer is the Glycyrrhetic and Glycyrrhizin which belong to the class of triterpenoid saponin glycoside[33].

An aqueous extract of G. glabra inhibits ascites Ehrlich tumor cell proliferation and growth of new blood vessels in vivo and in vitro[18].

Meanwhile, several reports have been published in vivo and in vitro studies on the anticancer effects of various derivatives of its components[1,8,14]. By inducing mitochondrial permeability conversion, glycyrrhizin may activate a pro-apoptotic pathway that may be effective for the apoptosis of tumor cells[7]. In bone marrow cells of albino mice, hydroethanolic extract of G. glabra root showed anti-mutagenic potential by inhibiting micronuclei formation and chromosomal aberrations[18]. Glycyrrhizin induced AP1

activity in untreated cells, whereas down-regulated TPA (12O-tetradecanoylphorbal13acetate) induced AP1 activity in treated cells[7]. TPA was used to treat the cells. This method can be used as a paradigm for the development of novel chemoprotective drugs[16].

Effect on Prostate Cancer

Prostate cancer is the most common non-skin cancer in men. The most common traditional treatments for prostate cancer include radiation therapy, androgen deficiency, and combination chemotherapy[7]. Chinese medicine has become more and more popular in Western countries in recent years. A recent study showed that ISL effectively inhibited LNCaP and C42 prostate cancer cells in a dose-dependent manner[19]. It also reduces the amount of ROS in epithelial cells of intraepithelial carcinoma without affecting mitochondrial membrane potential [Psi(m)] and mitochondrial membrane potential [Psi(m)]. Abnormal AMPreliant/stimulated ERK and protein kinase pathways selectively inhibited C42 cells. In DU145 human and MatLyLu rat prostate cancer cells[10], isoliquiritigenin slowed cell cycle progression, resulting in antitumorigenic effects. Isoliquiritigenin[3,4,25] increased the number of cells in the G1 phase by lowering the levels of cyclin E, cyclin D1, and cyclin-reliant kinase4 proteins and increasing the number of cells in the G1 phase.[2]

Acts as Antiviral

Glycyrrhizin has a strong antiviral effect because it prevents virus cells from adhering to it. Recently, the antiviral activity of ribavirin, aziridine, pyraziofurin, mycophenolic acid, and glycyrrhizin against two clinical isolates of the SARS virus, FFM1, and FFM2, were investigated. Glycyrrhizin was shown to be the most effective in suppressing viral replication and could be utilized as a preventative approach. Glycyrrhizin has previously been used to treat HIV1 and chronic hepatitis C virus, patients.

Effects as Anti-inflammatory & Antioxidant

As a possible source of antioxidants, Glycyrrhiza (root) has a lot of polyphenolic components.[21] Licochalcones B and D can reduce lipid peroxidation in microsomes. Retrochalcones show mitochondrial lipid peroxidation and inhibit oxidative hemolysis in red blood corpuscles.[5] Glycyrrhiza glabra isoflavones such as glabridin, hispaglabridin A, and 30 hydroxy4 Omethylglabridin[1] have been discovered to have antioxidant action. Dehydrostilbene derivatives, such as dihydro3,5,4trihydroxy4,5diiodopentenylstilbene, have been discovered and reported as free radical scavengers in recent years.[21,5,7]

Treatment for Hepatitis C

Glycyrrhizin may aid in the treatment of hepatitis C, a liver-infecting virus. Hepatitis C can induce inflammation and long-term liver damage if left untreated.[20] An injectable version of glycyrrhizin is used to treat chronic hepatitis C in persons who have failed to respond to conventional treatments.16,1,14] In cell samples, glycyrrhizin showed antibacterial activity against hepatitis C, suggesting that it could be used as a future therapy for the virus.[8,6,24]

Anti-ulcer agent

Licorice has been used as an anti-ulcer agent since the early Seventies. Deglycyrrhizinizedlicorice[9,10] is a type of extracted glycyrrhizin commonly used to treat ulcers. Carbenoxolone extracted from licorice root has anti-ulcer effects by inhibiting gastrin secretion.[22,27] Liquorice may increase the number of prostaglandins that aid digestion in the digestive tract. Licorice has also been shown to prolong the life of stoma.

Effects on the cardiovascular system

Licorice contains about 300 active ingredients and has been used for thousands of years. Glycyrrhizin is the main active ingredient in licorice. In the intestine, licorice converts 3βmonoglucuronyl18β glycyrrhetinic acid (3MGA) and 18βglycyrrhetinic acid to glycyrrhizin. The enzyme 11βhydrogenase type II (11βHSD2) that converts cortisol to cortisone is blocked by 3MGA and GA. Antioxidant and antioxidant properties reduce inflammation and oxidative stress by neutralizing free radicals and increasing the production of antioxidant enzymes. In addition, quercetin inhibits various proteins by competing for adenosine triphosphate (ATP) binding sites, and lipid kinases reduce inflammatory pathways. In addition, the saponins in licorice root help loosen mucus that needs to be pushed out. individuals who have already got excessive blood pressure or are taking blood pressure medication can have serious problems if they eat a lot of licorice. Side effects from high doses of licorice are attributed to glycyrrhizin, 3MGA, and AG.

Memory-enhancing effect

Glycyrrhizin, a well-known anti-inflammatory molecule, was also discovered to be the first herbal thrombin inhibitor. The activity of glycyrrhizin was discovered to reduce thrombin-induced platelet aggregation, but it did not affect collagen-induced agglutination as well as a PAF-aether, which is a potent phospholipid activator.

Acts as Antidiabetic

Diabetes mellitus type 2 (noninsulin-based), regularly called insulin resistance syndrome, is the main health difficulty in ultra-modern culture. Peroxisome proliferation-activated receptors (PPARs) are ligand-based transcriptional regulators that manipulate the expression of a group of genes worried in glucose and lipid metabolism. PPAR receptors are divided into 3 kinds: PPARα, PPARγ, and PPARδ. The PPARα can be present inside the liver, muscle, and kidney. PPARγ is discovered in adipose tissue, the adrenal gland, and the small gut, but is expressed all through the body. Insulin-stimulating tablets consisting of pioglitazone and rosiglitazone are recognized to target PPARγ.

Immune Modulator (SWINE INFLUENZA)

The H1N1 influenza virus has evolved the capability to overcome species boundaries (from pigs to people) and to unfold widely between people. The polysaccharide additives of Glycyrrhiza glabra set off phagocytes [2], thereby growing and assisting immune activation. Nacetylmuramoyl peptide (MDP) is a glycyrrhizin

analog that may have immune-stimulating effects in animal and test-tube experiments. Its efficacy against influenza viruses, mediated by inhibition of viral replication, is a potential source of immunomodulators. The plant's glycyrrhizic acid inhibits virus growth and renders viral particles inactive.

Treatment of Covid 19

RNA against the COVID-19 virus is made up of proteins that wreak havoc on the internal organs of the human body. This virus infects human breathing cells due to amino and carboxyl corporations being the practical additives of the virus[13]. The hydroxyl group plays an important role in inactivating the virus. As man-made chemical compounds have mild to severe negative effects on human organs, they are not recommended for use. The antiviral properties of the licorice-based nanofilm allow it to be used as a wound dressing material. To increase the functional quality of natural plant membranes, some additional biological components can be added.

Effect on Fertilization

Licorice exposure will increase the rate of in vitro pregnancy (IVF) [1,36]. Sperm transplantation is a beneficial approach to reproduction while pregnancy can be carried out by improperly inserting sperm right into a lady's vagina. artificial insemination is important for cattle breeding and infertility remedies [37]. After some time, the extracted sperm cellular starts to mature, [1] and the acrosome response starts, and finally, the egg mobile is fertilized. two aqueous extracts of licorice, isoliquiritigenin, and formononetin, were located to enhance IVF ranges in a mouse version [1,36]. Estrogen impacts sperm function and acrosome reactions. Isoliquiritigenin has a potent activity just like estrogen. Formononetin aids in sexual improvement, which includes puberty, ovarian function, oestrus circulatory issues, and pituitary and hypothalamic capabilities [38]

Conclusion

Glycyrrhiza glabra is an ethnobotanical species with a long history. Europeans and Eastern countries use the stem and rhizomes of this plant as a conventional medicinal drug. Because of the presence of many bioactive components, including triterpene, saponins, flavonoids, alkaloids, glycyrrhizin, glycyrrhizic acid, glabridin, liquidity. Glycyrrhiza glabra extracts were proven to have an extensive range of medicinal characteristics, consisting of antitussive, antimicrobial, antioxidant, anti-inflammatory, antiulcer, anticancer[4], etc. Glycyrrhiza glabra is an ancient plant that has been utilized in traditional pharmacopeias for its varied effects against a wide range of systematic and nonsystematic diseases. Glycyrrhiza glabra's chemical foundations were found in the last epoch[2,4]. The phytochemical contents of Glycyrrhiza glabra have multiple potentials in terms of generating novel compounds that could have a lot of medical applications in the drug discovery process for the creation of new medications[2].

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