



YASHTIMADHU (GLYCYRRHIZA GLABRA LINN.) A REVIEW

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INTRODUCTION

Yashtimadhu is an important plant in Indian medicinal plant. A genus of perennial herbs and under shrubs distributed in the sub-tropical and warm temperate regions of the world, chiefly grown in the mediterian countries and china. The classical text of Ayurveda mentions number of therapeutic uses for the management of several diseases. In *Charaka Samhita* and *Sushruta Samhita* described therapeutic uses and formulation of *Yashtimadhu*. Ayurvedic Pharmacopoeia of India gave nomenclature in following manner.^[1]

Latin Name :- Glycyrrhiza glabra Linn.

Family :- Leguminosae

Classical Name :- *Yashtimadhu*, *Yashti*, *Yashtimadhuka*, *Madhuyashtika*, *Madhuka*, *Kleetaka*, *Yashtyahva*.

English - Licorice

Hindi - *Mulhathi*

Kannad - *Jesthamadhu*

Marathi - *Jesthamadha*.

Malayalam - *Irattimadhuram*

Sanskrit - *Yashtimadhu*

Tamil - *Atimaturam*

Telgu - *Atimadhurarau*

Kulam - *Aparajeta kulam*.

MATERIALS AND METHODS

Classical text books of Ayurveda and the published works on various scientific journals are reviewed for documenting the information about *Yashtimadhu* (*Glycyrrhiza glabra* Linn.).

Classification in Ayurvedic Texts

Name of Nighantu	Varga (Class)
<i>Bhavaprakasha Nighantu</i>	<i>Haritakyadi Varga</i> ^[2]
<i>Raja Nighantu</i>	<i>Pippalyadi Varga</i> ^[3]
<i>Madanapala Nighantu</i>	<i>Abhayadi varga</i> ^[4]
<i>Shaligram Nighantu</i>	<i>Astha Varga</i> ^[5]
<i>Sodhala Nighantu</i>	<i>Guduchyadi Varga</i> ^[6]

MORPHOLOGY^[1]

The plant: - It is hardy herb attaining a height upto six feet's, leaves are multi foliate, impar pinnate, flowers are in axillary spikes, papilionaceous, lavender to violet in color, pods are compressed, containing eniformed seeds. The licorice of commerce is the dried underground stems and roots. Its outer surface is pale chocolate brown in color, flexible and fibrous and internally has a light-yellow color. It has a characteristic pleasant sweet taste.

a) Macroscopic

Stolon consists of yellowish brown or dark brown outer layer, externally longitudinally wrinkled, with occasional small buds and encircling scale leaves, smoothed transversely, cut surface shows a cambium ring about one-third of radius from outer surface and a small central pith, root similar without a pith, fracture, coarsely fibrous in bark and splintery in wood, odor, faint and characteristic, taste, sweetish.

b) Microscopic

Stolon- transverse section of stolon shows cork of 10-20 or more layers of tabular cells, outer layers with reddish-brown amorphous contents, inner 3 or 4 rows having thicker, colorless walls, secondary cortex usually of 1-3 layers of radially arranged parenchymatous cells containing isolated prisms of calcium oxalate, secondary phloem a broad band, cells of inner part cellulosic and outer lignified, radially arranged groups of about 10-50 fibers, surrounded by a sheath of parenchyma cells, each usually containing a prism of calcium oxalate about 10-35 long, cambium form tissue of 3 or more layers of cells, secondary xylem distinctly radiate with medullary

rays, 3-5 cells wide, vessels about 80-200 in diameter with thick, yellow, pitted, reticulately thickened walls, groups of lignified fibers with crystal sheaths similar to those of phloem, xylem parenchyma of two kinds, those between the vessels having thick pitted walls without inter-cellular spaces, the remaining with thin walls, pith of parerichymatous cells in longitudinal rows, with inter-cellular spaces.

Root-transverse section of root shows structure closely resembling that of stolon except that no medulla is present, xylem tetrarch, usually four principal medullary rays at right angles to each other, in peeled drug cork shows phelloderm and sometimes without secondary phloem all parenchymatous tissues containing abundant, simple, oval or rounded starch grains, 2-20 μ in length.

Properties as per Ayurvedic text

Bhavaprakasha Nighantu^[2]

यष्टी हिमा गुरुः स्वाद्वि चक्षुष्या बलवर्णकृत |

सुनिग्धा शुक्लला केश्या स्वर्या पित्तानिलास्त्रजित ||

व्रणशोफविषच्छ्रदितृष्णाग्लानिक्षयापहा |

Rasa - *Madhura*
Veerya - *Sheeta*
vipaka - *Madhura*
Guna - *Rasayan, Snegdha, Sheeta.*
Rasa :- *Madhura*
Doshghnata :- *Vatapittashamaka*
Karma :- *Keshya, Chakshushya, Balya, Varnya.*
Rogaghnata :- *Vranashotha, Visha, Vamana, Trishna.*
Vranaropana, Chakshusya, Bala-varnakruta, Shukrala, Keshya, Svarya Sothanashaka, Vishahara Chhardihara, Trushnahara, Glanihara, Kshayapaha Vatapittajit.

Raja Nighantu^[3]

Chakshusya, Trushnanashaka, Vranapaham.

Kaiyadev Nighantu^[7]

Vrushya, Varnya, Svarya, Keshya, Chhardihara, Kshayahara, Sofanashaka, Vranahareta.

Flavonoids and Isoflavonoids

The flavonoids impart the yellow colour to licorice. The main flavonoid is Liquiritin Other are.

Isoliquiritin	Beta sitosterol Stibmasterol
Liquiritigenin Rhamoliquiritinin Ucoflavonol Lcoisoflavonol	Dihydro stigmasterol Phytcrestrogen-
Licoisoflavones A and B Licoisoflavone	GJizerone;
Glabrol	Volatile oil-
Giabrone 3- hydroxyglabrol 4-0--a-methylglaberdin	Fenchone
3 methoxy glaberdin	Linalool
Formononetin	Benzaldehyde
Phaseelin isoflavone	Bitter principle-Glycyramarin
Hisglaberdin A	Nutritional constituent-
Hisglaberdin B	Vitamins
Coumarins-	E, B1, B2, B3, B5, B6 inositol, biotin Minerals
Liquocoumarin	Phosphorus
Umbiliferone	Manganese
Herniarin	Iodine
Sterols-	Chromium
	Zinc

Dhanvantari Nighantu^[8]

Shitapittavinashini, Vrushya, Soshanashaka, Kshayahara, Chhardivinashini.

Medicinal Uses^[1]

The roots are sweet, refrigent, emetic, tonic, diuretic, demulcent, emmenagogue. Alexipharmic, alterant and intellect promoting. They are useful in hyperdipsia, cough, bronchitis, vitiated condition of *Vata*, gastralgia, cephalgia, fever, skin diseases, ophthalmopathy etc. A decoction of root is a good wash for falling and graying hairs.

Some of the above properties are confirmed by extensive research on licorice. It has been, proved to be osteogenic, demulcent, anti-oxidant, anti-inflammatory, anti-ulcer, anti-allergic anti-spasmodic and expectorant.

Constituents

The Phyto chemicals in *Glycyrrhiza glabra* include.^[9]

Main active constituents

The main constituents of *Glycyrrhiza glabra* are glycyrrhizin a mixture of calcium and potassium salts of glycyrrhizic acid. Glycyrrhizin is extremely sweet, approximately 50 times sweeter than sugar and foams in water. The intestinal flora of large intestine cleaves glycyrrhizin to its aglycone portion glycyrrhitinic acid and disaccharide. It is the glycyrrhitinic acid (GA) and glycyrrhizin which accounts for much of its activity of *Glycyrrhiza glabra*. GA is not well absorbed from gastro intestinal tract, which explains the need of large doses of licorice to demonstrate its pharmacological actions.

Apart from GA and glycyrrhizin the main active constituents can be differentiated as below.

Saponins -
 Liquiritic acid
 Glycyrrhetol
 Glabrolide
 Iso glabrolide
 Licoric acid

Pharmacology

Anti inflammatory activity^[9]

Most interest has centered on glycyrrhizin and glycyrrhithinic acid. Chemically they resemble adrenocorticotrophic hormone and consequently exert a strong influence on the adreno cortex, influencing both minerealo corticoid and glucoerticoid function. This action has been shown to be dependent on functioning adrenal cortex. In part due to the above effect on endogenous glucoerticoid production, Licorice possess anti-inflammatory actions. In addition by, inhibiting an enzyme responsible for the degradation of cortisol, as well as aldosterone and progesterone, there is an increase in half-life of secreted, cortisol. While glycyrrhizin does mimic cortisol anti-inflammatory action it apparently antagonizes others, notably its anti granulomatous effects as well its action of increasing hepatic glycogen. When used topically by inhibiting 11 beta hydroxy steroid dehydrogenase extract of Glycyrrhiza glabra has been shown to increase the effects of hydrocortisone. Glycyrrhithinic acid also exerts a direct anti inflammatory effect by inhibiting 15-hydroxy prostaglandin dehydrogenase and delta-13-prostaglandin reductase affecting the metabolism of inflammatory prostaglandins. This may be responsible for the protective action exerted by licorice on the gastric mucosa.

Hepatoprotective activity^[9]

Glycyrrhiza glabra has been shown to have a direct hepatoprotective effect; Glycyrrhiza glabra flavonoids provide protection to hepatocytes exposed to CC1₄ and galactosamine. The central mechanism of the hepatoprotective effect of licorice may be due to anti lipid per oxidation effect.

In Japan, Glycyrrhizin is an accepted treatment in chronic hepatitis from 20 years. Glycyrrhiza is a conjugate of Glycyrrhithinic acid and glucuronic acid. Glycyrrhizin orally administered is metabolised in the intestine to glycyrrhithinic acid, while intravenous' glycyrrhizin cannot be metabolized to glycyrrhithinic acid until it is excreted through the bile into the intestines. Both glycyrrhizin and glycyrrhithinic acid have been found to possess anti viral activity. Even smaller doses of glycyrrhithinic acid of 5 micro grams/ml are found to be effective. The dose can be increased up to 1000 micrograms/ml: Glycyrrhizin is found effective in lowering levels of hepatic enzymes.

The first evidence of glycyrrhizins antiviral activity was found in 1977 in culture studied with herpes simplex virus type 1. Crance found complete inhibition of hepatitis A virus antigen expression at concentration of 1000 and 2000 me g/ml. The mechanism of glycyrrhizins antiviral effect was later discovered not to be viral inhibition, as previously thought, but inhibition of virus ability to penetrate the human hepatocyte. Hepatitis A virus enters cells by the process endocytosis, a process that glycyrrhizin interrupts by altering cell membrane

permeability. Entero hepatic cycling of: Glycyrrhiza. glabra shows effectiveness in liver disorders. The reason is that Glycyrrhiza glabra enters enterohepatic loops and is excreted in bile, then is reabsorbed in the gut to recycle repeatedly through the liver.

Gastro intestinal activity^[9]

In Ayurveda as well as in European herbal medicine licorice is widely used as a treatment for gastric ulcers. In the 1950 news, research showed that licorice derived compound can raise the concentration of prostaglandin in the digestive system that promote mucus secretion from the stomach as well as produce new cells in stomach. It was also shown that licorice prolongs the life span of surface cells in the stomach and has anti pepsin effect. The combined effect leads to healing of ulcers.

Newer research has proved that glycyrrhithinic acid reduced licorice, shows a good reduction in gastric ulcers size. Glycyrrhithinic acid reduced licorice consist licorice from which all but 3% of the glycyrrhithinic acid has been removed. Another licorice derivative, carbenoxolone is synthesized from glycyrrhithinic acid (the aglycone of glycyrrhithinic acid) and is of proven value in the treatment of gastric ulcers. The mechanism of glycyrrhithinic acid reduced licorice is not known. Experiments suggest that DGL has an anti spasmodic effect on the spontaneous activity of ilium of rabbit. Various possible modes of action have been proposed and these include the effects on mucus production, mucosal regeneration, local blood flow and mucosatluid transport.

Metabolic effects^[9]

Glycyrrhithinic acid a poly terpene with chemical formula resembling that of cortico steroids is the component of licorice, which causes fluid retention, and an alteration of sodium and potassium. Glycyrrhizin inhibits hepatic and renal 11 b -OHSD and 5a-reductase there by blocking the inactivation of glucocorticoids and mineralocorticoids and elevating the serum titer, DGL is a preparation from which the Glycyrrhizin molecule has been removed. DGL causes no odema in-patient who had previously experienced severe odema when given crude licorice.

Immunomodulatory activity^[9]

Research on polysaccharides of licorice have revealed the capability of stimulating the immune system. It is known to increase the phagocytic activity of macrophages. It helps macrophages to secrete interlukin-1.

It enhances both natural killer cell and antibody dependent cellular cytotoxic activity. Glycyrrhizin was shown to protect the mice exposed to lethal doses of influenza virus through the stimulation of IFN-gamma production of T cells, Glycyrrhithinic acid and glycyrrhizin potentially inhibits the classical complement pathway (1C 50). The anti allergic like activites have been ascribed to the action of aglycone 6-glycyrrhithinic

acid, which has a steroid like structure and is believed to have immunomodulatory properties. Glycyrrhithinic acid potently inhibits the classical complement pathway, whereas no inhibitory activity was observed towards the alternative pathway. The anti-complementary activity of B-glycyrrhithinic acid depends on its confirmation since this type does not show the activity. Naturally occurring steroids such as hydrocortisone and cortisone did not inhibit human complement activity under similar conditions. Detailed studies show that B-glycyrrhithinic acid acts at the level of complement component C₂.

Antibacterial and Anti Viral activity^[9]

Glycyrrhiza glabra extract has displayed anti-microbial activity in vitro against *Staphylococcus aureus*, *S. matanes*, *M. smigmatidis* and *Candida albicans* strain of bacteria. The majority of anti-bacterial effects are due to iso-flavonoid components particularly hispaglaberidin A and B, 4'-O-methyl glaberidin, glaberidin, glabrol and 3-hydroxyl glabrol. A trial conducted in Japan demonstrated Glycyrrhiza glabra root to be effective against an original *Staphylococcus aureus* strain that was already made resistant to penicillin and streptomycin as well as against succeeding drug-resistant cultures or generation of that strain which tend to develop even greater resistance of the standard drugs.

Anti Viral activity^[9]

Glycyrrhizin and glycyrrhithinic acid exhibit significant antiviral activity. Several different mechanisms may be responsible for these anti-viral effects. Glycyrrhithinic acid inhibits herpes simplex type I, Varicella zoster, decreases hepatitis B surface antigen, inhibits HIV-I, but not via reverse transcriptase.

Interferon activity is potentiated with licorice. Glycyrrhizin and glycyrrhithinic acid stimulate interferon, the body's natural anti-viral compound. Thus, it produces significant antiviral activity because interferon binds to cell surface, stimulating synthesis of intracellular proteins that block viral DNA. Glycyrrhizin and glycyrrhithinic acid induce intracellular destruction of viral parasites. It is known to prevent intracellular uncoating or activation of infecting virus and also causes impairment in the assembling process.

Anti allergic activity^[9]

Licorice is known to inhibit prostaglandin E₂, arachidonic acid release and has a similar activity to that of hydrocortisone. Licorice suppresses dexamethasone-induced histamine release and mast cell degranulation in vivo studies.

Anti oxidant activity^[9]

Glycyrrhizin also appears to work as a free radical scavenger. Studies with ischemia-reperfusion damage in rat liver pretreated with subcutaneous glycyrrhizin significantly decrease lipid peroxidation and transaminase levels.

Expectorant activity^[9]

Glycyrrhiza glabra exhibits expectorant activity. This activity is produced to a reflex expectorant action from the GI tract mediated by the embryonic neural link between the mucosal membranes of the GIT and the respiratory tract. Glycyrrhizin exerts a local effect in the GIT upon ingestion. This effect can best be described as a slight irritation of the mucous membrane, which stimulates the secretion of mucus from the respiratory tract mucous membrane. This helps to loosen tenacious sputum and promotes its removal from the respiratory tract. It is also known to be demulcent, which is soothing to irritated mucous membrane. Glycyrrhithinic acid and its derivative have anti-tussive effects similar to codeine.

Detoxification activity^[9]

Recent studies have brought to light the ability of licorice to enhance the detoxification of medications and toxins. Several mechanisms seem to be involved; one of which is increased liver glucuronidation. Rats treated with glycyrrhiza tincture one gram/kg p.o. for six days significantly increased the cumulative biliary and urinary excretion of acetaminophen glucuronide conjugate within 120 minutes after the administration of acetaminophen. However, the dose in the study was significantly high and would likely cause significant side effects in humans.

Another mechanism of detoxification is an activation of P450, phase I detoxification. The detoxification of a wide variety of substances that is testosterone, ethoxyresorun, methoxyresorufin, phenoxyresorufin, p-nitrophenol and aminopyrin are found to be enhanced. Hepatotoxic reaction in patients being treated with tuberculosis was significantly reduced in patients who received herbal liver support of licorice.

Miscellaneous activity^[9]

Scientists have shown that licorice has an effect on adrenal glands helping to stimulate adrenal glucocorticoid production. A number of papers have been published by Dr. Merck Demitrik of the University of Michigan Medical Center, New Zealand, showing the relation of mild glucocorticoid insufficiency in chronic fatigue syndrome and patients who don't have symptoms of Addison's disease. As licorice is known to stimulate glucocorticoid production it can be successfully used in the patient with chronic fatigue syndrome. A further detailed study is needed in this context.

Due to the steroidal structure of the triterpene portion, it has been postulated that licorice may also possess oestrogenic activity.

Researchers have discovered an ingredient in the root of the licorice plant that appears to prevent the buildup of cholesterol in arteries. Glaberidine is known to delay the oxidation of low-density lipoproteins, the main contributing factors to increase cholesterol on the arterial wall that leads to atherosclerosis or narrowing of arteries.

Aqueous extract of *Glycyrrhiza glabra* does not exert this cholesterol lowering effects because aqueous extract of licorice does not contain glabiridin and constituents involved in reduction of cholesterol. Licorice works as an anti oxidant by trapping free radicals that cause oxidation, resulting in a reduction of the built up of cholesterol.

Contraindication^[9]

Idiosyncratic hypersensitivity action of licorice root is rare but have been empirically noted. Licorice is contraindicated in overweight, hypertensive and cardiac patient, especially those cardio tonic drugs or diuretics.

Licorice is also contraindicated in severe renal insufficiency or high blood pressure due to sodium and fluid retention. It is contraindicated in hypocalcemia due to increased potassium excretion from kidneys.

Toxicity^[9]

The effects of prolonged consumption of licorice root in excess of the safe therapeutics dose may result in pseudo

aldosteronism, which mimics mineralocorticoid excess. This syndrome is characterized by potassium loss, sodium retention edema, hypertension and weight.

Drug interaction^[9]

Licorice if prolonged use potentiates the cumulative toxicity of cardiac glycosides due to potassium loss. It increases potassium loss from thiazide diuretics, and should not be used simultaneously with either spironolactone or amiloride. Licorice potentiates corticosteroids by prolonging its biological half-life. Interaction with neuro transmitter modulating drugs is not reported. As hydrolysis of glycyrrhizin to glycyrrhithinic acid is performed by bowel flora. This adversely affects the antibiotic therapy although it is not a potentially dangerous side effect.

Dosage

Dried root 1 to 4 gm. Useful part- Root

Kaur et al. revealed pharmacological activities reported from *Glycyrrhiza Glabra*.^[10]

Table 1: Pharmacological activities reported from *Glycyrrhiza Glabra*.

Sr. No	Activity	Part/Extract	Animal models & cell lines
1.	Immunomodulatory activity	Aqueous extract	In vivo phagocytosis, determination of cellular immune response hemagglutination antibody titer & plaque forming cell assay using sheep RBCs
2.	Antitussive activity	Ethanol extract	SO ₂ gas induced cough in experimental animals. Mice showed an inhibition of 35.62% in cough on treatment with <i>G.glabra</i> extract
3.	Anti-inflammatory activity	Hydroalcoholic extract	Carrageenan induced rat paw edema at dose levels of 100,200,300 mg/Kg. The extract showed a maximum of 46.86% inhibitory action
4.	Chronic fatigue stress	Hydroalcoholic extract	The extract showed the protective effect on mice on exposure to chronic fatigue stress
5.	Antinociceptive activity	Ethanol extract	Different pain models in Swiss albino mice. Activity was evaluated at 50-200 mg/Kg ip in mice using various pain models like acetic acid induced abdominal constrictions, formalin induced hyperalgesia & tail flick method
6.	Antiulcer activity	Aqueous, acetone, ethanolic extracts of leaves	Micro-organism used: <i>Helicobacter pylori</i> by agar well diffusion method
7.	Hepatoprotective activity	Aqueous extract of roots	PCM induced rats' hepatocytes damage in vivo. Rabbit models with acute liver injury induced by CCl ₄
8.	Memory enhancing activity	Aqueous extract of roots	Three-month-old Wistar albino rats. Elevated -plus maze and Morris water -maze test was conducted
10.	Anticonvulsant activity	Hexane, ethanol, methanol extract of leaves	Fractions were evaluated intraperitoneally in mice using maximal electroshock (MES) & pentylene tetrazole (PTZ) seizure tests
11.	Antistress activity	Alcoholic & aqueous extract	Reduce stress in <i>Drosophila melanogaster</i> induced by Methotrexate at different conc.
12.	Antioxidant activity	Methanol extract	The method based on scavenging activity & reduction capability of 1,1-diphenyl-2-picrylhydrazyl radical; Also, against nitric oxide & superoxide radicals
13.	Testicular toxicity	Aqueous extract	Carbendazim induced testicular toxicity in albino rats
14.	Cytotoxic activity	CHCl ₃ , methanol & aqueous extract	In vitro cytotoxic activity using two different cell lines MCFT-cancerous & Vero-normal cell line
15.	Enzyme inhibiting activity	Methanolic extract	Invitro inhibition of tyrosinase enzyme

16.	Antihyperglycemic activity	-----	Male albino rats of Wistar strain
17.	Antimalarial activity	Alcoholic extract	Micro-organism used: Plasmodium falciparum; Plasmodium yoelii
18.	Antiviral activity	Aqueous extract	Herpes simplex 1 & vesicular stomatitis virus
19.	Anticancer activity	Licorice extract	Ames test, Trp-p-1, Trp-p-2 in <i>S. typhimurium</i> TA 98 revertants
20.	Estrogenic activity	Alcoholic extract	Mouse
21.	Antimycobacterial activity	Methanolic extract	Micro-organisms used: Mycobacterium tuberculosis H37Ra & H37Rv strain
22.	Antidyslipidaemic activity	Ethanol extract	Fractions significantly brought down LDL and VLDL in the HFD fed hamsters to various degrees
23.	Antimicrobial activity	Ether, Chloroform, acetone	Micro-organisms used: <i>E. coli</i> , <i>B. subtilis</i> , <i>P. aeruginosa</i> , <i>S. aureus</i> 43

Table 2: Chemical Constituents Responsible for the Bioactivity.

Sr. No	Activity	Chemical constituent	Class
1.	Antiulcer activity	Glabridin, glabrene, glycyrrhizic acid	Flavonoid, isoflavone, saponin glycoside
2.	Antimycobacterial activity	Glabridin	Flavonoid
3.	Analgesic & uterine relaxant	Isoliquiritigenin	Flavonoid
4.	Antioxidant activity	Licochalcone, glabridin, isoliquiritigenin, licocoumarin	Chalcone, flavonoid
5.	Memory enhancer	Glabridin	Flavonoid
6.	Corticosteroid activity	18- β -glycyrrhetic acid	Triterpenoid saponin glycoside
7.	Antiallergic activity	Glycyrrhizin, 18- β -glycyrrhetic acid, liquiritigenin	Triterpenoid saponin glycoside, flavanone
8.	Hepatoprotective activity	Glycyrrhizin	Triterpenoid saponin glycoside
9.	Anti-inflammatory activity	Glycyrrhetic acid, liquiritoside, Licochalcone a	Chalcone
10.	Anticancer activity	Glycyrrhetic acid, Glycyrrhizin	Triterpenoid saponin glycoside
11.	Antimalarial activity	Licochalcone A	Chalcone
12.	Antiviral activity	Glycyrrhizin, licochalcones, glycyrrhetic acid	Triterpenoid saponin glycoside
13.	Antihyperglycemic activity	18- β -glycyrrhetic acid, glycyrrhizin	Triterpenoid saponin glycoside
14.	Hepatocellular carcinoma	Glycyrrhizin	Triterpenoid saponin glycoside
15.	Antitussive activity	Glycyrrhizin	Triterpenoid saponin glycoside
16.	Antithrombin activity	Glycyrrhizin, isoliquiritigenin	Triterpenoid saponin glycoside, flavanoid
17.	Immunostimulating	Glycyrrhetic acid	Triterpenoid
18.	Anti HIV	Glycyrrhizin	Triterpenoid saponin glycoside
19.	Chronic hepatitis C	Glycyrrhizin	Triterpenoid saponin glycoside
20.	Spasmolytic	Liquiritin	Flavonoid
21.	Muscle relaxant	Rhamnoglucoside	Flavanone
22.	Antimycobacterial activity	Glabridin	Flavonoid
23.	Estrogenic activity	Glabrene, liquiritigenin	Isoflavan, flavanone

CONCLUSION

From various *Samhita* and *Nighantu* described traditional uses that can be proved through modern parameter also. *Glycyrrhiza glabra* have been possess Anti-inflammatory activity, Hepatoprotective activity, Immunomodulatory activity, Antibacterial and Anti-Viral activity, Anti allergic activity Anti-oxidant activity, Expectorant activity, Detoxification activity.

REFERENCES

1. Pharmacopoeia of India, Part I, Volume – I, Pg. No 169.
2. Sri Brahmasankara Misra, Sri Rupalalaji Vaisya (2007), Bhavaprakash Nighantu-I, Chaukhambha Sanskrit Bhawan, Varanasi, 65. Haritakyadi Varga Purva khanda. shlok no.145-146. Page no.65.
3. Narhari, Raj nighnatu, Dr. Indradev Tripathi, Chaukhambha Sanskrit Sansthan, Varanasi, 4th edition, 2006.
4. Illustrated Madanpala nighantu, Dr. J.L.N. Sastry, Chaukhambha orientalia, Varanasi, 1st edition, 2010. page 43.

5. Sri Shaligram Vaishya, Shaligram Nighantu, Part 7-8, Khemraj Shrikrishnadas Prakashan, Bombay Edition 2007 Page 632,633,634.
6. Shodhala, Shodhala Nighantu, edited by Sharma P.V, I edition, Baroda, Oriental institute, 1978, Guduchyadi Varga 1/196197, p-19.
7. Kaiyadev Nighantu, Prof, Priyavat Sharma, Dr Guruprasad Sharma, Chaukhambha Orientalia, Varanasi, Reprint-2009, page 637.
8. Dhanavantari Nighantu, Dr Jharakhande Ojha, Dr Umapati Misra, Chaukhambha Sanskrit Pratishthan, Revised edition, 2004 page no.281.
9. Dr Mukund Submis, Chemistry and pharmacology of ayurvedic plants, 2006,p465.
10. Kaur et al. IJPSR, 2013; 4(7): 2470-2477.