

PHARMACOGNOSTIC STUDY OF GLYCYRRHIZA GLABRA LINN- A REVIEW

Dr. Balaji S. Sawant¹ Dr. Janhavi R. Alawe² Dr Kaveri V. Rasal³

¹HOD & Guide, ²Asst. Professor, ³Final MD research scholar

Department of Dravyaguna Vigyan

Smt. K. G. M. P. Ayurved Mahavidyalaya, Charni road, Mumbai, Maharashtra, India

ABSTRACT

Liquorice or Licorice, Latin name *Glycyrrhiza glabra*, family Leguminosae, sanskrit name *Yashtimadhu* or *Madhuk* is a herbaceous perennial legume, native to Southern Europe & parts of Asia such as India. It is a well known plant from *vedic kaal* which is used not only to treat the disease but also in ritual functions like yagya etc. Almost all *nighantus* & *granthas* have described Liquorice & its properties. It is also widely used in Chinese herbs, Unani, Homeopathy treatments. As a herbal medicine it has an impressive list of well documented uses such as anti inflammatory, anti ulcer, anti oxident, expectorant, memory enhancing etc & it's probably one of the most over looked of all herbal wonders. The present article is aimed to provide a broad overview of pharmacognosy, phytochemistry of Liquorice. The phytochemical studies revealed the presence of flavonoids, tannins, steroids, saponins, glycosides, proteins & sugars.

Keywords: *Glycyrrhiza glabra*, pharmacognocny, Aurvedic properties.

INTRODUCTION

Now-a-days there is a renewed interest in drugs of natural origin simply because they are considered as green medicine and green medicine is always supposed to be safe. Another factor which emphasizes this attention is the incidences of harmful nature of synthetic drugs which are regarded as harmful to human beings and environment. The advantage of natural drugs is their easy availability, economic and less or no side effects but the disadvantage is that they are the victims of adulteration. The more effective the natural drug more is its demand and the chances of non-availability increases. To meet the growing demand, the natural drug is easily adulterated with low grade material. Adulteration or substitution is nothing but re-

placement of original plant with another plant material or intentionally adding any foreign substance to increase the weight or potency of the product or to decrease its cost. Therapeutic efficacy of medicinal plants depends upon the quality and quantity of chemical constituents. The misuse of herbal medicine or natural products starts with wrong identification. The most common error is one common vernacular name is given to two or more entirely different species. All these problems can be solved by pharmacognostic studies of medicinal plants. It is very important and in fact essential to lay down pharmacognostic specifications of medicinal plants which are used in various drugs.

Pharmacognosy is the study of medicines

derived from natural sources, mainly from plants. It basically deals with standardization, authentication and study of natural drugs.

Glycyrrhiza glabra (Liquorice), a plant which have lots of medicinal properties. So, it may be known as plant for future.

HABITAT & DISTRIBUTION^{1,6}

Liquorice is a Herb of 1 to 1.5 meter in height. It (*Glycyrrhiza glabra*) grows in the sub - tropical and warm temperate regions of the world. *Glycyrrhiza glabra*, also known as Sweet Wood is part of the Fabaceae or (Leguminosae) plant family. Liquorice enjoys fertile, sandy or clay soil near a river or stream where enough water is available for the plant to flourish in the wild, or under cultivation where it can be irrigated. It is native to Arabia, Persian, Gulf, Afganisthan, Turkesthan, Asia minor, Siberia etc but the root is cultivated in the Punjab, Sub Himalayan tracts from the Chenab eastwards, Sindh & Peshwar Valley, Burma & Andaman Islands. Dried liquorice roots are found in all the bazaars of India.

CLASSICAL NAMES¹³

Atirasa, Jalaja, Klitaka, Klitana, Klitaniyak Klitaka, Klitanaka, Madhuli, Madhulika, Madhu, Madhuk, Madhuyashti, Madhuvalli, Mahuyashti, Madhuparni, Madhuras, Madhurlata, Madhurstrava, Sosanasini,

Rasa, Saumya, Virasa, Yashti.

VERNACULAR NAMES^{1,3,12}

Sanskrit-*Yashtimadhu, Madhuk.* Hindi-*Mithilakadi, Mulahati, Kubassusa* (extract in black stick), Marathi-*Jyeshthamadh, Gujarati-Jethimadha.* English Sweet wood, Liquorice.

Bengal-*Yastomadhu, Kannada Samgara.*

Karnataki-*Valliyashtimadhu.* Punjabi-*Mularthi, Tamil Atimadhurama* (root),

Atimadhurappala (extract).

SCIENTIFIC CLASSIFICATION

Kingdom-Plantae, Division-Phanerogams, Subdivision-Angiosperms, Class-Dicots, Subclass-Polypetalae, Order-Calciflorae, Family-Leguminosae, Subfamily-Papilionaceae, Genus-*Glycyrrhiza*, Species-*Glabra*, Authority-Linn

PARTS USED^{1,2} -Root

TYPES^{2,6}

According to *Ayurveda*, 2 types-1. *sthalaja* (Terrestrial)- originates in dessert.

2. *jalaja* (aquatic) – originates in water.

Jalaja is also called *madhulika* and *madhuparni*. It is rare.

According to Yunani vaidyaka, 3 types

1. *Misheya* 2. *Arabiya* 3. *Turkiya*

There sweetness decreases successively

EXTERNAL MORPHOLOGY OR MACROSCOPIC DESCRIPTION^{2,6}

Type of plant-A hardy herb or Under shrub, growing to a height of 1.8 m.

Roots-thick, manybranched, red or lemon colour outside & yellowish or pale yellow inside.

Leaves- Compound, spreading, large stalked with very minute deciduous stipules, imparipinnate leaflets opposite in 4-7 pairs and a terminal one, shortly stalked oblong oval or ovate, obtuse, entire smooth.

Flowers axillary spikes, Papilionaceae, lavender to violet in colour (comes in March)

Fruits-pods, compressed (comes in August)

Seeds- 2-5, reniform, flat, deep grey.

MACROSCOPY OF ROOT (Dried sample of Root)¹¹

Length: 5 cm – 9.4 cm, Diameter: 1.2 cm – 3 cm, Colour: brownish grey to brown with longitudinal striations, Fracture: smooth, Odour: none, Taste: sweet

AYURVEDIC PROPERTIES

CLASSICAL CATEGORISATION^{7,8,9}

Acharya Charak-

Jeevaniya, Sandhaniya, Varnya, Kanthya, Kandughna, Snehopaga, Vamanopaga, Asthapanopaga, Mutravirajaniya, Dahapra shaman, Angamardaprashaman, Shonitsthapan.

Acharya Sushrut-

Haridradi, Kakolyadi, Nyagrodhadi, Bruhat yadi, Utpalad.

Acharya Vaghat-

Haridradi, Ambashtadi, Nyagrodhadi

RASAPANCHAK^{2,3,4,12}

Rasa-Madhur, Vipaka-Madhur, Virya-Sheeta, Guna-Guru, Snigdha, Doshagnta-Vatapittaghna.

According to API-Rasa-Madhur, Veerya-Sheeta, Vipaka-Madhur, Guna-Guru, Snigdha.

ROGAGNATA^{3,4,12}

In ayurveda, it is used extensively as a demulcent, mild expectorant and anti-inflammatory agent. It relieves 'Vata' and 'Pitta' inflammations; it is also used in eye diseases, throat infections, symptomatic relief in peptic ulcer, and as an antiarthritic agent

PHARMACOTHERAPEUTIC (TRADITIONAL USES)³

It can be used in many ways such as externally, internally, in single form or in combination with other drugs.

External uses- Decoction is used for eye bath in timir and conjunctivitis, In stomatitis, *Yashtimadhu* decoction is used for mouth rinsing, In hair fall and graying of hair *Yashtimadhu* decoction is used for rinsing hair. In summer and autumn, liquorice powder long with other herbs is used as a face pack. It makes skin smooth and reddish like red lotus. It is applied locally in poisoning and ulcerated wounds. Surgical wounds are healed with local application of *Yashtimadhu* and ghee and pain is relieved.

Internal uses-

1. *Raktajacchardi* (haematemesis)- In *raktaja & pittaja cchardi*, *Yashtimadhu & Chandana* paste in milk is given orally.
2. *Aadhman* – *Yashtimadhu* & sugar is given with water.
3. *Yashtimadhuphanta* is given in dyspepsia, belching, gas stomach ache, intestinal & liver colics & gastritis.
4. *Trushna* - In *Pittajtrushna*, *yashtimadhu* decoction is given.
5. *Yashtimadhu & Katukrohini* rasa with sugar and water is beneficial in *Rudrog*.
6. The decoction or *churna* of *Yashtimadhu* is effective in *Pandu*.
7. In *Raktapitta*, *Yashtimadhu & Chandana* decoction is given.
8. *Adhoga Raktapitta* – In per anal bleeding decoction of *Yashtimadhu* with honey is given for *Vamana*.
9. In treatment of *Vatarakta*, oil is prepared by *Yashtimadhu & Gambhari* root.
10. Lactation- *churna* of *Yashtimadhu* & sugar in similar quantities taken with cow's milk enhances lactation.
11. *Churna* of *Yashtimadhu* given with milk is a good *Rasayana yoga*.
12. In IUGR as well as in underweight babies, *Yashtimadhuchurna* given with sugar & milk proves to be very effective *bruhan* yoga.
13. For granulation tissue in proper wound healing, *yashtimadhuchurna* should be given with ghee & honey. It enhances the nutrition of *Rasadidhatu* particularly increasing *bruhana* of *maansdhatu*, thus heals wound properly.
14. *Churna* of *Yashtimadhu* given with milk acts as a good brain tonic.
15. In *Apasmar*, it is advised to give *Yashtimadhuchurna* with *Shweta Kushanand* juice for 3 days.
16. 10 mg *churna* of *Yashtimadhu* with ghee and honey is given with milk for *Vajikarana*.

17. In *Mutrakruccha*, milk prepared with *Yashtimadhu* is given.

18. In Leucorrhoea, *churna* of *Yashtimadhu* & sugar is given with *tandulodaka*.

IMPORTANT FORMULATIONS^{2,14}

Yashtimadhu is more effective drug when used in combination than that of single drug therapy. Hence it is one of the ingredients of no. of formulations such as *Yashtyadi churna*, *Lavangadi churna*, *Kapuradi churna*, *Yashtimadhwadya tail*, *Yashtyadi kwath etc*.

DOSAGE^{2,4}-*Churna*- 3 to 5 gm, *Kwath*-20 to 40ml and *tail,lep* for external use as per required quantity.

CHEMICAL CONSTITUENTS^{2,6}

Root contains glycyrrhizic acid, glycyrrhizin, a yellow amorphous powder, saponin, sugar, asparagin, starch, resin, gum, mucilage, phosphoric, sulphuric & malic acids, calcium & magnesium salts. Bark contains a small quantity of Tanin.

SUBSTITUENTS AND

ADULTERANTS^{4,5}

Substituent of Licorice is *Dhataki* (Wood for diafruticosa). The principal constituent of licorice root is the sweet principal glycyrrhizin. Because of this some species of glycyrrhiza and root of *Gunja* (*Abrus precatorius*) Linn. are used for adulteration

CONTRAINDICATIONS¹⁵

Licorice contains small amounts of a steroid substance, which stimulates the suprarenal glands. So when consumed in high doses or for long period time, it can produce symptoms of hyperaldosteronism, fluid retention (oedema) in joints (especially the ankles) or in face, nausea, headache, muscle cramps & high blood pressure. These side effects are caused by a decrease of the level of potassium in blood as well as an increase of the sodium level. They quickly disappear when treatment is stopped. Prolonged consumption of licorice

is not recommended in the case of arterial hypertension, pregnancy or when corticoid based treatment is followed.

PHARMACOGNOCY

MICROSCOPY OF ROOT¹¹

Root- Transverse section of root shows Cork, of many layers of cork cells with reddish brown contents. **Primary cortex**, a very narrow zone of cortical parenchyma, some of the cells containing ellipsoidal or oval starch grains, others monoclinic prisms of calcium oxalate. **Phloem**, a broad zone of elongated, radially arranged phloem patches separated from one another by prominent medullary rays of the phloem. Each phloem patch consists of a matrix of soft bast in which are found groups of thick walled bast fibers, adhering to which are cells of crystal fibers containing monoclinic prisms of calcium oxalate. **Xylem**, a broad zone of numerous, elongated, radially arranged xylem patches, separated from each other by medullary rays which are continuous through the cambium, with those of the phloem. Each xylem patch consists of a matrix of starch and crystal containing wood parenchyma imbedded in which are broad tracheae with yellowish walls and compact groups of thick, yellow walled wood fibers that are partially surrounded by the cells of crystal fibers containing monoclinic prisms of calcium oxalate. Each **trachea** is surrounded by a ring of yellow tracheids and wood fibers. **No medulla** is present.

Powder study¹¹

The powder is light yellow to faintly whitish. The powder shows fragments of yellow thick walled fibers, prisms of calcium oxalate. The walls of the large vessels are yellow; the vessels are thick & lignified and have numerous bordered pits. Fragments of cork consisting of thin walled cells and isolated prisms of calcium oxalate occur as well as fragments of paren-

chymatous tissue. The powder shows simple, round or oval starch granules.

Physicochemical standards

Total ash	Not more than 4.5%
Acid insoluble ash	Not more than 1.5%
Water soluble ash	Not more than 1%
Aqueous extractive value	Not less than 20%
Ethanollic extractive value	Not less than 15%
Chloroform extractive value	Not less than 5%
Moisture content	Not more than 7.45%

Phytochemistry¹¹-Phytochemical study shows presence of Flavonoids, Tannins, Steroids, saponins, glycosides Proteins and sugar in Chloroform, Ethanol and Aqueous extracts.

CONCLUSION

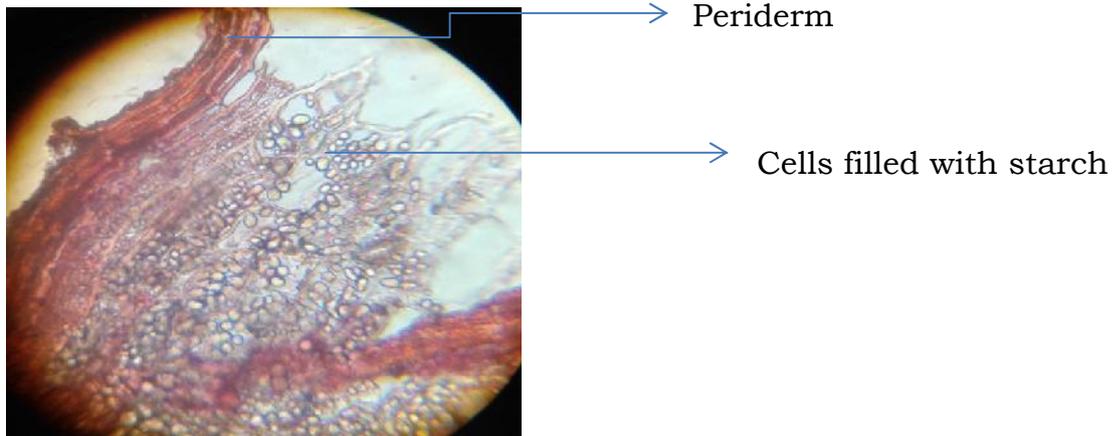
Liquorice has been used in medicine for more than 4000 years. Liquorice was one of the most widely known medicines in ancient history. The vast range of biological effects like anti inflammatory, anti allergic, anti oxidant, anti viral of the phytochemicals present in extract have been of immense importance in phytotherapeutic. Thus there is an immense need to modify the natural Glycyrrhizagalbrato constituents like glycyrrhizin etc thereby generating the advanced versions of the bioactive compounds to be used as drug in future. Thus the pharmacological activities are reported in this review.

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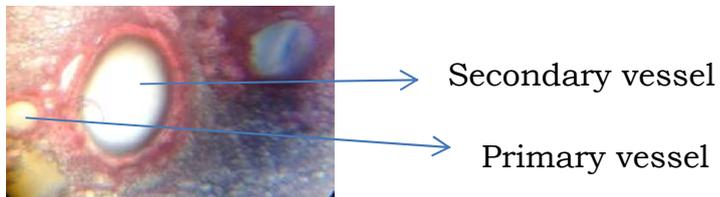
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IMAGES OF POWDER MICROCOPY OF ROOT OF GLYCYRRHIZA GLABRA¹¹



Section of the root showing periderm, crushed primary cortex, starch filled cells



Section of the root showing primary and secondary vessels

CORRESPONDING AUTHOR

Dr Kaveri Vasant Rasal

Department of Dravyaguna Vigyan
Smt K.G.M.P. Ayurved Mahavidyalaya,
Charni Road, Mumbai, Maharashtra, India
Email: kaubrij12315@gmail.com

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