

REVIEW ARTICLE

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A COMPREHENSIVE REVIEW OF YASHTIMADHU (GLYCYRRHIZA GLABRA L.) WITH SPECIAL REFERENCE TO ITS RASA PANCHAKA, RASAYANA PROPERTIES, PHYTOCHEMICAL CONSTITUENTS AND GASTROPROTECTIVE ACTIVITY

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ABSTRACT

Background: Yashtimadhu (*Glycyrrhiza glabra* L.), commonly known as liquorice or Mulethi, is an important medicinal drug described in Ayurvedic literature. Its predominant Madhura Rasa, Guru and Snigdha Guna, Shita Virya and Madhura Vipaka provide a rational basis for its Vata-Pitta Shamaka, Balya, Varnya, Chakshushya and restorative actions. It is extensively used in gastrointestinal, respiratory and inflammatory disorders and is also valued as a Rasayana. Modern investigations have demonstrated the presence of glycyrrhizin, glycyrrhetic acid, liquiritin, liquiritigenin, isoliquiritigenin, glabridin and several other flavonoids and saponins. These constituents possess anti-inflammatory, antioxidant, antimicrobial, hepatoprotective and gastroprotective activities. **Materials and Methods:** Classical Ayurvedic texts, the Ayurvedic Pharmacopoeia of India, pharmacognostic literature and published scientific studies related to *Glycyrrhiza glabra* were reviewed. Information regarding identification, chemical constituents and pharmacological actions was critically compiled and interpreted. **Results & Discussion:** The review showed close agreement between the traditional soothing, Pitta Shamaka, Vrana Ropana and

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Rasayana uses of Yashtimadhu and experimentally demonstrated anti-inflammatory, antioxidant, mucosal protective and anti-ulcer actions. Glycyrrhizin and flavonoids appear to contribute substantially to these activities. **Conclusion:** Yashtimadhu is a multidimensional Ayurvedic drug having significant nutritive, restorative and gastroprotective potential. Classical pharmacodynamics and contemporary pharmacological evidence provide a rational basis for its therapeutic application, although prolonged or excessive glycyrrhizin exposure requires appropriate clinical supervision.

Keywords: *Yashtimadhu*, *Glycyrrhiza glabra*, *Rasa Panchaka*, *Rasayana*, glycyrrhizin, gastroprotective activity

INTRODUCTION

Yashtimadhu is one of the widely used medicinal drugs of Ayurveda and is recognized particularly for its sweet taste, soothing action and restorative properties. The name is derived from *Yashti*, meaning a stick or slender stem, and *Madhu*, indicating sweetness. Classical Ayurvedic literature describes *Madhuka* or *Yashtimadhu* in several therapeutic contexts, particularly in conditions involving *Pitta*, irritation, tissue depletion, throat disorders, wounds and weakness. Its characteristic *Madhura Rasa*, *Snigdha Guna* and *Shita Virya* make it suitable for nourishing tissues while reducing excessive heat and irritation. The API identifies *Yashti* as the dried, unpeeled stolon and root of *Glycyrrhiza glabra* L., family Fabaceae.¹

In Ayurvedic pharmacology, the therapeutic effect of a drug is understood through *Rasa*, *Guna*, *Virya*, *Vipaka*, *Prabhava* and specific *Karma*. *Yashtimadhu* possesses *Madhura Rasa*, *Guru-Snigdha Guna*, *Shita Virya* and *Madhura Vipaka*. These features explain its predominant *Vata-Pitta Shamaka*, *Balya*, *Varnya*, *Chakshushya* and *Raktaprasadana* actions. Its nourishing and stabilizing qualities support its use as a restorative drug, while the cooling and unctuous qualities provide a logical basis for its traditional application in burning sensation, inflammatory conditions, gastric irritation and tissue injury.²

Modern phytochemical research has identified a complex group of biologically active constituents in liquorice, particularly triterpenoid saponins and flavonoids. Glycyrrhizin is regarded as a major characteristic constituent, while glycyrrhetic acid, liquiritin, liquiritigenin, isoliquiritin,

isoliquiritigenin and glabridin contribute to its diverse pharmacological activities. Experimental evidence indicates anti-inflammatory, antioxidant, antimicrobial, antiviral, hepatoprotective and gastroprotective properties. The ability to protect the gastric mucosa and regulate inflammatory responses provides a contemporary pharmacological explanation for several traditional gastrointestinal uses of *Yashtimadhu*.³

MATERIALS AND METHODS

The present drug review was carried out using information obtained from classical Ayurvedic literature, standard *Dravyaguna* texts, the Ayurvedic Pharmacopoeia of India and published scientific literature. Botanical identity, synonyms, distribution, morphology, macroscopic and microscopic features, Ayurvedic properties, chemical composition, dose and therapeutic actions were compiled. Contemporary studies dealing with phytochemistry, anti-inflammatory, antioxidant, antimicrobial and particularly gastroprotective effects of *Glycyrrhiza glabra* and its active constituents were evaluated and correlated with Ayurvedic pharmacodynamic principles.⁴

DRUG REVIEW

Introduction

Yashtimadhu is a perennial medicinal herb whose roots and stolons constitute the principal medicinal part. The drug has characteristic yellowish-brown to brown external coloration, fibrous internal structure and a distinctly sweet taste. It has been used in traditional systems of medicine for gastric disorders, respiratory irritation and inflammatory conditions. The presence of glycyrrhizin and diverse flavonoids provides pharmacological support for its traditional therapeutic importance.⁵

Taxonomical Classification

Taxonomical Rank	Classification
Kingdom	Plantae
Division	Angiospermae
Class	Dicotyledonae
Order	Fabales

Family	Fabaceae / Leguminosae
Genus	Glycyrrhiza
Species	Glycyrrhiza glabra L.

Vernacular Names

Language	Name
Sanskrit	Yashtimadhu, Madhuka, Madhuyashti
Hindi	Mulethi, Mulathi, Jethimadh
English	Liquorice, Licorice root
Bengali	Yashtimadhu
Gujarati	Jethimadh, Jethimadha
Kannada	Jyeshthamadhuka, Atimadhura
Malayalam	Irattimadhuram
Marathi	Jeshthamadh
Punjabi	Mulathi, Jethimadh
Tamil	Athimadhuram
Telugu	Atimadhuramu
Urdu	Mulethi, Asl-us-sus

Synonyms

Sanskrit Synonym	Meaning / Significance
Yashtimadhu	Sweet stick/root
Madhuka	Sweet drug
Madhuyashti	Sweet stem
Yashtika	Stick-like structure

Madhuya	Possessing sweetness
Klitaka	Classical synonym appearing in lexicons

Geographical Distribution

Glycyrrhiza glabra is naturally distributed and cultivated across Mediterranean regions, southern Europe and parts of western and central Asia, particularly Iran, Afghanistan and adjoining regions. Commercial cultivation also occurs in several countries with suitable temperate to subtropical climates. In India, the plant has traditionally been cultivated on a comparatively smaller scale, while a substantial proportion of raw liquorice has historically been obtained from external sources. The medicinal root and stolons are collected after adequate maturation and dried before use.⁶

Morphological Characters

Glycyrrhiza glabra is a tall perennial herb that may reach about 1–2 metres in height. The underground system is well developed and consists of roots and long horizontal stolons. Stems are erect and branched. Leaves are alternate and imparipinnate with several leaflets. Flowers are typically pale violet to bluish-purple and arranged in axillary racemes. Fruits are flattened pods containing several seeds. The medicinally important underground stolons and roots are fibrous, yellowish internally and characteristically sweet because of the presence of glycyrrhizin.

Macroscopic Study According to API

The official drug consists of dried, unpeeled stolons and roots. The stolon possesses a yellowish-brown to dark-brown outer surface showing longitudinal wrinkles, occasional small buds and encircling scale-leaf markings. A transverse cut surface displays a distinct cambium ring approximately one-third of the radius from the outer surface and a small central pith. The root resembles the stolon but lacks a central pith. Fracture is coarsely fibrous in the bark and splintery in the woody region. Odour is faint and characteristic, whereas taste is distinctly sweet.⁷

Microscopic Study According to API

A transverse section of the stolon shows approximately 10–20 or more layers of tabular cork cells. Outer cork cells may contain reddish-brown amorphous material, whereas inner rows possess relatively thicker colourless walls. The secondary cortex is narrow and formed by radially arranged

parenchymatous cells containing calcium oxalate prisms. Secondary phloem is broad and contains radially arranged groups of fibres associated with crystal-bearing parenchymatous sheaths. Cambium is composed of several layers. Secondary xylem is distinctly radiate, with medullary rays generally three to five cells wide. Vessels possess thick, yellow, pitted or reticulately thickened walls, while lignified fibres occur in groups. The pith consists of parenchymatous cells. The root shows a structure resembling the stolon but is characterized by absence of medulla and usually tetrarch xylem. Parenchymatous tissues contain abundant simple, oval or rounded starch grains.⁸

Chemical Composition

Group	Important Constituents
Triterpenoid saponins	Glycyrrhizin, glycyrrhizic acid
Sapogenins	18 β -Glycyrrhetic acid
Flavanones	Liquiritigenin
Flavonoid glycosides	Liquiritin, liquiritin apioside
Chalcones	Isoliquiritigenin, isoliquiritin
Isoflavonoids	Glabridin, glabrene
Coumarins	Herniarin, umbelliferone derivatives
Other components	Asparagine, sugars, starch, resins, polysaccharides, sterols, volatile substances

The phytochemical diversity of *Glycyrrhiza glabra* explains its wide pharmacological spectrum. Glycyrrhizin is a major sweet triterpenoid saponin, while flavonoids such as liquiritin, liquiritigenin, isoliquiritigenin and glabridin possess important antioxidant and anti-inflammatory activities.⁹

Ayurvedic Properties

Parameter	Property
Rasa	Madhura
Guna	Guru, Snigdha

Virya	Shita
Vipaka	Madhura
Dosha Karma	Predominantly Vata-Pitta Shamaka
Major Karma	Balya, Varnya, Chakshushya, Raktaprasadana
Therapeutic orientation	Rasayana, soothing, nourishing, tissue restorative

The dominance of *Madhura Rasa* and *Madhura Vipaka* supports nourishment and tissue development, while *Snigdha Guna* counteracts dryness and irritation. *Shita Virya* contributes to control of excessive *Pitta*, burning and inflammatory manifestations. Together these characteristics provide a rational basis for its restorative and mucosal protective actions.¹⁰

PHARMACOLOGICAL ACTIONS

Gastroprotective and Anti-ulcer Activity

The gastroprotective action of liquorice is one of its most important pharmacological properties. Glycyrrhizin and other constituents can support gastric mucosal defence by influencing prostaglandin-related pathways, promoting mucus production and reducing inflammatory damage. Experimental evidence also indicates protection against chemically or drug-induced gastric mucosal injury. Deglycyrrhizinated liquorice has been investigated as a means of retaining mucosal protective activity while reducing glycyrrhizin-related mineralocorticoid adverse effects.¹¹

Anti-inflammatory Activity

Glycyrrhizin, glycyrrhetic acid and several liquorice flavonoids influence inflammatory signalling pathways and can reduce production or activity of pro-inflammatory mediators. This pharmacological effect corresponds well with the traditional use of *Yashtimadhu* in inflammatory and irritation-dominant disorders and may also contribute directly to its gastroprotective action by limiting inflammation-induced mucosal injury.¹²

Antioxidant Activity

Liquorice flavonoids possess free-radical-scavenging and antioxidant potential. Reduction of oxidative stress is particularly relevant in gastric mucosal injury because reactive oxygen species

contribute to lipid peroxidation, epithelial damage and inflammatory amplification. Liquiritin, liquiritigenin, isoliquiritigenin and glabridin are among the constituents associated with antioxidant effects.¹³

Antimicrobial Activity

Extracts and isolated constituents of *Glycyrrhiza glabra* demonstrate antibacterial and antifungal effects against a range of organisms. Flavonoids such as glabridin have received particular attention. Some liquorice preparations have also demonstrated activity against *Helicobacter pylori*, an important organism associated with gastritis and peptic ulcer disease, suggesting an additional mechanism contributing to gastrointestinal benefits.¹⁴

Hepatoprotective Activity

Glycyrrhizin and glycyrrhetic acid exhibit hepatoprotective activity associated with antioxidant, membrane-stabilizing and anti-inflammatory mechanisms. Experimental and clinical investigations have examined liquorice preparations in hepatic disorders, although dosage, formulation and duration require careful consideration.¹⁵

Rasayana and Immunomodulatory Potential

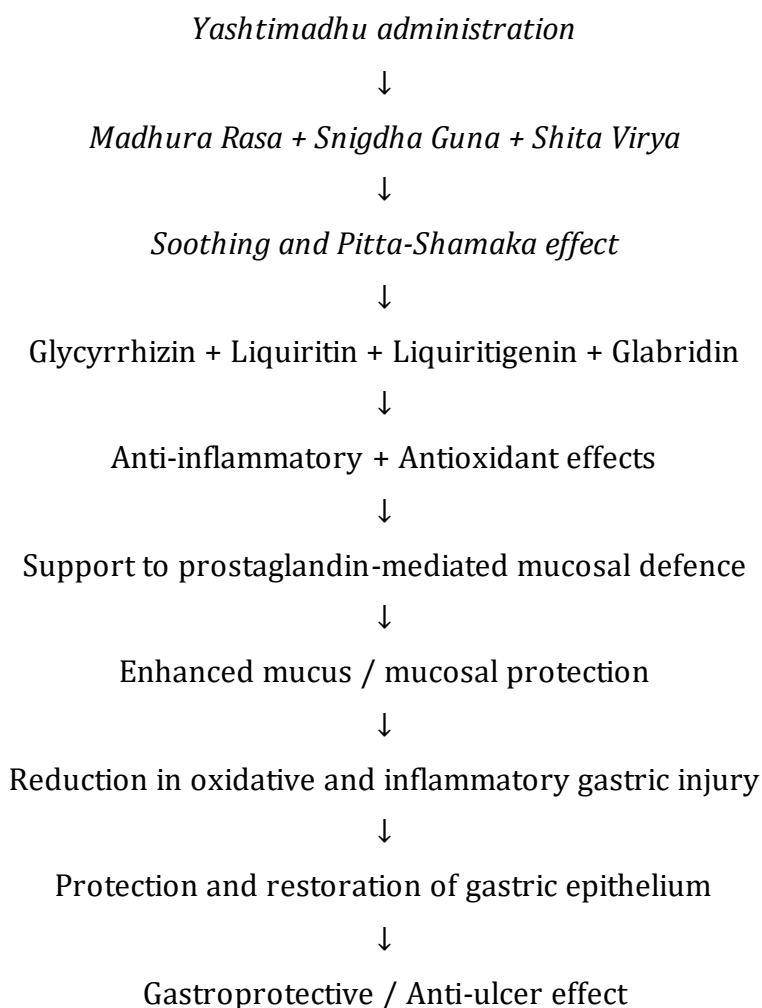
The classical concept of *Rasayana* involves maintenance of tissue quality, strength, resistance and healthy ageing rather than treatment of a single disease. The nourishing *Madhura Rasa*, *Snigdha Guna*, restorative actions and contemporary evidence for antioxidant, anti-inflammatory and immunomodulatory activities provide a possible biomedical correlation for the traditional *Rasayana* application of *Yashtimadhu*.

Drug and Dosage

Preparation / Form	Dose / Use
Yashtimadhu Churna	2–4 g
Fine root powder	With suitable Anupana according to condition
Kwatha	Prepared as prescribed in the formulation

Yashtimadhu Ghrita	According to classical formulation and clinical indication
Yashtimadhu Taila	According to formulation / therapeutic requirement
External paste / Lepa	Quantity sufficient for local application

FLOW CHART: PROBABLE GASTROPROTECTIVE ACTION



DISCUSSION

Yashtimadhu represents an important example of a medicinal plant in which the traditional Ayurvedic pharmacodynamic description can be meaningfully correlated with modern experimental findings. *Madhura Rasa*, *Guru-Snigdha Guna*, *Shita Virya* and *Madhura Vipaka* collectively indicate a drug that nourishes tissues, reduces dryness, provides a soothing effect and controls excessive *Pitta*. These properties provide a logical traditional basis for its use in conditions

involving mucosal irritation, burning, inflammatory injury and tissue depletion. The *Balya*, *Varnya*, *Raktaprasadana* and restorative actions further extend its therapeutic role beyond a simple symptomatic gastric remedy.¹⁶

The gastroprotective activity is supported by multiple mechanisms rather than a single active constituent. Glycyrrhizin and glycyrrhetic acid exhibit significant anti-inflammatory activity, while flavonoids such as liquiritin, liquiritigenin, isoliquiritigenin and glabridin provide antioxidant and antimicrobial effects. Enhancement of gastric mucosal defence, influence on prostaglandin-mediated protective mechanisms, reduction of oxidative stress and inhibition of inflammatory injury may act together to preserve gastric epithelial integrity. Evidence of activity against *H. pylori* by some flavonoid-rich preparations further broadens the possible mechanism of action.¹⁷

The available evidence therefore supports the traditional application of *Yashtimadhu* as a soothing, restorative and mucosal-protective drug. However, therapeutic safety must also be considered. Excessive or prolonged intake of glycyrrhizin-containing liquorice can produce apparent mineralocorticoid effects through inhibition of 11 β -hydroxysteroid dehydrogenase type 2, potentially leading to sodium retention, potassium loss, oedema and elevation of blood pressure. Thus, although *Yashtimadhu* has substantial therapeutic potential, prolonged use and higher doses should be undertaken under professional supervision, particularly in patients with hypertension, renal dysfunction, cardiovascular disease or concurrent medicines affecting electrolyte balance.¹⁸

CONCLUSION

Yashtimadhu (*Glycyrrhiza glabra* L.) is an important Ayurvedic medicinal drug possessing well-defined pharmacognostic features, characteristic *Rasa Panchaka* and significant *Rasayana* potential. Its *Madhura Rasa*, *Guru-Snigdha Guna*, *Shita Virya* and *Madhura Vipaka* provide a logical Ayurvedic basis for its nourishing, soothing, *Pitta-Shamaka* and tissue-protective effects. Glycyrrhizin, glycyrrhetic acid, liquiritin, liquiritigenin, isoliquiritigenin and glabridin contribute to its anti-inflammatory, antioxidant, antimicrobial and gastroprotective activities. Contemporary evidence therefore supports several traditional applications of the drug, particularly in gastrointestinal mucosal disorders. Rational dose selection and clinical supervision remain important during prolonged administration.

CONFLICT OF INTEREST

Nil.

SOURCE OF SUPPORT

None.

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