



Research Article

PHYSICAL AND PHYTO-CHEMICAL EVALUATION OF *GLYCYRRHIZA GLABRA* LINN
(*YASHTIMADHU*)

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ABSTRACT

Glycyrrhiza glabra Linn (*Yashtimadhu*) is a perennial herb commonly known as liquorice. The drug is used in many Ayurvedic formulations like *Dasamoolarishtam*, *Aswagandharishtam*, *Phalasarpihrita*, *Khadiragulika*, *Madhuyastyaditaila* etc. Ascertaining the identity, genuineness and purity of herbal drugs has an important role in the maintenance of the quality of the drug and its formulations. The present study was undertaken to assess the preliminary Phyto-chemical constituents of the drug. The preliminary phyto-chemical analysis including quantitative data, qualitative chemical analysis, Thin Layer Chromatography, High Performance Thin Layer Chromatography and Atomic Absorption Spectroscopy were determined. The preliminary Phyto-chemical characteristics observed in the herb may help in standardization, identification and in carrying out further research in *Glycyrrhiza glabra* Linn.

KEYWORDS: *Yashtimadhu*, *Glycyrrhiza glabra* Linn, Phytochemistry.

INTRODUCTION

Yashtimadhu (*Glycyrrhiza glabra* Linn) is a tall perennial herb or under shrub mainly distributed in sub-tropical and warm temperate regions. The root of this plant has been used in India since time immemorial. It is effectively proved with properties such as memory enhancing activity¹, anti-oxidant activity², anti-microbial activity³ etc.

Yashtimadhu (*Glycyrrhiza glabra* Linn) is an important drug included in many number of drug groups mentioned by Caraka Samhitha (an ancient Indian medical literature) mainly *Sandhaniya*, *Vamanopaga*, *Chardinigrahaniya*, *Mutavirajaniya* etc. It is also a major ingredient in several Ayurvedic formulations such as *Dasamoolarishtam*, *Aswagandharishtam*, *Phalasarpihrita*, *Khadiragulika*, *Madhuyastyaditaila* etc. These are being widely manufactured by pharmaceuticals and used by practitioners. So it is very important to assess its genuineness.

The objective of the present study is to evaluate the preliminary phyto-chemical characteristics of the drug.

MATERIALS AND METHODS

Collection of Drug

The genuine samples of *Yashtimadhu* (*Glycyrrhiza glabra* Linn) were collected from the herbal garden of Central Ayurveda Research Institute for Respiratory Disorders, Patiala, Punjab and was

authenticated from Pharmacognosy Unit, Poojappura, Thiruvananthapuram. They were shade dried and packed in zip lock polythene bag.

Study-setting

Drug Standardisation Unit, Govt. Ayurveda College, Thiruvananthapuram, Kerala.

Physico-chemical evaluation

Physico-chemical analysis including the analyzing parameters such as the foreign matter, moisture content, ash values, fiber content, volatile oil content, sugar content, extractive values, qualitative analysis, and heavy metal analysis by Atomic Absorption Spectroscopy and chromatographic techniques as TLC, HPTLC were done. The procedures were done as per guidelines mentioned in Ayurvedic Pharmacopoeia of India.⁴

Preparation of sample drug

The samples of *Glycyrrhiza glabra* Linn (sufficient quantity) were collected, cleaned and dried in shade. After drying, the coarsely powdered drug was kept in air tight containers.

Reagents used

Xylene, dilute Hydrochloric acid, Petroleum ether, Cyclohexane, Acetone, Acetic anhydride, concentrated Hydrochloric acid, concentrated Sulphuric acid, Magnesium ribbon, neutral Ferric chloride, Benzene, Chloroform, Ethyl acetate, Potassium permanganate, Acetic acid, Fehling's

solution, Sodium bicarbonate, Dragendroff's reagent, Ferric alum, Ethanol, Lead acetate, Sodium oxalate, Ethanol, and distilled water.

Apparatus

Dean and Stark's apparatus, Clevenger apparatus, Soxhlet apparatus, silica crucible, Bunsen burner, round bottomed flask, measuring jars, beakers, conical flask, funnel, glass rods, watch glass, electronic balance etc.

RESULTS AND DISCUSSION

Total ash represents the inorganic salts present in the drug. Acid insoluble ash represents the contamination of earthy material. The extractive values assist in the evaluation of the constituents soluble in a particular solvent. The moisture content should be less to prevent the bacterial and fungal contamination. The volatile oil content was found to be in trace amount.

Preliminary physical and physico-chemical analysis such as foreign matter, moisture content, ash values, sugar content, fiber content, volatile oil content, extractive values were done and the results are summarized in Table No: 1.

Results of preliminary phyto-chemical analysis

The ethanol extractive obtained was subjected to qualitative analysis for identification of various plant constituents like steroids, phenols, alkaloids, flavonoids, tannins and results were

depicted in Table No:2. This has got supreme importance since pharmacological action and therapeutic properties of the drug mainly depends on these chemical constituents. The drug showed the presence of appreciable amounts of tannins, steroids and flavonoids and presence of alkaloids and phenols in moderate amount. Testing for these phyto constituents helps in determining the quality of the drug.

Results of TLC and HPTLC

The spots obtained in TLC gives a rough idea about the study plant constituents. The best separation was achieved using Toluene, Ethyl acetate, and Formic acid in the ratio of 12:10:2. The plates were first viewed through UV fluorescence viewing cabinet (365nm) and the RF values of the spots were noted (Table No:3). HPTLC was done and the data of the analysis were tabulated (Table No: 4). The HPTLC profiles are shown in figure.

Results of Atomic Absorption Spectroscopy

Atomic absorption spectroscopy is used in the determination of heavy metal elements and some non metal elements in atomic state and the results are shown in Table No:5. Four heavy metals viz., cadmium, iron, lead and copper contents were found within permissible limits. Hence the drug is not contaminated by heavy metals and can be used safely for internal administration.

Table 1: Preliminary phytochemical analysis of *Glycyrrhizaglabra* Linn

Sl. No	Name of Experiment	<i>Glycyrrhiza glabra</i> Linn
1.	Foreign matter	0.3 %
2.	Moisture content	5.6 %
3.	Volatile oil content	0.01%
4.	Total ash	4.25%
5.	Acid insoluble ash	0.65%
6.	Fibre content	25.69%
7.	Hot water soluble extractive	17.2%
8.	Alcohol soluble extractive	24.6%
9.	Sugar: Total sugar	5.03%
	Reducing Sugar	3.2%

Table 2: The results of Qualitative chemical analysis of alcoholic extract

Sl.No	Chemical Constituent	Status
1	Alkaloid	Present
2	Steroid	Present
3	Phenols	Present
4	Flavonoids	Present
5	Tannin	Absent

Table 3: RF values of spots obtained in Chromatography

Solvent system	Extract	Spot detection	No: of spots	Rf value
Toluene: Ethyl acetate: Formic acid (12: 10: 2)	Ethanol	UV	2	0.33 0.59

Table 4: RF values of different spots obtained in HPTLC

Solvent system	Extract	No: of spots	Rf value
Toluene: Ethyl acetate: Formic acid (12: 10: 2)	Ethanol	3	0.26 0.42 0.55

Table 5: Results of AAS

Metals	Sample (ppm)
Cadmium	0.0026
Iron	4.6487
Lead	0.0751
Copper	0.5362

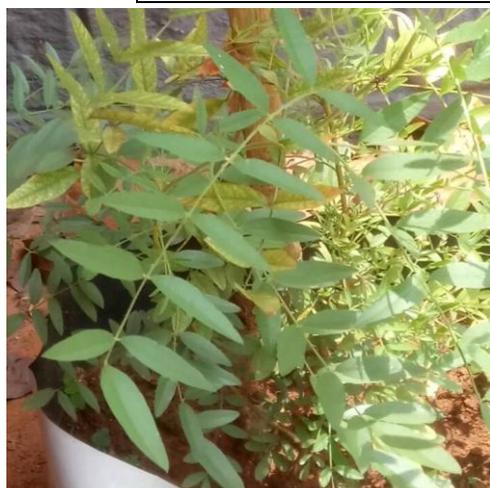


Fig 1. Glycyrrhiza glabra Linn



Fig 2. Root of Glycyrrhiza glabra Linn

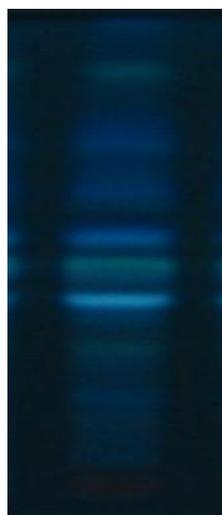


Fig 3: HPTLC Plate with solvent system Toluene, Ethyl acetate, Formic acid in ratio (12:10: 2)

CONCLUSION

Yashtimadhu is not cultivated in Kerala. Since it is used in a large number of Ayurvedic formulations, the genuineness of the drug plays a key role in determining the quality and efficacy of the formulations. In the present study, various phyto-chemical screening was carried out as per the standard procedure. The study revealed the phyto-chemical constituents which may be responsible for various pharmacological activities of this medicinal plant. Also, TLC and HPTLC results may help in identity and standardization of drug. Also, screening of heavy metals by means of AAS proves the purity of drug. Thus, through this study identity, purity and quality of the drug can be established. Also, further research works can be carried out.

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