Journal of Ayurveda & Holistic Medicine

www.jahm.co.in

eISSN-2321-1563

REVIEW ARTICLE OPEN ACCESS

A DETAILED PHARMACOGNOSTIC, PHYSICOCHEMICAL AND PRELIMINARY PHYTOCHEMICAL STUDY OF *PATALA* (*STEREOSPERMUM SUAVEOLENS* ROXB. DC.)

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ABSTRACT:

Stereospermum suaveolens is one among Dashamoola group of herbs (group of 10 roots), used in many diseases like *vata vikar, rakt vikar, pitta, hikka, vaman, shotha, kapha* and *aruchi.*It belongs to family Bigniniaceae. The roots, leaves and flower are used for the treatment of diseases.These observations will be useful in establishing pharmacognostic standards on identification, purity, quality and classification of the plant. The main purpose of this study was to evaluate pharmacognostic studies for their macro, microcharacteristics and Preliminary phytochemical studies of Patala (Stereospermum suaveolens, Roxb, DC . Phytochemicals from the whole plant of Patala were extracted using ethanol and water as solvents. Phytochemical analysis of whole plant extract showed the presence of primary and secondary metabolites i.e.alkaloids, glycosides, steroids. All analytical parameters studied by the authors prove efficient in identification and authentication of the *Patala*. It will also help to compile the monograph in suitable pharmacopoeia for quality control that can be used globally.

Key-words: *Patala,* Pharmacognostic study, Physicochemical Analysis, Phytochemical Analysis

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INTRODUCTION

Herbal medicine has its origins in ancient cultures. It involves the medicinal use of plants to treat disease and enhance general health and wellbeing. People often choose Herbal Medicine over the prescribed and conventional medicine when they have a lifelong health complication. The major use of herbal medicines is for health promotion and therapy for chronic, as opposed to life-threatening, conditions. However, usage of traditional remedies increases when conventional medicine is ineffective in the treatment of disease.[1]

Dashmoola is a famous Ayurvedic combination of roots of ten medicinal herbs, which used together. It contains *Brihat Panchmool* i.e. roots of five big trees and *Laghu Panchmool* i.e. roots of five small herbs[2]. This is the most common polyherbal combination used in the production of many Ayurvedic formulations that are indicated in the treatment variety of ailments especially in *Vata Roga*. *Patala* is one of the most important drug of *Dashmoola* and widely use in Ayurvedic preparations. Any kind of negligence regarding its preparation knowingly or unknowingly affects its efficacy.

It is necessary to examine the plants as a potential source in development of many new formulae. Sometimes adulterated drugs cause harmful effect on the body. Many times some of the drugs which are labelled in the formulation, qualitatively and quantitatively may not go with the product at all, on the whole the patient is at losing end. Nowadays the proper identification of these herbs is one of the major challenges, Many times due to improper knowledge a wrong drug or a drug of low potency is mistakenly chosen for production which leads to mismanagement of the disease, so there is need of evolution of certain methodology for the identification and standardization of plant products.

In ancient times physicians were directly involved in drug collection so that there was only minimal chance of Adulteration, but now things have changed and most of the drugs in market are not genuine, but most of the physicians are not aware of genuinity of the raw drug which has direct impact on the quality of medicinal preparations and efficacy also. So standardization of every raw drug is a must to get the desired safety and efficacy of the formulations. [3]

In present days *Ayurvedic* physicians are mainly dependent on market, both for raw drugs as well as for formulations. Indiscriminate use of adulterants in place of genuine drug in herbal markets is becoming commercial. The ability to provide timely, accurate and reliable data is an essential part of discovery, development and manufacture of Pharmaceuticals

2. Material and Methods

Materials:

1. Collection:

Patala sample was collected from forest area 50 km from our city in *Grishma rutu* according to *Dravya sanghraha kala* described by Charaka [4] and according to the Guidelines on Good Field Collection Practices for Indian Medicinal Plants.

Complete intact roots were collected without doing any harm to the roots. Then this sample was cleaned with water and dried under shade to avoid direct sunlight.

2. **Plant identification[5]:**

Patala root *(Stereospermum suaveolens, Roxb.DC.)* was identified on the basis of its Morphology and family characters of the plant.

Figure 1-Root sample

3. Authentication:

Collected sample of *Patala* (*Stereospermum suaveolens,* Roxb. DC) authenticated from taxonomist, Department of Botany of well-known research institute. The authenticity of the samples was confirmed by comparing their characters with standard herbarium sample available at the Botany department of Nagpur university with the help of Subject experts and the specimen sample was vouchered as 10105.

4. Preparation of Root Powder:

Dried roots of Patala sample was powdered in mechanical grinder and sieved with the help of 20 mm sieve for further studies.

Figure 2 -Powder of *Patala* Root

5. Storage:

Polythene bags were used to store powdered drug to protect from moisture and any other contamination.

Methodology:

1. Pharmacognostic Study:[6]

- It includes both macroscopic and microscopic study of the samples.

a) Macroscopic study/ Organoleptic Study (*Panchabhautik Parikshana*):

Morphological or organoleptic evaluation means conclusion drawn from studies resulted due to impression on organ of senses.

b) Microscopic study-

This method allows more detailed examination of a drug and it can be used to identify the organized drugs by their known histological characters. It is mostly used for qualitative evaluation of organized crude drugs in entire and powdered forms.

2. Physicochemical Analysis[7]

Different physicochemical properties like LOD, PH value, total ash, acid insoluble ash, extractive values of the powder were determined using the

methods described in the British Pharmacopoeia and Ayurvedic Pharmacopoeia

3. Preliminary Phyto-chemical Analysis [8]-

The extracts obtained in physico-chemical analysis were subjected to qualitative tests for the identification of various plant constituents like glycosides, alkaloids, tannins, etc.

4. HPTLC[9]

High performance thin layer chromatography (HPTLC) is an invaluable quality assessment tool for the evaluation of botanical materials.

It allows for the analysis of a broad number of compounds both efficiently and cost effectively.

Additionally, numerous samples can be run in a single analysis thereby dramatically reducing analytical time.

With HPTLC, the same analysis can be viewed using different wavelengths of light thereby providing a more complete profile of the plant than is typically observed with more specific types of analyses.

Results:

Macroscopic characteristics of *Patala*:

Table No.1-Macroscopic characters of *Patala* root

Sr. No.	Characteristics	Description
1.	**Shabda** (Fracture)	Hard with sound, Fibrous
2.	**Sparsha**(Touch)	Ruksha- Kathin (Rough due to scaling, inner side is soft)
3.	**Roopa** Appearance Colour Shape Size	 Root Outer light brown, inner pale yellow Cylindrical branched cut pieces 20-50 cm long, 2-4 cm thick
4.	**Rasa**(Taste)	Tikta,Kashaya
5.	**Gandha**(Odour)	Typical strong odour

Microscopic characteristics of *Patala*:

Transverse section of root shows cortex composed of 25 to 30 layers of rectangular cells with 3-5 stratified layers, followed by cork cambium up to 1-2 layers of tangentially elongated cells; secondary cortex, phloem, secondary xylem and a central pith region.

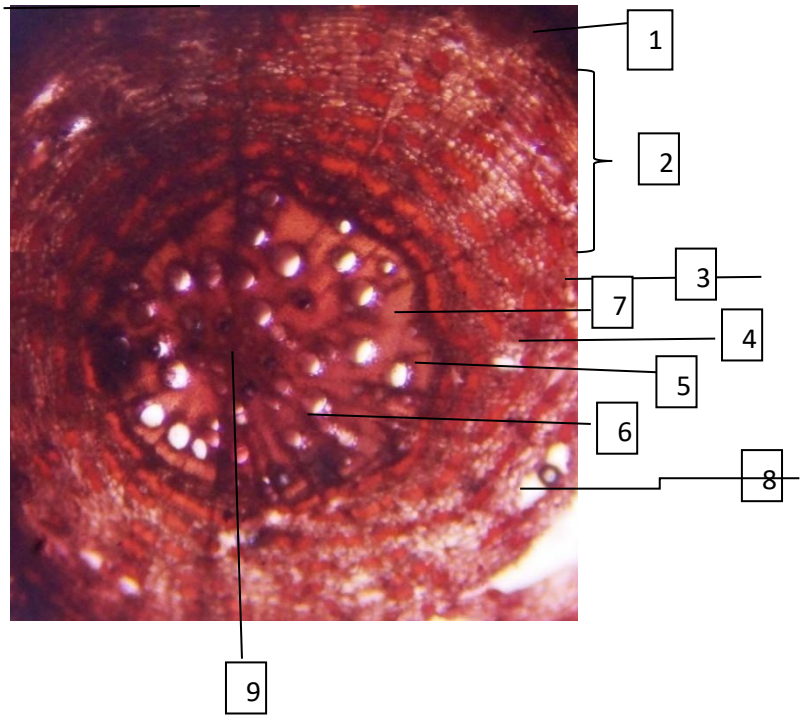

Figure 3: T.S. of root of *Patala*

Epidermis, 2-Cortex, 3- Endodermis, 4- Pericycle, 5- Phloem, 6- Secondary Xylem, 7-Cambium cells, 8-Medullary rays, 9- Pith

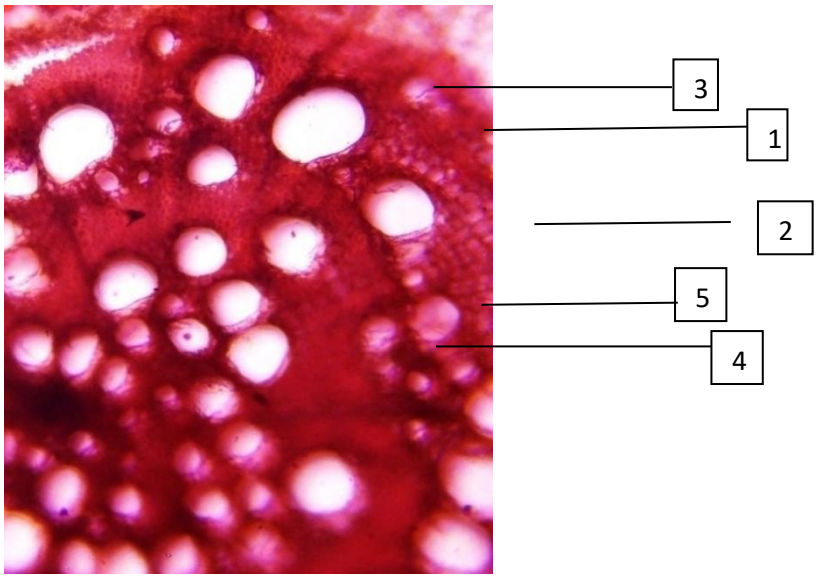

Figure 4: T.S. of root of *Patala* (Secondary Xylem)

1-Secondary Xylem, 2- Cambium cells, 3- Medullary rays, 4- Starch grains, 5-Vessel

- Secondary Cortex was polyhedral shape and composed of 4-5 layers of parenchyma cells. Few stone cells of regular shape also present.
- Secondary Phloem was wide forms ceratochyma between two obliquely

running rays. Stone cells are present and

- Starch present in parenchyma cells, few Lipid droplets present only in some cortical cells
- The functional phloem region consists of phloem fibers, sieve elements and phloem parenchyma cells.
- Phloem parenchyma was intact; medullary rays were multiseriate, fibres had projection at both ends.

of polygonal shape.

- Sieve tubes formed strips of ceratenchyama.
- Few small calcium oxalate crystals were present at phloem parenchyama and rays.
- Secondary xylem was wide; vessels simple and pitted.
- Rays were multiseriate and 2-3 cells wide.

- **Microscopic features of powder *Patala* root (*Stereospermum suaveolens,* Roxb.DC).**

Following structures were seen in powder microscopy of Patala

- Long fibres
- Phloem was wide.
- Calcium crystals and starch grains were present as a part of xylem.
- Simple vessels were found in this sample.
- Crowded pith

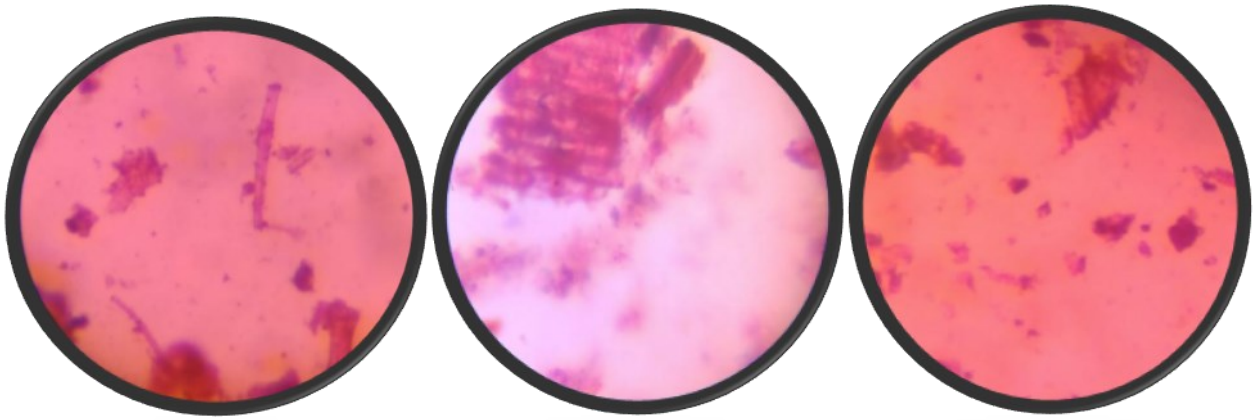

Table No.2-Physicochemical characters of *Patala* root

Sr. No.	Parameters	Result
1	Foreign matter	0.90%
2	Loss on drying	6%
3	Total Ash values	4%

4	Acid insoluble ash	0.40%
5	Water soluble extractive	22.8%
6	Alcohol soluble extractive	11.8%
7	pH value	5.12

2. Preliminary Phyto-chemical Analysis

Table No.3-Prelimnary Phyto-chemical characters of *Patala* root

Sr. No.	**Constituent**	**Test**	**Water soluble extractive**	**Alcohol soluble extractive**
1.	Carbohydrates	Molish's test	-	-
2.	Glycosides	Liberman Burchard's test	+	+
3.	Steroids	Liberman Burchard's test	+	+
		Salkowaski test	+	+
4.	Flavonoids	Test name is missing	-	-
5.	Tannins	Test name is missing	-	-
6.	Alkaloids	Mayer's test	+	+
		Dragendroff's test	+	+
7.	Proteins	Biuret test	-	-
		Xanthoproteic test	-	-
8.	Amino acids	.....	-	-
9.	Saponins		-	-

+ve indicats presence of constituents; -ve indicates absence of constituents

Table No.4-HPTLC evaluation of *Patala* root

Wave length	Track 1		Wave length	Track 2	
	No.of spots	Max.Rf Value		No.of Spots	Max.Rf Value
254	13	-0.03	366	13	-0.03

Nm		0.02 0.09 0.16 0.23 0.30 0.38 0.50 0.62 0.73 0.81 0.86 0.97	Nm		0.02 0.11 0.28 0.38 0.45 0.49 0.57 0.64 0.73 0.81 0.92 1.04

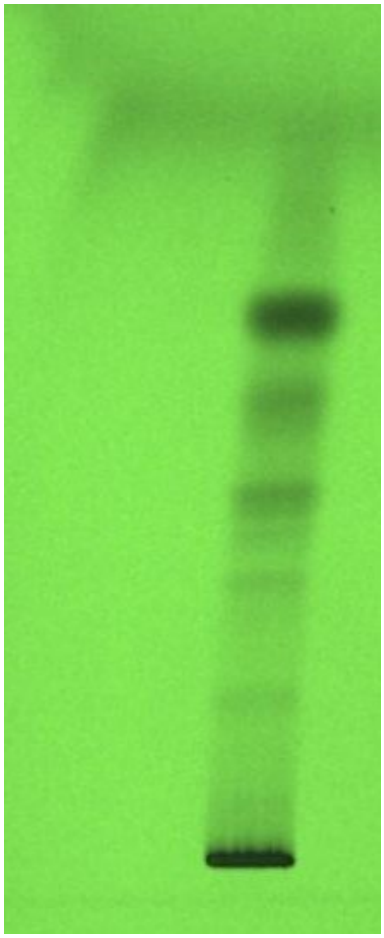

Figure 6: HPTLC image at 254nm

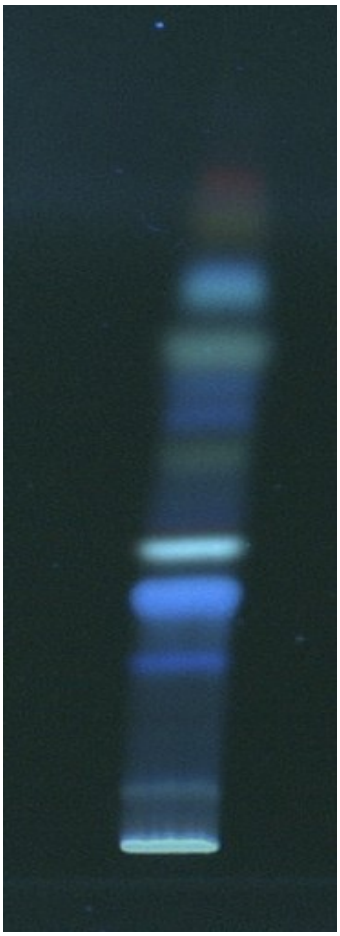

Figure 7: HPTLC image at 366 nm

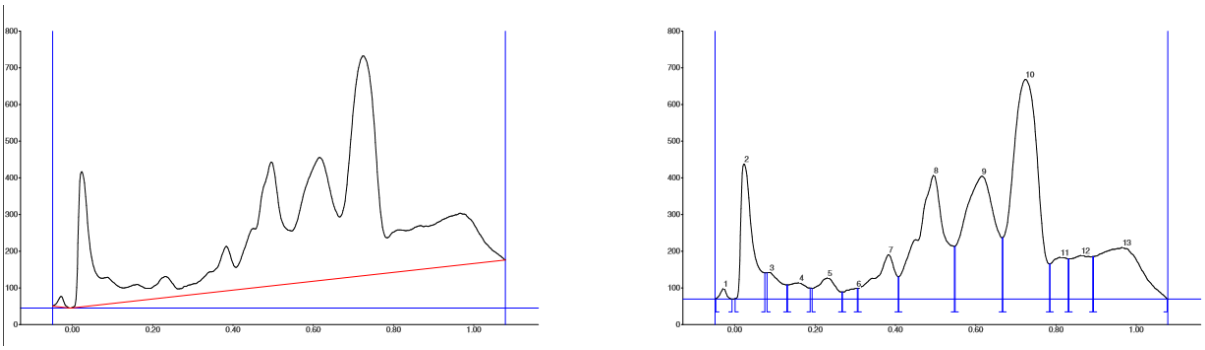

Figure 8- at wavelength 254 nm

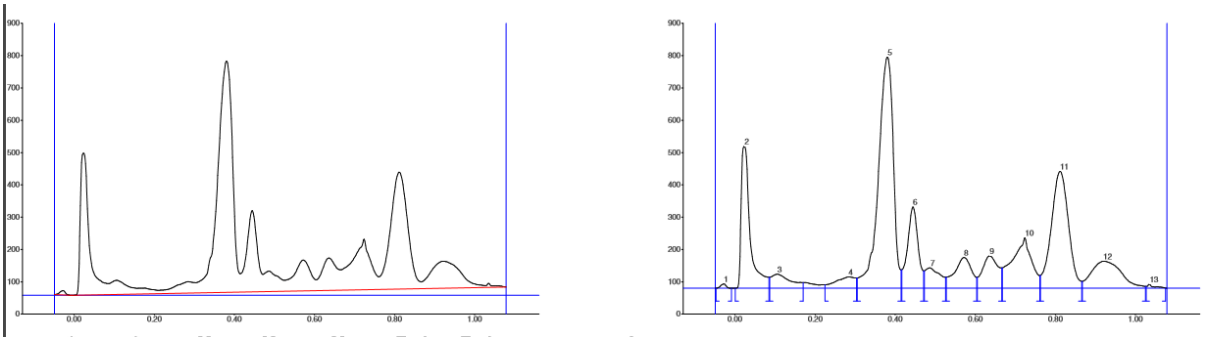

Figure 9- at wavelength 366 nm

DISCUSSION

The macroscopic & microscopic identifying characters of the *Patala (Stereospermum suaveolens,*Roxb, DC*)* were found to be identical to the Ayurvedic Pharmacopoeia of India monograph considering the legal document of the Government of India. Powdered microscopy showed the presence of Long fibres, Phloem, Calcium crystals, starch grains, simple vessels, pith, etc. The phytochemical investigation shows the presence of glycosides, steroids, alkaloids in *Patala* sample. pH of the drug determines that *Patala* is acidic in nature. Here an attempt was made to get a standardized data of this *Patala* sample. The pharmacognostical, phytochemical and physicochemical characters are useful to generate standards to assess the quality and purity of the drug. The information provided by this study may be useful to carry out further studies of Ayurvedic drugs of traditional medicinal practice of person.

CONCLUSION

Pharmacognostic parameters studied by the authors may prove efficient in identification and authentication of the *Patala*. It will also help to compile the monograph in suitable pharmacopoeia for quality control that can be used globally. Physico-chemical evaluation is an important component of qualitative evaluation, useful in establishing quality profile of a crude drug and constitute. The tested water soluble and alcohol soluble extracts of *Patala*, showed some of the phytochemical constituents such as alkaloids, glycosides and steroids. These phytochemicals are considered as active chemical constituents and

have commercial attention in both pharmaceutical companies and research institutes for new drug manufacturing. Thus, we hope that the important phytochemical properties acknowledged by this study in the local plant of *Patala* will be supportive in managing different diseases.

Due to its many medicinal properties, there is an enormous scope of future research on *Patala*.

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CITE THIS ARTICLE AS

Snehal Bombatkar, Manisha Gavit, Nitin Gaikwad. A detailed pharmacognostic, physicochemical and Preliminary phytochemical study of Patala (*Stereospermum suaveolens* Roxb. DC.). *J of Ayurveda and Hol Med (JAHM)*. 2023;11(3):47-56

Conflict of interest: None

Source of support: None