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Biochemical Analysis and Pharmacognostic Study of Prasarini (*Paederia foetida* Linn.)- Stem

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ABSTRACT

Paederia foetida, Family Rubiaceae is an herbaceous climber medicinal plant, usually found in Himalaya region and also Bengal, Assam, Orissa and Bihar. It is known as "Prasarini" in local language Hindi. The present study deals with the pharmacognostic study and biochemical investigation of Prasarini stem. Stem powder was analyzed by using various parameters like macro & microscopic study, physicochemical tests (LOD at $105^{O}C$, alcohol soluble extractive value, water soluble extractive, total ash value and acid in soluble ash value), qualitative phytochemical analysis and development of HPTLC fingerprints profile.

Key words : Pharmacognosy, physicochemical, biochemical, *Paederia foetida*

INTRODUCTION

Traditional medical system has become more significant during the past some years. The traditional practitioners are using the medicinal plants for primary healthcare in developing as well as developed countries[1]. Prasarini (*Paederia foetida)*, Family-Rubiaceae is an popular ethno-medicinal fast growing perennial climbing plant, usually found in Himalaya region and also in Bengal, Assam, Orissa and Bihar. It is known as "Prasarini" in local language Hindi[2,3,4]. Stem woody at the base, slender and about 9-10 meter long. Whole plant used in traditional and Ayurvedic medicinal system, decoction of the root, stem and leaves are used to treatment of different types of diseases. It is used in diarrhea, seminal weakness, diabetes, and dysentery, piles, asthma and stomach disorder. Traditionally dried fruits extract is applied for toothache. The plant is used several Ayurvedic preparations such as Dasmularishta[5,6,7]. The present communication with the pharmacognostic study and biochemical investigation of Prasarini stem. Stem powder was analyzed by using various parameters like macro & microscopic study, physicochemical tests (LOD at $105^{O}C$, alcohol soluble extractive value, water soluble extractive, total ash value and acid in soluble ash value), qualitative phytochemical analysis and development of HPTLC fingerprints profile.

MATERIALS AND METHODS

Collection of samples

In the month of May, the fresh stem of the Prasarini plant was collected from the herbal garden in Arogyadham Chitrakoot in Satna, Madhya Pradesh. Dr. Manoj Tripathi, Deendayal Research Institute, Chitrakoot, Satna (M.P.), identified and verified the plant[8]. Fresh material was employed for anatomical studies, while shade-dried material was ground into a powder using an electric grinder for physicochemical analysis, phytochemical test, and the develop the High Performance Thin Layer Chromatography fingerprints.

Macroscopic study

Macroscopic characters of Prasarini stem *viz.* colour, odour and taste were evaluated.

Microscopic study

Fresh stem sections were cut[6] by hand, and numerous sections underwent microscopic examination. Olympus Trinocular Research Microscope CX- 21l with Digi-eye camera and Calliper Plus version 4.2 software were used to take pictures of the microscopical sections[9].

Powder microscopic study

The dried stem was powdered and at least 50% of it made it through the 180 m IS Sieve (old sieve number 85) and 355 m IS Sieve (old sieve number 44). 2 g of powder were properly washed in potable water and the water was drained out without any material loss. A small portion of the sample was mounted in glycerin. A small portion of the sample was cleaned by heating with chloral hydrate solution, washed, and mounted in glycerin. A small portion of the sample was treated with iodine solution and mounted in glycerin[10,11].

Physico-chemical parameters

Physico-chemical tests such as moisture content (loss on drying at 105^0C), water soluble extractive value, alcohol soluble extractive value, total ash value and acid insoluble ash value was calculated.[12,13].

Preliminary phyto-chemical investigation

Preliminary phyto-chemical tests were carried out on ethanolic and water extract for the presence\absence of phyto-constituents like alkaloids, flavonoids, tannins, resins, carbohydrates, proteins and saponins.[14,15,16].

High Performance Thin Layer Chromatography (HPTLC) fingerprint profile

For HPTLC, 2 gm of powder sample was extracted with 100 ml of methanol overnight, filtered and concentrated. It was applied by spotting extracted sample on pre-coated silica-gel aluminium plate 60 F_{254} (5x10 cm with 0.2 mm layer thickness Merk Germany) using Camag Linomat -5 sample applicator and a 100 µl Hamilton syringe. Plate was developed using mobile phase toluene*: ethyl acetate* (7: 3 v/v). Linear ascending development was carried out in 10x10cm twin through glass chamber equilibrated with mobile phase. The length of chromatogram run was 8 cm. 20 ml of the mobile phase. Subsequent to the development, Thin Layer Chromatography plate was dried with the help of Hot Air Oven. The peak area for samples and standard were recorded with Camera photo documentation system Camag Reprostar 3. Visualization of spot was made before and after derivatization (with 5% Methanolic - sulphuric acid reagent) at UV light with Win cat software and R_f values noted[17,18,19].

RESULT

Macroscopic characters

Paederia foetidais is a climber plant, stem woody at the base, slender and about 9-10 meter long. Stem colour is dark brown, odor disagreeable and taste bitter (**Fig.1**).

Microscopic characters

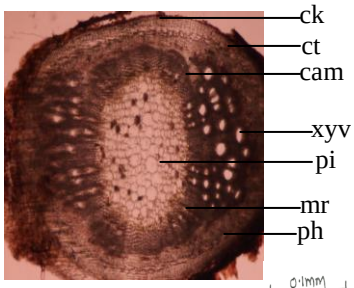
TS of Prasarini stem is circular in outline shows outer thick walled cork cells which is showing uni to multicellular trichomes, paranchymatous cortex embedded with acicular crystals of calcium oxalate; oil cells and starch grains. phloem is broad and traversed by a number of narrow radial strips of fibres alternating with 2 to 4 seriate medullary rays in continuation with xylem rays; cambium is distinct, xylem composed of vessels, tracheid's and fibres **(Fig. 2**).

Powder microscopic characters

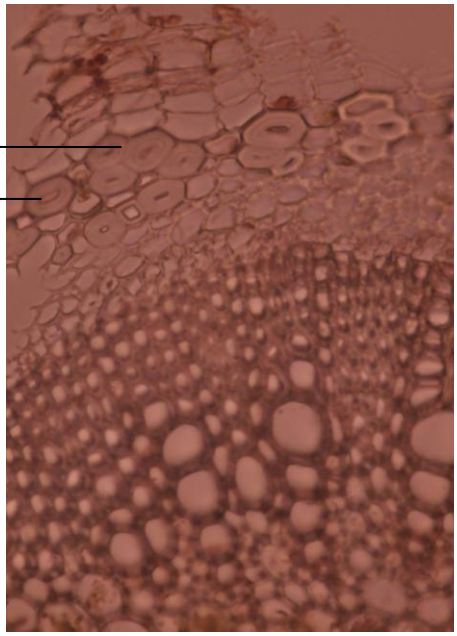
Prasarini stem powder colour is brown, taste- bitter and odour disagreeable.Under microscope powder shows cork cells in surface view, uni to multicellular covering trichomes, various types of vessels, acicular crystals of calcium oxalate, simple rounded starch grains, tracheids in various shape and sizes, Tangentially radially cut medullary rays and long septate thick walled fibres. **(Fig. 3)**

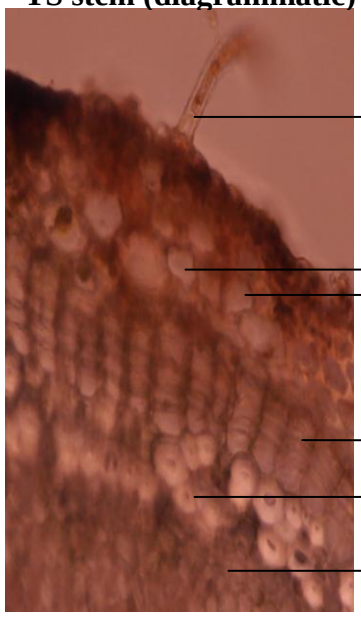
Fig.1 –Prasarini plant

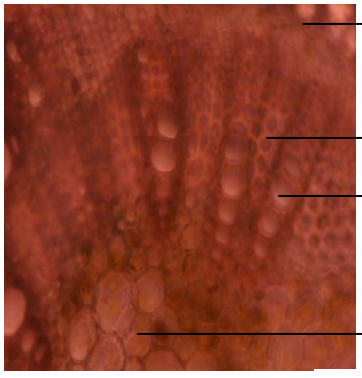
Fig.2- Microscopic characters of Prasarini Stem



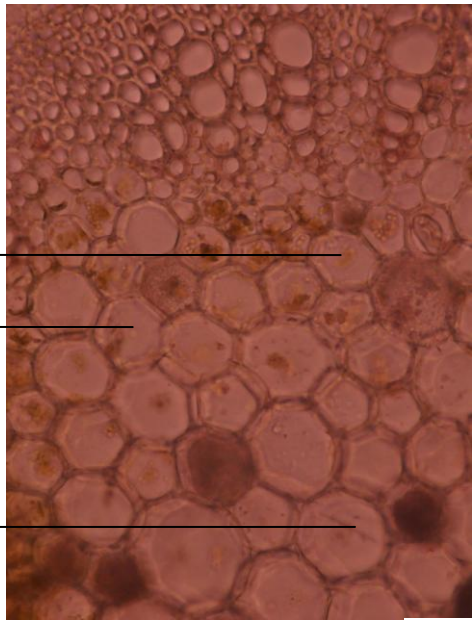
TS stem (diagrammatic)







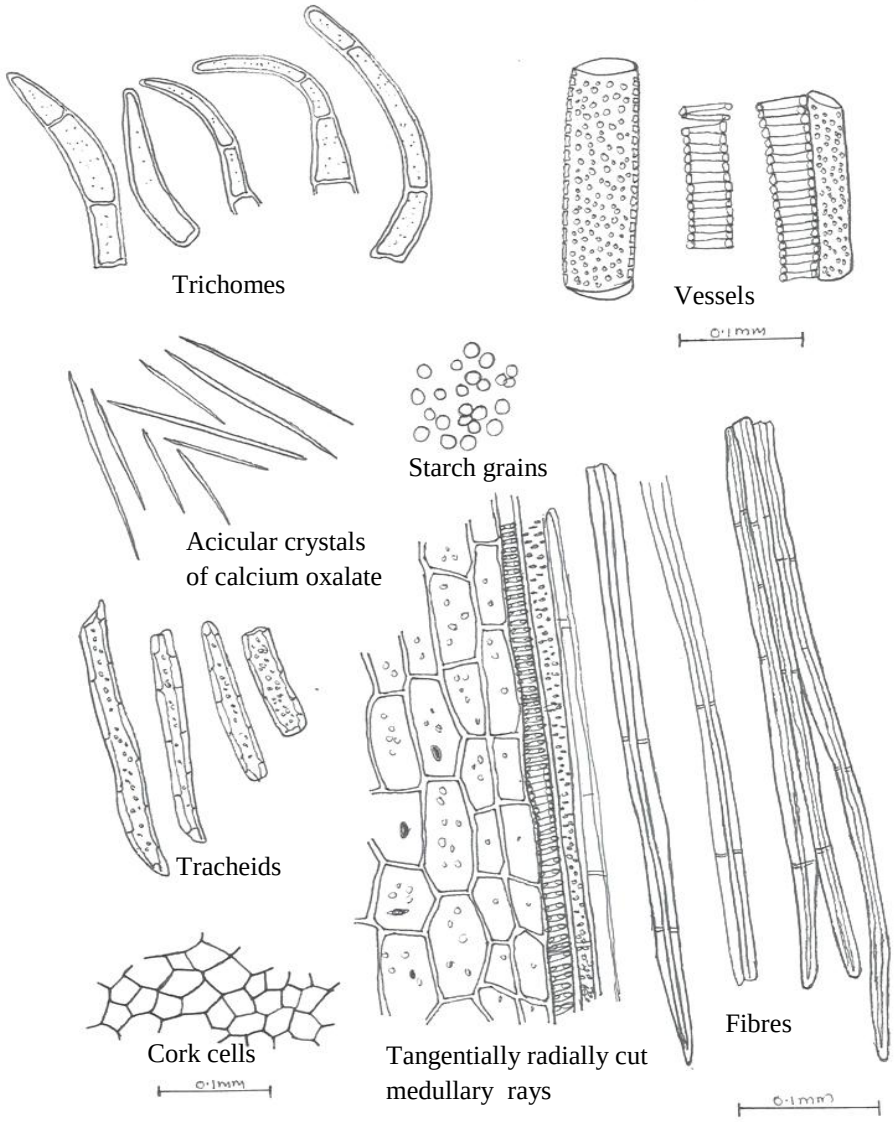
T S stem (detailed)



T S stem (enlarged)

Abbreviations: ac, acicular crystals of calcium oxalate; cam, cambium; cc, collapsed cell; ck, cork cells; ct, cortex; mr, medullary rays; ogl, oil globules; perf, pericycle fibres; ph, phloem; pi, pith; sg, starch grains; tr, trichome; xyv, xylem vessels.

Fig. 3- Powder microscopic characters of Prasarini stem



Physico-chemical analysis

Physico-chemical tests such as such as moisture content (loss on drying at 105^0C), water soluble extractive value, alcohol soluble extractive value, total ash value and acid insoluble ash value was performed and results are given in (**Table 1).**

Qualitative Phyto-chemical study

Qualitative phyto-chemical analysis was performed water and ethanol extracts. Different types of phyto-constituents protein, carbohydrates, tannin, saponin, flavonoids and alkaloids are present.

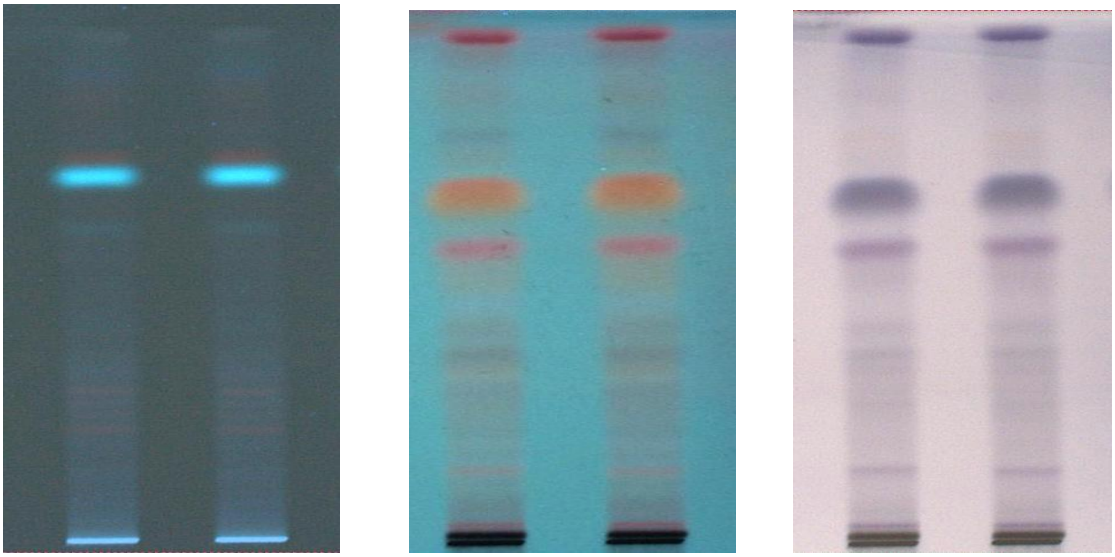
Table-1: Physico-chemical analysis of Prasarini stem

S.No.	Tests name	Results
1	pH	6.9
6	Moisture Content (Loss on drying at 105^0C)	5.6%
7	Water soluble extractive value	23.14%
8	Ethanol soluble extractive value	18.10%
13	Total ash value	5.2%
14	Acid insoluble ash value	1.6%

Development of HPTLC finger prints profile

High performance thin layer chromatography (HPTLC) study was performed in methanolic extract. Sample was applied in precoated TLC plate. Applied 6 µl of the sample and develop the plate in a solvent system *toluene: ethyl acetate* (7: 3 v/v) to a distance of 8 cm. Dry the developed plate in room temperature and examined. Derivatized the plate using 5% *Methanolic-sulphuric acid* reagent and heating at 105^0C till the bands are clearly visible. Major spots R_f values with colour were recorded before derivatization at 366nm, after derivatization at 366nm and at UV light. Chromatogram profile and R_f values are given **(Fig. 4 & Table 2).**

Fig. 3- HPTLC fingerprints profile of Prasarini stem



At 254nm **At 366nm** **At 366nm after derivatization**

Table-2: Rf Value of HPTLC fingerprints profile of Prasarini stem

Rf Value	Before derivatization at 254nm	Before derivatization at 366nm	After derivatization at 366nm
Rf 1	0.70 sky blue	0.60(red)	0.60(blue)
Rf 2	-	0.70(orange)	0.70(dark blue)
Rf 3	-	0.90(brick red)	0.90(dark blue)

CONCLUSION

The importance and application of herbal medicines are growing worldwide on a daily basis as a result of the negative effects of contemporary medications on human health. Because the plants contain natural compounds that don't harm people's health in any way. However, the lack of quality control and standardisation factors affects herbal medications. As a result, it is crucial to standardise and monitor herbal medication quality. One of the most significant plants in India, prasarini, is used to make Dasmularishta and other Ayurvedic compound formulations. Its various parts, including the root, stem, leaves, and fruits, are used to treat a variety of human illnesses and diseases, including diarrhoea, seminal weakness, diabetes, dysentery, piles, and dysentery.

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