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Research Article

Pharmacognostic Study of *Passiflora foetida* Stem

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Abstract

Introduction: Ethnomedicinally, the stem of *Passiflora foetida* (Passifloraceae) is certainly utilized in numerous illnesses in traditional system; most significantly it is utilized against nausea, swelling, renal or bladder and feminine complications, dermatitis, measles, ulcers, injuries, itchiness and urinary burning. The primary hurdle accomplished in the standardization of natural drugs is deficit of correct recognition of herb source. Therefore, there exists an ought to set up quality control guidelines by making use of pharmacognostic and phytochemical analysis, which will assure the purity, safety, and efficiency of therapeutic herb *P. foetida.*

Aim: To judge pharmacognostic properties involves macroscopic, microscopic and physicochemical variables of the stem of *P. foetida.*

Methods: Micro and Organoleptic characteristics of fresh and dried stem samples had been examined. Physicochemical variables had been done by using WHO suggested variables, preliminary phytochemical and fluorescence evaluation of stem sample had been performed for identity and standardization of stem of *P. foetida.*

Results: The organoleptic characteristics were noted from the stem and powdered stem material of *P. foetida*. Light electron microscope pictures of cross portion of stem and powdered stem revealed that the existence of multicellular, uniseriate covering trichomes, epidermis, cortex, vascular bundles, lignified sclerenchyma and pith. Phytochemical testing revealed the existence of flavonoids, tannins, phenols, saponins, carbohydrates, proteins and glycosides. Physicochemical variables including moisture content, ash value, extractive value and fluorescent behaviour of stem powder had been established. These types of variables are helpful tools which will distinguish the powdered drug materials.

Conclusion: The current research is useful to supplement the data regarding its standardization and identity and in performing additional exploration in Ayurvedic system of medication.

Keywords: Pharmacognostic; Microscopical; *Passiflora foetida*; Physicochemical and Lignified Spiral Vessels

Introduction

The process of standardization is attained by pharmacognostic studies which usually help in authentication and recognition of herb. Appropriate quality and recognition poise of the raw materials are essential in herbal remedies to make sure their quality, safety, and effectiveness. Pharmacognosy might be a reliable and simple unit, by that utter details of the crude medication is acquired [1]. *Passiflora foetida* belonging to the Passifloraceae family the varieties are indigenous to exotic northern South America and Western Indies. It has become naturalized in several exotic areas across the globe and it is considered a pantropical weed around the globe [2-5]. It is utilized by Indians as traditionally in the treat-

of vomiting, inflammation, kidney or bladder and female problems, eczema, measles. Ulcers, wounds, rashes and urinary burning [3,4]. So far, phytochemical studies have revealed some structurally diverse chemicals from this plant, alkaloids, phenols, glycosides, flavonoids and cyanogenetic compounds, passifloricins, polypeptides, and α-pyrones. A few pharmacological activities of *P. foetida* offers been reported such as Antioxidant, Hepatoprotective, Gastroprotective, and Antimicrobial [5].

Consequently, we make an effort designed for standardization of *Passiflora foetida* stem to analyze the morphological, anatomical, physicochemical and preliminary phytochemical analysis of stem was performed.

Material and Methods

Plant material and Authentication

Passiflora foetida was maintained in the botanic garden, Department of Botany, Sri Venkateswara, Tirupathi and a voucher specimen (1569) was deposited in the herbarium of the same department for reference.

Pharmacognostic evaluation

Organoleptic evaluation

Organoleptic characteristics of *Passiflora foetida* stem was evaluated by noticing colour, smell, taste, shape, and size as outlined by WHO quality control techniques for herbal medicine [6-8].

Microscopic evaluation

Preparation of sections

Free handed sections of the stem were cut into thin sections manually with the sharp cutting edge of the blade. After that transferred on the slide, cleared by heating with chloral hydrate, tainted by way of phloroglucinol and Conc. HCl and mounted in glycerine. The lignified tissues had been identified by using distinct staining approaches [6].

Powder microscopy

The powder microscopy was performed based on the technique described in Khandelwal [6].

Physicochemical analysis

Physicochemical parameters had been established based on the methods described in WHO quality control methods for herbal materials [6-8].

Phytochemical analysis

Various extracts of *Passiflora foetida* had been subjected to qualitative chemical evaluation of various primary and secondary phytoconstituents according to methods of Khandelwal [6,8-10].

Preparation of extract

The stem of *Passiflora foetida* was shade dried and powdered. 100g of the powder stem was subjected to cold maceration by various solvents. After 24 hrs filtered the extracts and concentrated with the help of rotary evaporator.

Fluorescence analysis of the powdered drug

The fluorescence characteristics of the herb material in various solvents had been noticed utilising visible, short and long light [6,11].

Results

Pharmacognostic evaluation

Organoleptic and Microscopic evaluation

The Organoleptic features of stem demonstrated in table 1. The T. S of stem is deemed circular in outline. The epidermis is the outer most layer it is consisting of cuboidal-shaped cells, which are organized compactly without the intercellular spaces. The outer layer contains many uniseriate multicellular hairs. The hypodermal layer comprises collenchymatous cells organized compactly with no intercellular spaces; accompanied by parenchymatous cells with some intercellular spaces. The endodermis revealed the existence of phloem and xylem. Phloem is well developed and displays the existence of phloem fibers, which are non-lignified. Additionally, it confirmed the existence of phloem parenchyma. The xylem region was the same as the phloem region which includes spiral xylem vessels, xylem fibers, and xylem parenchyma as shown in figure 1 to 5. The central region of T. S is occupied by pith, which is made up of parenchyma cells with intercellular spaces.

Powder microscopy

The powder plant material is pale green color, showed phloem fibers, parenchyma, prism-shaped calcium oxalate crystals, lignified xylem vessels, and multicellular uniseriate covering trichomes as shown in figure 6.

Organoleptic characters	Observation
	Stem
Colour	Green
Odour	Characteristic
Taste	Characteristic
Texture	Smooth

Table 1: Organoleptic characteristics of *Passiflora foetida* stem.

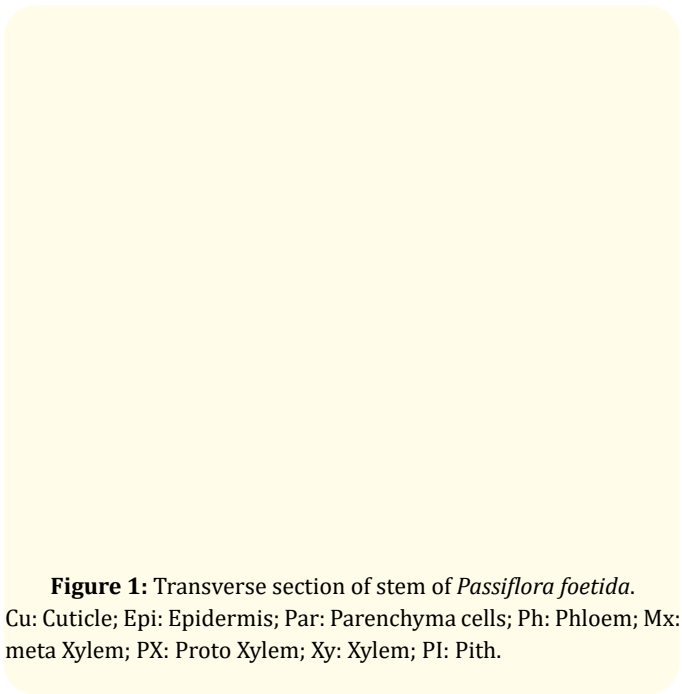

Figure 1: Transverse section of stem of *Passiflora foetida*.
Cu: Cuticle; Epi: Epidermis; Par: Parenchyma cells; Ph: Phloem; Mx: meta Xylem; PX: Proto Xylem; Xy: Xylem; PI: Pith.

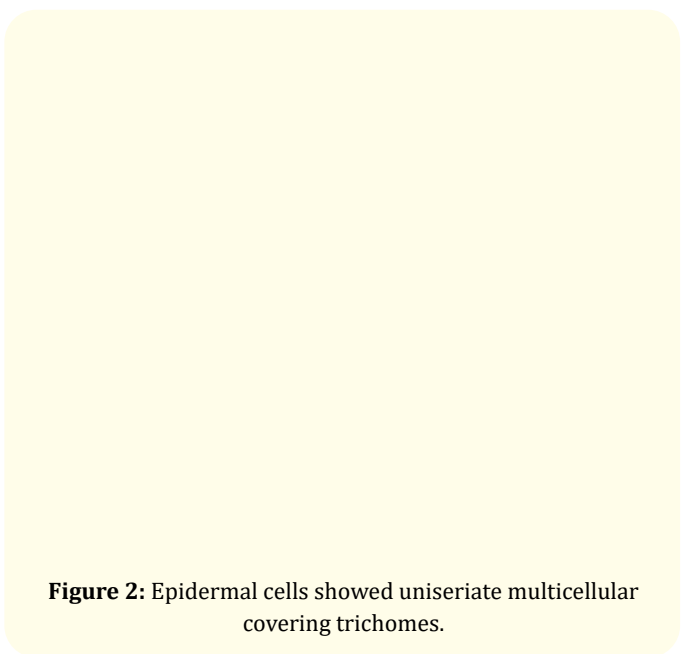

Figure 2: Epidermal cells showed uniseriate multicellular covering trichomes.

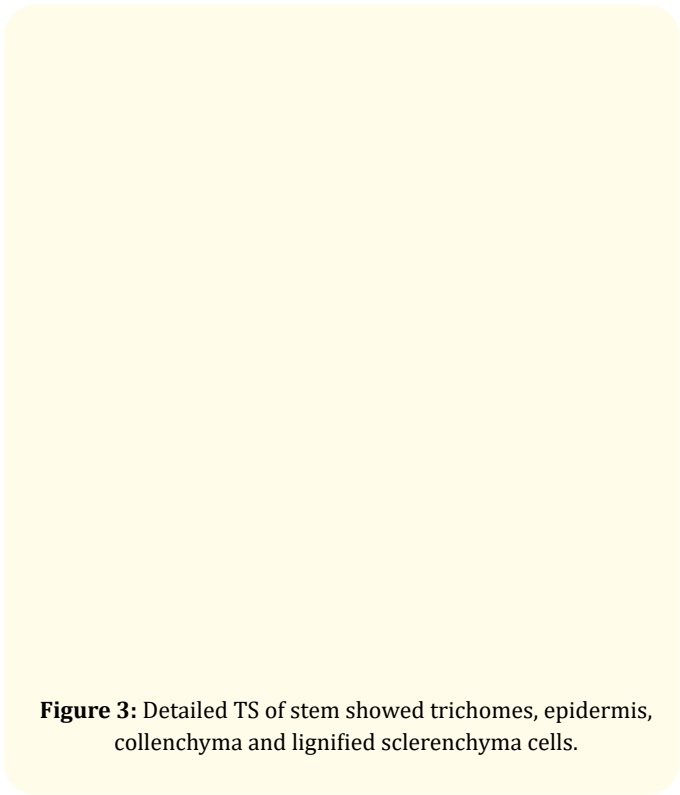

Figure 3: Detailed TS of stem showed trichomes, epidermis, collenchyma and lignified sclerenchyma cells.

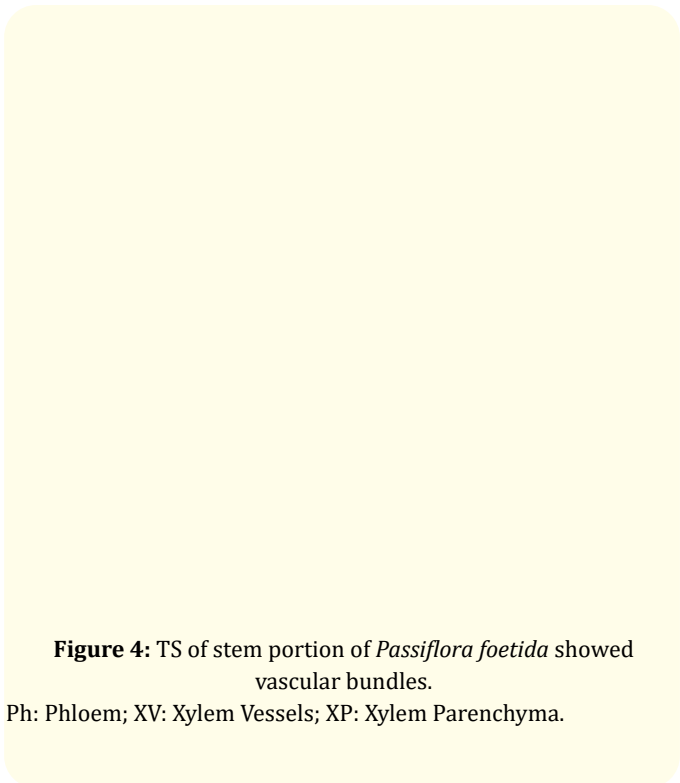

Figure 4: TS of stem portion of *Passiflora foetida* showed vascular bundles.
Ph: Phloem; XV: Xylem Vessels; XP: Xylem Parenchyma.

Figure 5: Arrangement of parenchyma cells.
IC: Intercellular Spaces.

Physicochemical evaluation

The various physicochemical parameters of stem and stem powder, i.e. loss on drying, ash value, and extractive value were determined and shown in table 2.

Parameters	Values %w/w
Moisture content (Loss on drying)	7.05 ± 0.58
Total ash	8.25 ± 0.32
Acid-insoluble ash	3.25 ± 0.18
Water soluble ash	1.89 ± 0.72
Petroleum ether soluble extractive value	0.87 ± 0.03
Chloroform soluble extractive value	4.25 ± 0.32
Ethyl acetate soluble extractive value	6.55 ± 0.53
Alcohol soluble extractive value	11.25 ± 2.12
Water soluble extractive value	12.54 ± 1.25

Table 2: Physicochemical Parameters of stem powder of *Passiflora foetida* L.

Figure 6: Powder microscopy of *Passiflora foetida* stem.
(a) Phloem fibers (b) Parenchyma cells (c) Prism shaped calcium oxalate crystals (d) Lignified xylem vessels (e) Multicellular uniseriate lignified trichomes.

Preliminary phytochemical screening

The preliminary phytochemical screening of the extracts viz., chloroform, alcohol, and water was carried out and the results obtained shown in table 3.

Fluorescence analysis

The behavioural changes of the powdered drug with distinctive chemical reagents were determined at both UV and Visible light, and it is reported as shown in table 4.

Phytoconstituents	Method	Aqueous Extract	Alcohol Extract	Chloroform Extract
Flavonoids	Shinoda Test	+	+	-
	Zn. Hydrochloride test	+	+	-
	Lead acetate Test	+	+	-
Volatile oil	Stain test	-	-	-
Alkaloids	Wagner Test	+	+	+
	Hager's Test	+	+	+
Tannins and Phenols	$Fecl_3$ Test	+	+	-
	Potassium dichromate test	+	+	-
Saponins	Foaming Test	+	+	-
Steroids	Salkowski test	-	-	-
Carbohydrates	Molisch test	+	+	-
Acid compounds	Litmus test	-	-	-
Glycoside	Keller-Killani Test	+	+	-
Amino acids	Ninhydrin test	+	+	-
Proteins	Biuret test	+	+	-

Table 3: Phytochemical analysis of various extracts of *Passiflora foetida* L. Stem.

"+": Present and "-": Absent.

Solvent used	Visible light	UV light	
		At short (254 nm)	At Long (366 nm)
Distilled water	Pale green	Pale green	Pale green
Conc.H_2SO_4	Black	Black	Black
Conc.HNO_3	Red	Pale green	Black
Picric acid	Pale green	Pale green	Black
$FeCl_3$	Dark green	Pale green	Pale green
Conc. HCl	Dark green	Pale green	Black
Methanol	Pale green	Pale green	Pale green
Ammonia	Pale green	Pale green	Pale green
NaOH	Pale green	Dark green	Black
Chloroform	Pale green	Pale green	Black
CCl_4	Pale green	Pale green	Black

Table 4: Fluorescence analysis of *Passiflora foetida* Stem powder.

Discussion

To guarantee the reproducible quality of natural medicines, suitable control of starting components is vital. The key stride toward ensuring starting substances is authentication. Therefore, recently there is an instant embrace the standardization of therapeutic vegetation. Although contemporary methods can be found, nonetheless recognition of therapeutic plants is more dependable on pharmacognostic studies [12]. With this scenario, the macroscopic and microscopic attributes of the stem had been examined. Macroscopical characters of the stem of the plant is a good diagnostic parameter. Microscopical research and powder evaluation of the herb sample unveiled the existence of multicellular uniseriate trichomes, prism shaped calcium oxalate crystals. lignified sclerenchyma, lignified xylem vessels and phloem fibers.

Even more, this kind of research may also be helpful to decrease the likelihood of adulteration of this beneficial herbal drug when it is accessible in the powder form [13]. Studies of physicochemical

parameters is an essential source to guage the purity and quality of primitive drugs. The extractive values give the estimated measure of their particular chemical constituents, and from the study, the extractive values of water were best followed by alcohol. The ash value implies the earthy matter or inorganic components, and various impurities present together with the herb. The pharmacognostic standard for the stem of *Passiflora foetida* set downward for the first time in the research. The phytochemical investigation of various solvent extracts viz., chloroform, alcohol, and water were examined, and it revealed the presence of flavonoids, tannins, phenols, saponins, carbohydrates, proteins, and glycosides.

Conclusion

The information produced from the present research help to authenticate the medicinally significant herb *P. foetida*. Microscopic features might be ideal for developing the pharmacopoeia preferences. Morphology and in addition various pharmacognostic facets of the stem of *P. foetida* was studied and mentioned using phytochemical and physicochemical parameters which may be useful in further isolation and purification of medicinally active ingredients.

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