



PHARMACOGNOSTICAL AND PHYTOCHEMICAL STUDIES ON STEM OF *STACHYTARPHETA JAMAICENSIS* (L) VAHL.

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ABSTRACT

The present study reveals the pharmacognostical and preliminary phytochemical studies of *Stachytarphyta jamaicensis* (L) Vahl. The objective of the present work comprises of collection, identification, macroscopical, microscopical, loss on drying, pH of aqueous solution, total ash value, acid insoluble ash, water soluble ash, alcohol soluble extractive, fluorescence analysis and phytochemical evaluation of *Stachytarphyta jamaicensis* (L) Vahl stem. The stem section was taken and microscopical studies were carried out. The T.S of stem shows the presence of cuticle, epidermis, vascular bundle, parenchyma, collenchymas and chlorochymatous tissue. The Preliminary phytochemical tests on various extracts indicates the presence of carbohydrates, proteins and amino acids, alkaloids, phenolic compounds and tannins, flavonoids, saponins, phytosterols, fixed oils and fats, gums and musilages, terpenoids, glycosides.

Keywords: Pharmacognosy, Phytochemistry, Macroscopic and Microscopic studies, Fluorescence, *Stachytarphyta jamaicensis* (L) Vahl, Stem.

INTRODUCTION

The *Stachytarphyta jamaicensis* (L) Vahl. belongs to the family verbenaceae. It is commonly known as seemai nayuruvi. Blue pottor weed, grows along roadsides and on disturbed sites, grass-fields, brushwood, young forest, watersides and moreover cultivated as a hedge-plant¹. *Stachytarphyta jamaicensis* (Bastard vervain or Brazillian tea) consists of 2600 species and 100 genera. It is an annual weedy herbaceous plant, sometimes perennial, that grows 60 - 120 cm tall and is reproduced from seeds. The stem is smooth and somewhat woody especially at the base. It is dark green, often covered with powder which gives it a bluish shine. The leaves are opposite, rounded to broadly acute at the apex, smooth on both surfaces and with short petioles. The inflorescence is made up of flowers in slender spikes on a long and swollen rachis about 30 - 40 cm long. The flowers are bluish with a white throat or could be seen as reddish purple to deep blue in color. It has a tubular corolla about 10 mm long and lobes about 3 mm long. They are more or less sparsely grouped along and immersed in the axis of the inflorescence². Ethno botanically, *S. jamaicensis* is an antacid, analgesic, anti-helminthes, anti-inflammatory, diuretic, hypotensive, laxative, lactagogue, purgative, sedative, stomachic tonic, spasmogenic, vacillator, vulnerary and vermifuge³. It is used for allergies and respiratory conditions such as colds, flu, asthma, bronchitis and others. It is used for digestive problems such as indigestion, acid reflux, ulcers, constipation, dyspepsia and slow digestion. Pregnant patients and patients with low blood pressure are advised not to use this plant because it is abortive and hypotensive⁴. Some plants have been discovered to be rich in secondary metabolite, such as tannins, terpenoids, alkaloids, flavonoids, phenols, steroids. These compounds are responsible for their therapeutic activities^{5,6}. This study is aimed at testing the preliminary phytochemistry of different solvent, Physicochemical and fluorescence analysis studies of the stem of *S. jamaicensis*.

MATERIALS AND METHODS

The plants were collected from the local areas of cuddalore district, Tamil Nadu, India. It was identified and

authenticated by taxonomic division. The required sample of different organs were cut and removed from the plant and fixed in FAA (Formalin- 5 ml + Acetic acid- 5 ml + 70 % Ethyl alcohol - 90 ml). After 24 h the materials was washed thoroughly with water, and was taken hand section, stained with safranin according to the prescribed methods⁷. Photographs were taken by Sony digital camera. Preliminary phytochemical screening of the⁸, behavior of powder drug towards different chemical reagent⁹.

Physicochemical and Fluorescence Analysis

These analyses were carried out as per the standard procedures¹⁰. In the present study, the powdered leaf was treated with various chemical reagents like aqueous 1N Sodium hydroxide, alcoholic 1N sodium hydroxide, 1N hydrochloric acid, 50 % sulphuric acid 100 % of sulphuric acid and concentrated nitric acid, picric acid, acetic acid, ferric chloride, chloroform, hexane, ethanol, and acetone and their extracts were subjected to fluorescence analysis in day light and UV light (254 nm and 366 nm). Various ash types and extractive values were determined by following the standard methods¹¹.

Preliminary Phytochemical Studies

Preparation of Extracts

Crude plant extracts was prepared by soxhlet extraction method. About 20 g of powdered plant was uniformly paced in to thimble and extracted with 250 ml of different solvents separately. Solvents used were methanol, ethanol, pet ether, distilled water and acetone. The process of extraction continues for 24 hours.

Calculation of Percentage of Yield

The percentage yield was calculated for the extracts and major compounds with reference to the crude material taken the formula given below:

$$\text{Percentage yield with reference to crude plant materials} = \frac{\text{weight in grams of extracts obtained}}{\text{grams of plant materials taken}} \times 100$$



Figure 1: Morphological character of stem

Anatomy of stem

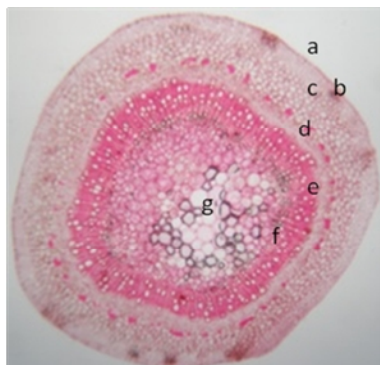


Figure 2: T.S. of stem

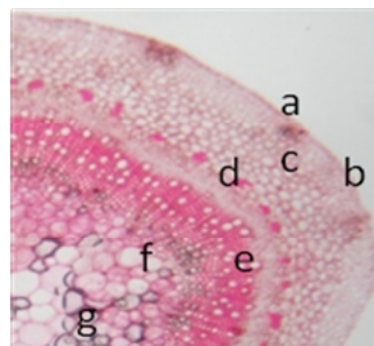


Figure 3: Marginal view on stem T.S

Figure 2 and 3: a-cuticle, b-epidermis, c-collenchyma, d-chlorochymatous tissue, e-phloem, f-xylem, g-pith.

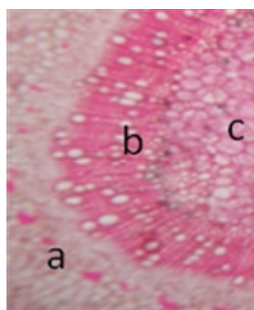


Figure 4: Middle portion of stem T.S

A-chlorochymatous tissues, b and c-vascular bundle

Table 1: Morphological Studies on Stem

Stem	<p>Trunk/bark/branches: not particularly showy; typically multi trunked or clumping stems</p> <p>Current year stem/twig color: green</p> <p>Current year stem/twig thickness: thin</p>
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Table 2: Physicochemical Studies on Stem

S. No	Parameters	Values (%) (W/W)
1.	Loss on drying	8.6 %
2.	Ash values	
	A. Total ash Total Ash	21 %
	B. Acid insoluble ash	9 %
	C. Water soluble ash	15 %
	D. Sulphated ash	11.5 %
3.	Extractive Values	
	A. Water soluble Extractive	15 %
	B. Methanol soluble Extractive	40 %
	C. Petroleum ether soluble Extractive	4.13 %

Table 3: Fluorescence Analysis on Stem Powder

Powder with chemicals	Normal light	UV radiation	
		254 nm	366 nm
Chloroform	Dark yellow	Green	Brown
Hexane	Light yellow	Green	Green
Agueos naoh	Greenish yellow	Green	Green
Alcoholic naoh	Dark yellow	Green	Brown
In hcl	Greenish yellow	Green	Reddish brown
Ethanol	Lemon yellow	Green	Green
Ethyle acetate	Yellow	Green	Green
Acetone	Pale yellow	Yellow	Yellow
50% sulphuric acid	Yellow	Red	Brown
100% sulphuric acid	Greenish yellow	Black	Brown
Picric acid	Dark yellow	Yellow	Dark yellow
Acetic acid	Pale yellow	Red	Blackish brown
Ferric chloride	Brown	Reddish brown	Brown
Nitric acid	Reddish brown	brown	Reddish brown

Table 4: Preliminary Phytochemical Studies

Class of Phytoconstituents	Test	Pet. Ether	Chloroform	Methanol	Ethanol	Distilled water
Phenolic compounds and tannins	a. Ferric chloride test	+	+	+	+	+
	b. Gelatin test	+	+	+	+	+
	c. Lead acetate test	+	+	+	+	+
	d. Alkaline reagent test	+	+	+	+	+
	e. Magnesium and HCL test	+	+	+	+	+
Alkaloids	a. Mayer's test	+	-	+	+	+
	b. Wagner's test	++	+	++	+	+
	c. Hager's test	+	+	+	+	++
	d. Dragendorff's test	+	-	+	+	+
Carbohydrates	a. Molish's test	+	-	+	-	+
	b. Fehling's test	-	+	+	+	+
	c. Barfoed's test	+	++	+	-	-
	d. Benedict's test	+	+	+	-	-
Glycosides	a. borntrager's test	+	+	+	+	+
	b. legal's test	+	+	+	+	+
	c. liebermann's test	+	+	+	+	+
	d. salkowski's test	+	+	+	+	+
	e. keller-kilani test	+	+	+	+	+
Proteins and amino acids	a. Millon's test	-	-	-	-	-
	b. Biuret test	-	-	-	-	-
	c. Ninhydrin test	-	-	-	-	-
	d. Hopkinscole test	-	-	-	-	-
Phytosterols	a. Libermann burchard's test	+	+	+	+	+
	b. Salkowski's test	+	+	+	+	+
Fixed oil and fats	Spot test	+				
Saponins	Form test	+	+	+	+	+

Notes: +Positive, -Negative

RESULT AND DISCUSSION

Present study was focused on characterization of morphological, anatomical and phytochemical parameters of leaf. In general, morphological, anatomical and phytochemical characterization helps in confirmation of identity and determination of quality and purity of herbal raw materials. Preliminary phytochemical studies indicate towards qualitative chemical profile of the plant material. The results of the present investigation and their discussions were presented below under following headings.

Morphological Studies

Younger stems are green or purplish in color, mostly hairless except for a few hairs near the joints, and somewhat square in cross-section. These branched stems are produced from a woody rootstock and tend to become rounded, light brown in color, and somewhat woody as they mature.

Anatomical Studies on Stem

The T.S of stem (*stachytarpheta jamaicensis* (L) Vahl) is having an outer thick layer cuticle and single layer of

epidermal cell followed by chlorochymatous tissues. The collenchyma cells are present in between the epidermis and chlorochymatic cells. The vascular bundle is surrounded by parenchymatous pith, the phloem towards outer and the xylem towards inner (Figure 2, 3, 4).

Physicochemical Studies

The percentage values of total ash, acid insoluble, water soluble ash, water insoluble ash of *Stachytarpheta jamaicensis* (L) Vahl. stem (Table 1).

Fluorescence Characters of Stem Powder

The fluorescence analysis of powder was carried out separately by treating them with various solvents and acids. Then observed in day light and ultraviolet light showed with different colors (Table 2).

Preliminary Phytochemical Analysis of Drug

The preliminary phytochemical studies of carbohydrates, proteins and amino acids, alkaloids, phenolic compounds and tannins, Flavonoids, Saponins, Phytosterols, Fixed oils and

fats, Gums and musilages, terpenoids, glycosides were carried out. Phytochemical screening indicated the chemical profile of *S. jamaicensis* stem and revealed the presence (Table 3).

CONCLUSION

Preliminary phytochemical evaluation and physicochemical analysis of *Stachytarpheta jamaicensis* (L) Vahl. stem can provide useful information for identification and authentication of plant. The majority of the information was on the identity, purity and quality of the plant material. It can be obtained from the macroscopy, microscopy and preliminary phytochemical and fluorescence parameters.

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