

## Pharmacogistic studies on root of *Stachytarpheta jamaicensis*

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### ABSTRACT

The present study reveals the pharmacognostic studies root of *Stachytarpheta jamaicensis* (L) Vahl. The objectives of the present work comprises of collection, identification, macroscopical, Ph of aqueous solution, soluble ash, alcohol soluble extractive, fluorescence analysis of root. The root section was taken and microscopical studies were carried out, the root shows derived from the cork, the periderm tissue is formed, which replaces the epidermis in the outer layer. The next tissue identified inwards was the cortex. Sclerenchyma was seen as a ring in the roots, while as a group, formed from a group of cells, in the mature ones. In the middle, xylem tissue occupies a large area, just below the phloem tissue.

**Keywords:** Pharmacognosy; morphology; anatomy; physic-chemical studies; *Stachytarpheta jamaicensis*

### 1. INTRODUCTION

*Stachytarpheta jamaicensis* (L) Vahl. belongs to the family Verbenaceae. It is commonly known as seemai nayuruvi. This plant can be found on street and Croix growing along roadsides. The disturbed sites, grass-fields, brushwood, young forest, watersides and moreover cultivated as a hedge-plant (Backer and Bakhuizen, 1965). Bluepotter weed is an erect and branched half-woody plant, 1 to 1.5 meters high. Stems are terete, the younger ones slightly angled. Leaves are elliptic to oblong-ovate, 2.5 to 10 centimeters long, with pointed tips and toothed margins, the base decurrent on the petioles. The spikes are terminal, rather slender, 10 to 30 centimeters long, 3-4 millimeters thick, green and continuous. Calyx is small, oblique and 4-toothed. Corolla is deep blue, 1 centimeter long. The fruit is enclosed in the calyx, appressed to and sunk in the rachis, smooth, oblong and about 4 millimeters long.

The medicinal usage of *Stachytarpheta jamaicensis*'s fresh leaves are consumed in bush tea as a "cooling" tonic and blood cleanser. *S. jamaicensis* is having anti spasmodic activity, anti-inflammatory activity, anti nociceptive activity, vasodilator activity, laxative activity, anti- diarrheal activity, antiulcer activity, antimicrobial activity, cytotoxic activity,

analgesic, antihelminthic, diuretic, hypotensive, lactagogue, purgative, sedative, stomachic and vermifuge (Schapoval *et al.*, 1998). It is used for allergies and respiratory conditions such as colds, flu asthma, bronchitis and others; it is also 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 both hypotensive and abortive (Taylor, 2005). However, perusal of literature reveals that Pharmacognostic information as *Stachytarpheta jamaicensis* is totally lacking, hence in the present investigation was undertaken.

## 2. MATERIALS AND METHODS

### 2. 1. Materials

*Stachytarpheta jamaicensis* (Verbenaceae) were collected from Alapakkam V at longitude 79° 719'N; latitude 11° 6018' E), cuddalore district, Tamilnadu, India. The collection made from months of February to July, 2011. Herbarium was deposited to the Department of Botany, Annamalai University, Chidambaram (Herbarium number AUBOT ≠ 246).

### 2. 2. Microscopic studies

The plant samples of different parts were cut and removed from the plant and fixed in FAA (95 % Formalin – 5 ml + 95 % Acetic acid - 5 ml + 70 % Ethyl alcohol 90 ml). After 24 hours the materials was washed thoroughly with distilled water and microtome (Weswox™ Optik, model MT- 1090A) section was taken, stained with safranin according to the prescribed methods (Sass, 1940). Photographs (Olympus SP-350, digital compact camera, 8.0 megapixels) were taken by phase contrast microscope.

### 2. 3. Macroscopic studies

The macroscopic studies were carried out by naked eye in terms of taxonomical description. The organoleptic evaluation of different parts of the plant including colour, size, odour, appearance, taste, smell, texture and other characters (Wallis, 2005).

### 2. 4. Pharmacognostical studies

Pharmacognostical studies on the leaf, stem and root of *Stachytarpheta jamaicensis* were carried out with a view to evolve standard and evolve morphological, anatomical, physicochemical studies like determination of ash values (Anonymous, 1980), pH of aqueous solution (Anonymous, 1987), extractive values (Anonymous, 1968), fluorescent analyses of leaf, stem and root powders were carried out (Pratt and Chase, 1949; Kokashi *et al.*, 1958). Behavior of powdered plant sample with different chemical reagents and solvents was carried out by Kay (1938) and Johansen (1940) method.

## 3. RESULTS

### 3. 1. Morphological studies

The root of *S. jamaicensis* are tap root system and branches are came from the tap root it was brown in color and very hard and the results are presented in (Table 1).

**Table 1.** Morphological studies of root of *Stachytarpheta jamaicensis*.

Morphological parameters	Root
	Fresh
Condition	Tap root
Type	11 cm
Size (length/width)	-
Shape	-
Apex	-
Margin	-
Venation	-
Base	-
Petiole	-
Phyllotaxy	Yellowish White
Colour	Odour less
Odour	Sweet bitter
Taste	-
Texture	-

### 3. 2. Microscopical studies of root of *Stachytarpheta jamaicensis*

In the transfer section of the root, it was seen that, derived from the cork, the periderm tissue is formed, which replaces the epidermis in the outer layer (Fig. 1). The next tissue identified inwards was the cortex. Sclerenchyma was seen as a ring in the roots, while as a group, formed from a group of cells, in the mature ones. In the middle, xylem tissue occupies a large area, just below the phloem tissue.



### 3. 3. Physico-chemical studies

#### Extractive values:

The extractive values determined in petroleum ether, chloroform, acetone, ethanol, methanol and aqueous using soxhlet apparatus are presented in (Table 2).

**Table 2.** Extractive values and physical test of root powder.

S. No	Plant parts	Petroleum ether (M $\pm$ SD)	Chloroform (M $\pm$ SD)	Acetone (M $\pm$ SD)	Ethanol (M $\pm$ SD)	Methanol (M $\pm$ SD)	Distilled water (M $\pm$ SD)
1	Root	1.18 $\pm$ 0.008	1.18 $\pm$ 0.10	0.45 $\pm$ 0.02	2.37 $\pm$ 0.05	3.68 $\pm$ 0.08	0.44 $\pm$ 0.03
2	Physical tests	Colour-light brown	Smell- odour less	Taste-sweet bitter			

#### Total ash:

Total ash analysis showed more amount of *S. jamaicensis* compared to acid insoluble ash and water soluble ash and the results are presented in (Table 3).

**Table 3.** Pharmacognostic characters of leaf, stem and root of *Stachytarpheta jamaicensis*.

S. No	Parameters	Root
1	Total ash value (%)	15.09 $\pm$ 0.01
2	Acid insoluble ash (%)	2.66 $\pm$ 0.01
3	Water soluble (%)	0.02 $\pm$ 0.008
4	pH of aqueous	1.32 $\pm$ 0.007

M = Mean  
SD = Standard deviation

#### Determination of pH:

The percentage of pH values of various parts of drug were determination separately in aqueous solution found in (Table 3).

#### Fluorescence analysis of powder sample:

The result of fluorescence analysis of *S. jamaicensis* powdered of various parts and their extracts in different solvent like petroleum ether, chloroform, acetone, ethanol, methanol and aqueous were shown in (Table 4).

**Table 4.** Fluorescence analysis of root Powder of *Stachytarpheta jamaicensis*.

Powder with chemicals	Visible light	UV light	
		254 nm	360 nm
Powder + 1 N HCl	Brown	Dark red	Brown
Powder + 1 N NaOH	Brown	Brown	Red
Powder + 1 N NaOH + MeOH	Brown	Brown	Saddle red
Powder + 50 % KOH	Brown	Yellowish brown	Brown
Powder + 50 % H <sub>2</sub> SO <sub>4</sub>	Yellow	Brown	Orange
Powder + Conc. H <sub>2</sub> SO <sub>4</sub>	Brown	Saddle red	Brownish red
Powder + 50 % HNO <sub>3</sub>	Yellow	Dark orange	Yellowish red
Powder + Conc. HNO <sub>3</sub>	Brown	Dark yellow	Orange
Powder + Acetic acid	Brown	Reddish brown	Dark red
Powder + Iodine solution	Reddish brown	Brown	Red
Powder + Picric acid	Dark yellow	Yellowish brown	Orange

**Consistency of extracts:**

The consistency of extracts of different parts of the *S. jamaicensis* was carried out and observed result are presented in (Table 5).

**Table 5.** Consistency of extracts of different parts of *S. jamaicensis*.

S. No	Extracts	Root
1	Petroleum ether	Sticky
2	Chloroform	Semi solid
3	Acetone	Non-sticky
4	Ethanol	Semi solid
5	Methanol	Semi solid
6	Aqueous	Semi solid

**4. CONCLUSION**

The present investigation of Pharmacognostical studies of the root of *Stachytarpheta jamaicensis* yielded a set of qualitative and quantitative parameters or standards that can serve as an important source of information to ascertain the identity and to determine the quality and purity of the plant materials for future studies

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