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## Pharmacognostic Studies of the Leaves of *Stachytarpheta jamaicensis* Linn. (Vahl) (Verbenaceae)



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### ABSTRACT

Raw samples were analyzed on fresh, powdered and cross-sectioned Jamaican berry (*Stachytarpheta jamaicensis*, SJ) leaves to determine their macroscopic, microscopic (quality and quantity), analytical structure and phytochemical properties. When viewed with the naked eye, the leaves are single, hairless, thick, slightly fleshy, obovate, symmetrical at the base, blunt and pointed at the tip, and have serrated teeth on the edges. Close examination of red leaves shows that phloem parenchyma cells are present in xylem vessels, epidermal cells have two-celled stomata, epidermal cells have drooping wavy walls, palisade cells are attached to epidermal cells, and multicellular single trichome whorls are irregular. calcium oxalate and small fiber packet. Quantitative analysis of *Sophora japonica* leaves showed that the ratio of palisade, number of stomata (upper and lower epidermis), stomatal index (upper and lower), vascular islands and vascular vessels totaled 4.42. These are  $\pm 2.53$ ,  $(105.67 \pm 2.73, 277 \pm 17.08)$ ,  $(28.00 \pm 2.31, 21.00 \pm 2.51)$ ,  $15.67 \pm 0.66$  and 3, respectively. is  $.50 \pm 0.00$ . Used to test standards; total ash, water-soluble ash, sulfate ash, acid-insoluble ash and alcohol-soluble extract were  $11.85 \pm 0.06$ ,  $2.17 \pm 0.00$ ,  $8.80 \pm 0.14$ ,  $2.04 \pm 0.05$ , respectively.  $\pm 2.51$  was 0.30. Phytochemical analysis of SJ leaves revealed the presence of carbohydrates, reducing sugars, alkaloids, glycosides, saponins, tannins, flavonoids, resins, proteins, steroids and terpenoids. These special samples obtained from experiments are important in creating indicators for plant identification, design and monographs.



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## **INTRODUCTION**

Medicinal plants have been used for many years as natural products containing bioactive substances that provide curative benefits and affordable treatment for many diseases. The use of medicinal plants as an alternative to the combined use of drugs in the treatment of diseases has been internationally accepted. Research-based on the use and effectiveness of medicinal plants is expanding to find that medicinal plants have secondary metabolites and inform their roles in various drugs, including antibiotics, antibacterial, antifungal, antioxidant, antihypertensive, antinociceptive, and anti-inflammatory.

Some of these compounds are gallic acid, apigenin, ursolic acid and luteolin. Early studies of *Salmonella jamaica* investigated various pharmacological activities such as antibacterial, antifungal, antioxidant, anti-inflammatory, analgesic, antidiarrheal, hypertensive, antidyslipidemic, hepatoprotective, anti-cancer, wound, etc. It has been found to be therapeutic, anti-trypanosomal, anti-diabetic and effective in various experimental models.

## **BACKGROUND**

*Stachytarpheta jamaicensis* (L.) Vahl. Verbenaceae is a genus of herbs and ornamentals commonly known as Brazilian tea and Allen's cane. Ethnomedicine studies have shown the use of plants in diabetes and other diseases. Preliminary identification of this plant is a prerequisite for its use in medicine. Therefore, the aim of this study is to develop an analytical method for *Stachytarpheta jamaicensis* (L.) Vahl. Herbs and tablets.

## **DISCUSSION AND CONCLUSION**

The results obtained in this study can be used as a model for *Stachytarpheta jamaicensis* (L.) Vahl. and its tablets. These products will be evaluated separately for medical use.

## **MATERIAL AND METHODS**

### **Plant collection and authentication**

## **MACROSCOPY**

External characteristics of all plants of *S.jamaicensis* (L.) Vahl. Use a digital camera to record. Observe and record macroscopic leaf characteristics including edge type, location, size, shape, base, apex, midribs, surface features, and texture. Similarly, body features were

also recorded. Sensory characteristics such as color, smell and taste are also observed and recorded according to standard methods. Compare macroscopic properties with previously published data.

## **MICROSCOPY**

Microsections and powder microscopy of different surfaces were performed according to standard procedures. Different parts of the new SJ plants, such as stems and leaves, were separated into separate sections with a sharp knife, stained with safranin, and examined under a compound microscope. The episode was shot using a camera under bright lights.

## **POWDER MICROSCOPY**

A handful of *Stachytarpheta jamaicensis*(L.) Vahl. Place the powder on a glass slide, treat with several reagents, cover with glycerol and look at the powder under a microscope. This feature was shot using a camera under bright light.

## **PHYSICOCHEMICAL STANDARDS**

Physicochemical tests included herbal tests as per Indian Ayurvedic Pharmacopoeia. These include foreign matter (% w/w), total ash (% w/w), acid-insoluble ash (% w/w), alcohol-soluble extractives (% w/w) and water-soluble extractants (% w/w). Analysis of samples as per API specifications [22] was done at the Dravyaguna Department, Dharmasthala Manjunatheshwara College, Hassan Ayurveda College, Karnataka, India. All tests were performed in triplicate and data are expressed as mean  $\pm$  standard deviation.

## **PRELIMINARY PHYTOCHEMICAL EVALUATION**

*Stachytarpheta jamaicensis* (L.) Vahl Aqueous and alcoholic extract of the whole plant. Using standard reagents and methods to analyze plant components.

### ***Stachytarpheta jamaicensis* (L.) Vahl. Tablet (SJ tablet) preparation**

*Stachytarpheta jamaicensis* tablets were prepared following the protocol described [23]. Check the SJ collected from the plane, cut it into small pieces and dry it in a cool place. Crush the crude medicine into a coarse powder after making sure it is completely dry. One serving of food Store separately in an airtight container. The remaining coarse powder is further crushed to obtain fine powder. The decoction is made from coarse flour. The

decoction preparation was used to grind SJ into fine powder and store it dry. The dry powder was crushed to obtain 500 mg tablets. The prepared tablets were stored in airtight containers for further research.

#### **Quality standards for *Stachytarpheta jamaicensis* (L.) Vahl. Tablet (SJ tablet)**

Adverse effects of SJ tablets were determined according to the standard. This includes general definition, metric analysis, micro properties, physicochemical parameters such as loss on drying, total ash (%w/w), acid insoluble ash (%w/w). Contains.) w), alcohol soluble extract (%w/w) and watersoluble extract (%w/w%) and other tests such as friability, hardness, pH (5% aqueous extract), tablet weight uniformity and disintegration time. Evaluated by example Department of Dravyaguna and Rasashastra-Bhaishajya Kalpana, Sri Dharmasthala Manjunatheshwara College Ayurvedic College and Hospital, Hassan, Kana Thakur, India .

#### **High performance thin layer chromatography (HPTLC) of the plant and tablet of *Stachytarpheta jamaicensis* (L.) Vahl**

*Stachytarpheta jamaicensis* (L.) Vahl powder and SJ masa sample, dissolve in 20.0 ml of methanol, leave overnight, filter, remove the solvent under reduced pressure, and dissolve in 10.0 ml of methanol. . 4  $\mu$ l of the above extract with gallic acid (labeled compound) is applied to pre-coated silica F254 on an aluminum plate with a strip width of 7 mm using a Linomat 5 TLC applicator. Samples were prepared in toluene:ethyl acetate:formic acid (5:2.5:0.1). The plate is visualized at short UV, long UV, then derivatized with vanillin sulfate (VSA) reagent, and then scanned at UV 254 nm, 366 nm, and 620 nm (after derivatization). Type rf, color, optical fast scan.

Table 1: Results of Phytochemical Analysis

S. No	Constituents	Inference				
		CME	HF	EF	BF	WF
1.	Carbohydrates	+	-	-	+	+
2.	Reducing sugars	+	-	-	+	+
3.	Alkaloids	+	+	+	+	+
4.	Glycosides	+	-	+	+	+
5.	Saponins	+	-	+	+	+
6.	Tannins	+	-	+	+	+
7.	Flavonoids	+	-	+	+	-
8.	Resins	+	+	+	-	-
9.	Proteins	+	-	+	+	+
10.	Oils	+	+	-	-	-
11.	Steroids	+	+	+	+	+
12.	Terpenoids	+	+	-	-	-

CME = Crude Methanol extract, HF = N-Hexane fraction, EF = Ethyl acetate fraction, BF = N-Butanol fraction, WF = Water fraction.

- = not present, + = present.

Table 2: Observations from Macroscopic observations of whole leaf.

S. No	Parameters	Observations
1.	Colour	Green and often have a slight bluish or grayish tinge
2.	Margin	Serrate-dentate
3.	Apex	Bluntly acute/obtuse to slightly acute
4.	Composition of lamina	Simple
5.	Shape of lamina	Obovate
6.	Midrib	Raised at the lower surface but flat on the upper surface
7.	Venation	Reticulate, Pinnate
8.	Base	Symmetrical
9.	Size	2-12 cm long and 1-5 cm wide are borne on stalks
10.	Texture	Relatively thick and slightly fresh
11.	Surface	Hairless (Glabrous) or have a few hairs along the veins on the underside (i.e. sparsely strigose)
12.	Odour	Characteristic
13.	Taste	Tasteless

### High-performance thin layer chromatography (HPTLC) of the plant and tablet of *Stachytarpheta jamaicensis* (L.) Vahl

Take 1 g Jamaican fruit ear (*Stachytarpheta jamaicensis* (L.) Vahl) powder and SJ sample tablets, dissolve in 20.0 ml methanol, leave overnight, filter, remove solvent under reduced pressure, dissolve in 10.0 ml methanol. 4 µl of the above extract with gallic acid (labeled compound) is applied to pre-coated silica F254 on an aluminum plate with a strip width of 7 mm using a Linomat 5 TLC applicator. The sample was prepared in toluene: ethyl acetate :formic acid (5:2.5:0.1). The plate is visualized at short UV, long UV, then derivatized with vanillin sulfate (VSA) reagent, and then scanned at UV 254 nm, 366 nm, and 620 nm (after derivatization). Type rf, color, optical fast scan.

## OBSERVATION AND RESULTS

### Macroscopic features

Macroscopic characteristics of leaves and stems are listed in Tables 1 and 2, respectively. (Picture 1) Leaves and stems have a bad smell and taste.

### Microscopic features

The lines of the handle are rounded and slightly straight. The outermost layer is a layer of epidermis covered by the stratum corneum. The cortex has a layer of 3-4 pachycolpary cells followed by a dense layer of 6-7 pachycolpary cells. Behind the cortex are vascular bundles with phloem on the outside and xylem on the inside. In the center is the core consisting of parenchyma cells. There are purple-colored cells in the cortex (Figure 2).

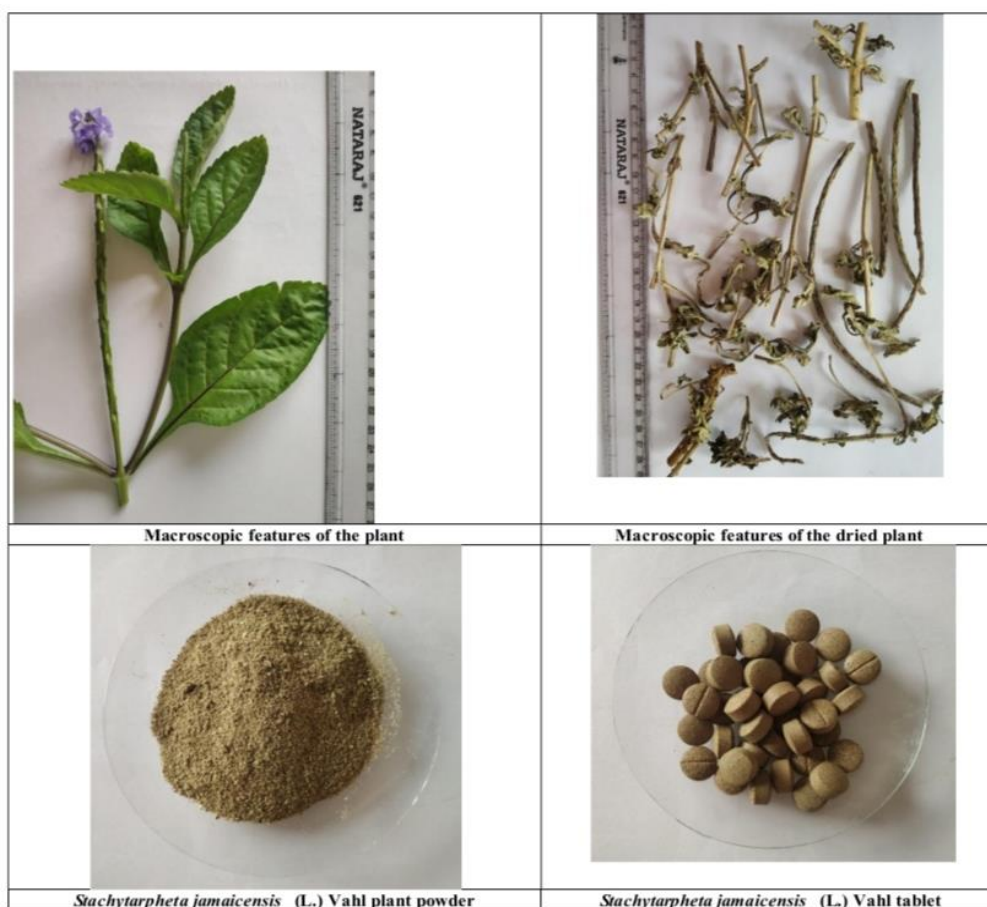


Figure 1: Macroscopic features of *Stachytarpheta jamaicensis* (L.) Vahl



Table 1: Results of Phytochemical Analysis

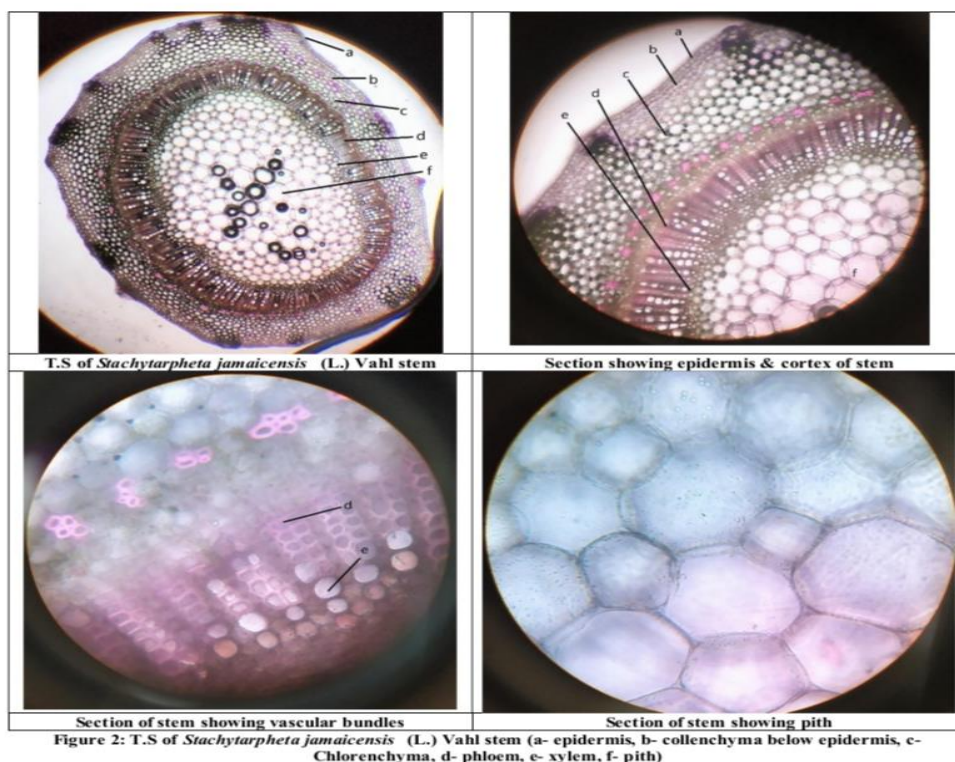
S. No	Constituents	Inference				
		CME	HF	EF	BF	WF
1.	Carbohydrates	+	-	-	+	+
2.	Reducing sugars	+	-	-	+	+
3.	Alkaloids	+	+	+	+	+
4.	Glycosides	+	-	+	+	+
5.	Saponins	+	-	+	+	+
6.	Tannins	+	-	+	+	+
7.	Flavonoids	+	-	+	+	-
8.	Resins	+	+	+	-	-
9.	Proteins	+	-	+	+	+
10.	Oils	+	+	-	-	-
11.	Steroids	+	+	+	+	+
12.	Terpenoids	+	+	-	-	-

CME = Crude Methanol extract, HF = N-Hexane fraction, EF = Ethyl acetate fraction, BF = N-Butanol fraction, WF = Water fraction.

- = not present, + = present.

Table 2: Observations from Macroscopic observations of whole leaf.

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13.	Taste	Tasteless



## DISCUSSION

This study aims to develop a clinical sample for the Jamaican *S. jamaicensis* (L.) Vahl plant and tablets. Macroscopic characteristics of plants According to published data. Microsections of stems and leaves, Powder microscopy revealed patterns similar to previous findings. Physical and chemical parameters of the SJ plant were used, and the total ash, acid-insoluble ash and leachate values were consistent with previous studies. The tablet test sample can be used as a product sample. Preliminary phytochemical analysis demonstrated the presence of secondary metabolites in plants, and the results of this study are consistent with previous studies. In previous studies, leaf extract was analyzed in terms of phytochemicals and was found to contain carbohydrates, alkaloids, saponins, flavonoids, and phenolic compounds. Bioactive substances found in plants are responsible for various pharmacological effects such as antioxidant activity, hypoglycemic ability, preventing arthritis, and preventing work. [30] SJ. Gallic acid is one of the biological components of SJ and was therefore chosen as the compound. However, in this study, this drug was not detected in both samples; This is perhaps due to the difference in value and the solvent used in drug testing. In a previous study, HPLC analysis of ethanol extracts was performed, detecting gallic acid at a concentration of 4.43 mg/L and 3.92 mg/L in supercritical CO<sub>2</sub> extracted SJ extracts from Soxhlet extraction. Therefore, other herbal products can now also be used as guides for identification.

## CONCLUSION

In this study, macroscopic examination, microscopic examination, physicochemical examination, phytochemical analysis, and chromatography were performed according to the standards used for *S. jamaicensis* (L.) Vahl plant powder and tablets. Plants and products can be further evaluated for various medicinal functions in humans.

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