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Morpho-Anatomical And Preliminary Phytochemical Studies Of The Leaf Of Stachytarpheta jamaicensis (L) Vahl.

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Abstract: The present study is morpho-anatomical and preliminary phytochemical studies of of *Stachytarphyta jamaicensis*(L)Vahl. The objective of the present work comprise of collection, identification, macroscopical, microscopical and phytochemical evaluation of Leaves of *Stachytarphyta jamaicensis*(L)Vahl (L)Vahl. The leaves section was taken and cellular structures were studied. The T.S of Leaves shows the presence of epidermis, vascular bundle, parenchyma, collenchyma, stomata. 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.
Key words: *Stachytarpheta jamaicensis*, Morpho-Anatomical ,Preliminary Phytochemical Studies,leaf.

Introduction:

Benefits derived from using medicine obtained from plants are that they are relatively safer than synthetic alternative by offering profound therapeutic benefits and more affordable treatment[1]. Furthermore, it has been found that some drugs are synthesized from plants. Infact it is estimated that plant materials are present in, or provide the models for more than 50% of western drugs[2].

The *Stachytarpheta jamaicensis* (L) Vahl. Belongs to the family verbenaceae. It is commonly known as Kandikandilaan. This plant can be found on Street. Croix growing along roadsides and on disturbed sites, grass-fields, brushwood, young forest, watersides and moreover cultivated as a hedge-plant[3]. *Stachytarpheta jamaicensis* (Bastard vervain or Brazillian tea) belongs to the family Verbanaceae which 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 inflorescence[4]

Ethnobotanically, *S. jamaicensis* is an antacid, analgesic, anti-helmithic, anti-inflammatory, diuretic, hypotensive, laxative, lactogogue, purgative, sedative, stomachictonic, spasmogenic, vasilator, vulnerary and vermifuge[5].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 hypotensive [6].

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[7,8]. This study is

aimed at testing the preliminary phytochemistry of different solvent, morphology and anatomical studies of the leaves of *S. jamaicensis.*

Materials And Methods:

The plant specimen for the proposed study was collected from kalrayan hills. 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- 5ml + Acetic acid- 5ml + 70% Ethyl alcohol-90 ml). After 24 hrs the materials was washed thoroughly with water, and was taken hand section, stained with safranin according to the prescribed methods[9]. Photographs were taken by Sony digital camera. Preliminary phytochemical screening of the[10],behavior of powder drug towards different chemical reagent[11].

Results 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 & 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.

Morpholgical Studies:

Fig: 1, a: Habit of the plant

Fig:1,b: single plant with flowers

Fig1,c: Close-up flowers

Fig1,d: leaves and flower clusters

Morphologically the *Stachytarpheta jamaicensis* 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 petiole. 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 somewhat sunk in the rachis, smooth, oblong, and about 4 millimeters long(table:1).

Table:1 (Morphology of *Stachytarpheta jamaicensis*(L)Vahl)

Parts	Observation
Flowers	**Flower color:** pink; blue **Flower characteristic:** summer flowering; fall flowering
Fruit	**Fruit shape:** unknown **Fruit length:** unknown **Fruit cover:** unknown **Fruit color:** unknown **Fruit characteristic:** inconspicuous and not showy
Stem	**Trunk/bark/branches:** not particularly showy; typically multitrunked or clumping stems **Current year stem/twig color:** green **Current year stem/twig thickness:** thin
Leaves	**Leaf arrangement:** opposite/subopposite **Leaf type:** simple **Leaf margin:** serrate **Leaf shape:** ovate **Leaf venation:** pinnate; reticulate **Petiole:** The base decurrent on the petiole **Leaf type and persistence:** semi-evergreen **Leaf blade length:** less than 2 inches **Leaf color:** green **Fall color:** no fall color change **Fall characteristic:** not showy
Root	Usually not a problem Light brown color

Anatomical Studies:

The leaf section of *Stachytarpheta jamaicensis* the epidermal cells are covered with thick cuticle, the epidermis are polygonal, isodiametric, or elongated in various directions, and arranged irregularly(fig1:c). The epidermal cells have mostly sinuous, occasionally arched or straight, and thick, anticlinal walls. The surface of the cuticle shows mostly parallel and straight, rarely corrugated,

striations radiating from the base of the hairs. Leaf epidermis showing diacytic stomata and stomata with a single subsidiary cell; note contiguous diacytic stomata and abnormal diacytic stomata with a single guard cell(fig1:b). The thickness of upper epidermis 55-63 (µm),and 4 layered, thickness of parenchyma 30-35 (µm), palisade parenchyma 4 layered, the vascular bundle is arranged by xylem towards inner side and phloem towards outer side.(fig1:a)

Fig1,a:T.S of leaf of *S. jamaicensis* leaf

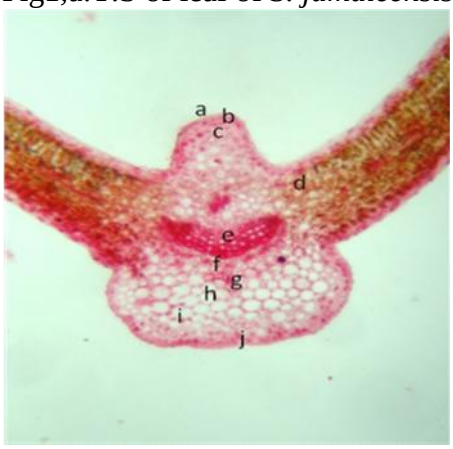

Fig1,b: surface section of

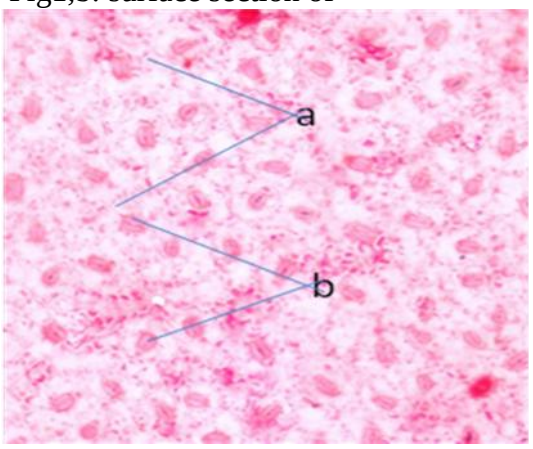

Fig1,a: a-Cuticle, b-upper epidermis, c-parenchyma, d-palisade cells, e-xylem, f-phloem, g-bundle sheath, h-ground tissue, i-collenchymas, j-lower epidermis.

Fig1,b: a- polygonal epidermis, b-diacytic stomata

Fig1,c: Epidermal cells

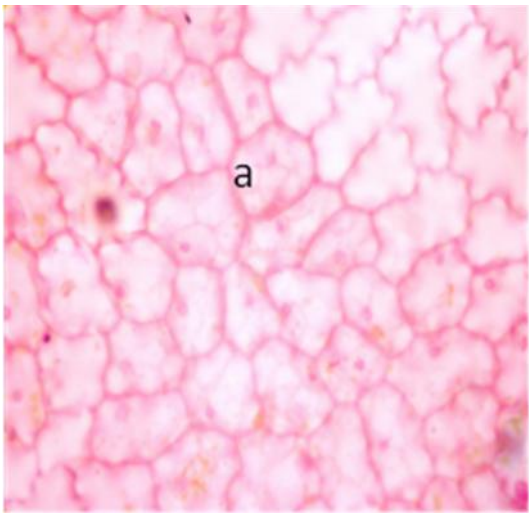

Fig1,c: a-polygonal epidermal cells

Fig 1:a,b,c anatomical structure of leaf *S.jamaicensis*

Phytochemical Studies:

Phytochemical screening indicated the chemical profile of S.jamaicensis leaves and revealed 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(table:2).

Table :2 phytochemical studies of leaf of *Stachytarpheta jamaicensis*(L)Vahl

S.N.	Phytochemicals	Petroleum ether(blackish green)	Chloroform (brownish green)	Ethyl acetate(blackish green)	Distilled water(brownish green)
01	**Carbohydrates**				
	a.Molish's test	–	–	–	–
	b.feling's test	–	–	–	–
	c. barfoed's test	–	–	–	–
	d. benedict's test	–	–	–	–
02	**Proteins and amino acids**				
	a.millon's test	–	–	–	–
	b.biuret test	–	–	–	–
	c.ninhydrin test	–	–	–	–
	d.hopkinscole test	–	–	–	–
03	**Alkaloids**				
	Mayer's test	–	–	+	+
	Wagners test	+	–	+	+
	Hager's test	+	–	+	+
	Dragendorff's test	–	+	+	+
04	**Phenolic compounds and tannins**				
	a.ferric chloride test	+	+	+	+
	b.gelatin test	+	+	+	+
	c. lead acetate test	+	+	+	+
	d. alkalin reagent test	+	+	+	+
	e. magnesium and hydrochloric acid reduction test	+	+	+	+
05	**Flavonoids**	+	+	+	+
06	**Saponins**	+	–	–	+
07	**Phytosterols**				
	a.librmann burchard's test	–	–	–	–
	b.salkowsti's test	–	–	–	–
08	**Fixed oils and fats**	–	–	–	–
09	**Gums and musilages**	+	–	–	+
10	**Terpenoids**	–	–	+	+
11	**Glycosides**				
	a.borntrager's test	–	–	+	+
	b.legal's test	–	–	+	+
	c.libermann's test	+	–	+	+
	d.salkowski's test	–	–	+	+
	e. keller-kilani test	+	+	+	+

Conclusion:

The Morpho-anatomical and preliminary phytochemical evaluation of Stachytarpheta jamaicensis (L) Vahl. leaves can provide useful information for identification and authentication of plant. The majority of the information on the identity, purity and quality of the plant material can be obtained from its macroscopy, microscopy and preliminary phytochemical parameters.

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