EUROPEAN JOURNAL OF BIOMEDICAL AND PHARMACEUTICAL SCIENCES
http://www.ejbps.com

ISSN 2349-8870
Volume: 5
Issue: 4
404-409
Year: 2018

PHARMACOGNOSTICAL EVALUATION OF *NEELPUSHPI APAMARGA* (*STACHYTARPHETA JAMAICENSIS* (L.) VAHL)

Rupesh Kumar Sanger*[1], Dinesh Chandra Singh[2] and Suresh Chaubey[3]

[1]Assistant Professor, Department of Agad Tantra, J.D. Ayurvedic Medical College, Aligarh.
[2]Professor and Head, Department of Dravyaguna, Rishikul Campus Haridwar, Uttarakhand Ayurved University.
[3]Professor, Department of Dravyaguna, Rishikul Campus Haridwar, Uttarakhand Ayurved University.

***Corresponding Author: Dr. Rupesh Kumar Sanger**
Assistant Professor, Department of Agad Tantra, J.D. Ayurvedic Medical College, Aligarh.

Article Received on 23/01/2018 **Article Revised on 12/02/2018** **Article Accepted on 04/03/2018**

ABSTRACT
Nighantu Adarsha has mentioned a special variety of *Apamarga i.e Neelpushpi Apamarga*, which contains a very good amount of *Kshara* in it. Morphologically a plant named *Stachytarpheta jamaicensis* (L.) Vahl seems to be very nearer to *Neelpushpi Apamarga*. But further Pharmacognostical and Phytochemical study of this very plant is required to establish the botanical identity of the *Neelpushpi Apamarga*. Botanical identity of *Neelpushpi Apamarga* was established as *Stachytarpheta jamaicensis* (L.) Vahl as it contains a good amount of *Kshara* in it, even more than *Achyranthes aspera* Linn, which was proved by physicochemical study. It was further supported by the morphological features and ethnobotanical studies. Ethnobotanically *Stachytarpheta jamaicensis* is used in respiratory disorders like Asthma and Bronchitis. It was also used in digestive problems like constipation and said to be hypotensive. It is also abortive in nature just like *Apamarga*. Total ash present in *Stachytarpheta jamaicensis* (L) Vahl was 18.54%, Acid insoluble ash was 6.74% while Water soluble ash was 10.37%. *Stachytarpheta jamaicensis* can be taken as *Ramatha* (a type of *Apamarga* described by *Kaideva Nighantu*) or not it is not still clear but its morphological features, ethnobotanical uses and certain phytochemical study very much indicates that this plant is very nearer to *Neelpushpi Apamarga* described in *Nighantu Adarsh*. So *Stachytarpheta jamaicensis* (L) Vahl can be taken as the probable Latin name of *Neelpushpi Apamarga*.

KEYWORDS: *Neelpushpi Apamarga, Toyapamarga, Stachytarpheta jamaicenisis* (L) Vahl.

INTRODUCTION
Kaideva Nighantu has mentioned a different variety of *Apamarga* i.e *Ramatha* and gave its synonym *Toyapamarga (Jalapamarga)*, means found on water sides.[1] J.L.N. Sastry while describing this plant took this plant as blue variety but with a question mark on it.[2] A plant *Stachytarpheta jamaicensis* (L.) Vahl. can be taken as blue variety of *Apamarga* as it has similar morphological features as that of *Apamarga*, has blue flowers and grow on water sides.

Nighantu Adarsha has mentioned a different variety of *Apamarga* i.e *Neelpushpi Apamarga*. *Stachytarpheta jamaicensis* (L.) Vahl. should be taken as *Neelpushpi Apamarga*.

Stachytarpheta jamaicensis, commonly known as light blue snake weed belongs to the family Verbenaceae. It is commonly known as Kandikandilaan. It is an annual weedy herbaceous plant, sometimes perennial, that grows 60-120 cm tall and is reproduced from seeds. This plant can be found on Street. Croix growing along roadsides and on disturbed sites, grassfields, brushwood, young forest, watersides and moreover cultivated as a hedge-plant. It belongs to the family Verbenaceae, which consists of 2600 species and 100 genera.[3]

It is a herb/shrub. Leaves usually opposite, toothed. Flowers in long slender terminal spikes in the axils of bracts often closing an excavation of the rachis in which they lie; bracts usually lanceolate; bracteoles 0. Calyx narrowly tubular, shortly 4-5 lobed, often slit at the back when in fruit. Corolla slaver- shaped, tube slender, cylindric, usually curved, limb spreading, 5 lobed, the lobes rounded, obtuse or retuse, equal or unequal, stamens 2, perfect, included, with 2 or no staminodes; filament short; anthers-cells divaricate. Ovary 2 celled; ovule solitary per cell, attached laterally near the base; style filiform; stigma capitates. Fruit schizocarpous, dry, cylindric, enclosed in the calyx-tube, separating into 2 hard, 1 seeded, usually phano-convex pyrenes. Seeds oblong; testa membranous.[4]

Ethnobotany: *S. jamaicensis* is an antacid, analgesic, anti-helmenthic, anti-inflammatory, diuretic, hypotensive, laxative, lactogogue, purgative, sedative,

stomachictonic, spasmogenic and vermifuge. 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.[5]

MATERIAL AND METHODS

Collection: The genuine sample of *Neelpushpi Apamarga (Stachytarpheta jamaicensis* (L.) Vahl*)* was collected from Bhubaneswar, Orissa. A herbarium was also prepared for the plant and was authenticated at Botanical Survey of India (BSI), Dehradun.

Macroscopic and Microscopic evaluation: The collected genuine sample was dried and studied macroscopically with naked eye, magnifying lens and measuring tape with the help of Pharmacognostical parameters i.e shape, size, surface, colour, odour and taste and findings were recorded. The microscopic characters were studied through Transverse section (T.S) and Powder microscopy.

Physicochemical Study: Physicochemical parameters like moisture content, ph value, alcohol extractive value, water extractive value, total ash, acid insoluble ash etc. were recorded for different samples.

Phytochemical Study: Freshly prepared extracts were tested for the presence of various active phytocompounds like carbohydrates, alkaloids, amino acids, proteins, glycosides, phenolic compounds, saponins, flavonoids, tannins etc.

Chromatographic Study: Thin Layer Chromatography (TLC) was performed and R_f values were recorded.

OBSERVATION AND RESULTS

1. Macroscopic comparison of *Apamarga* (*Achyranthes aspera*) and *Neelpushpi Apamarga* (*Stachytarpheta jamaicensis*).

S.N		*Apamarga*	*Neelpushpi Apamarga*
1.	**Latin Name**	*Achyranthes aspera* Linn.	*Stachytarpheta jamaicensis* (L.) Vahl.
2.	**Plant**	Erect weedy herb, 30-90 cm tall	Erect weedy herb/shrub, 60-120 cm tall
3.	**Root**	Tap root	Tap root
4.	**Stem**	Angular	Angular
5.	**Leaf**	Opposite or alternate with smooth margin	Usually opposite with toothed margin
6.	**Flower**	Greenish white or red, bract present	Blue, bract present
7.	**Inflorescence**	Spike up to 8-30 cm	Spike up to 40-45 cm long
8.	**Seed**	Inverse, get pricked on touch	Seeds are embedded in spike, do not get pricked on touch

2. Microscopic characters of different parts of *Neelpushpi Apamarga (Stachytarpheta jamaicensis)* in transverse section (T.S)

a. Root: In the transverse section of root the epidermis is replaced by peridermis. On the inner side of periderm cortex was noticed. Schlerenchyma was seen as a ring in the roots. In the middle, xylem tissue occupies a large area, just below the phloem tissue.

b. Stem: Outer thick layer of cuticle and single layered epidermis seen followed by chlorochymatous tissues. The collenchymas cells were present in between the epidermis and chlorochymatous cells. The vascular bundle was surrounded by parenchymatous pith. Xylem was present on the inner side while phloem on the outer side.

c. Leaf: The epidermal cells covered with thick cuticle ware noticed. The epidermal cells were elongated and arranged irregularly in various directions. The upper epidermis and palisade parenchyma were 4 layered. The vascular bundles were arranged by xylem towards inner side and phloem towards outer side.

d. Seed: Outer most single layered testa was present. 1 seeded separated into two hard pyrenes.

3. Powder microscopy of *Neelpushpi Apamarga* (*Stachytarpheta jamaicensis*): Powder microscopy showed the presence of starch, cellulose, mucilage, cutin, cell nuclei and lignin.

4. Physicochemical Study

S.No.	Parameter	Result
1.	Moisture content	11.37 %
2.	pH value	6.2
3.	Total Ash	18.54 %
4.	Acid Insoluble Ash	6.74 %
5.	Water Soluble Ash	10.37 %
6.	Aqueous Extractive value	19.44 %
7.	Alcohol Extractive value	28.68 %
8.	Petroleum Eather Extractive value	4.63 %

5. Phytochemical Study

A. Test for Carbohydrate.

Sample	Name of Test	Aqueous extract	Alcohol extract	Petroleum ether extract
Whole plant of *Stachytarpheta jamaicensis*	Molisch test	+ve	-ve	+ve
	Benedict test	-ve	-ve	-ve
	Barfoed's test	-ve	-ve	+ve
	Fehling test	+ve	+ve	+ve

B. Test for Alkaloid.

Sample	Name of Test	Aqueous extract	Alcohol extract	Petroleum ether extract
Whole plant of *Stachytarpheta jamaicensis*	Dragondrof test	+ve	+ve	+ve
	Mayer's test	+ve	+ve	+ve
	Wagner's test	+ve	+ve	+ve
	Hager's test	+ve	+ve	+ve

C. Test for Amino acid.

Sample	Name of the Test	Aqueous extract	Alcohol extract	Petroleum ether extract
Whole plant of *Stachytarpheta jamaicensis*	Ninhydrine test	+ve	+ve	-ve

D. Test for Proteins.

Sample	Name of the Test	Aqueous extract	Alcohol extract	Petroleum ether extract
Whole plant of *Stachytarpheta jamaicensis*	Biuret test	-ve	-ve	-ve
	Xanthoprotic test	+ve	+ve	-ve
	Millon's test	-ve	-ve	-ve

E. Test for Saponin.

Sample	Name of the Test	Aqueous extract	Alcohol extract	Petroleum ether extract
Whole plant of *Stachytarpheta jamaicensis*	Foam test	+ve	-ve	-ve

F. Test for Glycosides.

Sample	Name of the Test	Aqueous extract	Alcohol extract	Petroleum ether extract
Whole plant of *Stachytarpheta jamaicensis*	Borntragor's test	+ve	+ve	+ve

G. Test for Phenolic compounds.

Sample	Name of the Test	Aqueous extract	Alcohol extract	Petroleum ether extract
Whole plant of *Stachytarpheta jamaicensis*	Phenolic test	-ve	+ve	-ve

H. Test for Steroids.

Sample	Name of the Test	Aqueous extract	Alcohol extract	Petroleum ether extract
Whole plant of *Stachytarpheta jamaicensis*	Salkowaski reaction	+ve	+ve	+ve

I. Test for Tannins.

Sample	Name of Test	Aqueous extract	Alcohol extract	Petroleum ether extract
Whole plant of *Stachytarpheta jamaicensis*	$Fecl_3$ test	+ve	+ve	-ve
	Lead acetate test	+ve	+ve	+ve
	Potassium dichromate test	-ve	+ve	-ve
	Gelatin test	+ve	+ve	+ve

J. Test for Flavonoid.

Sample	Name of the Test	Aqueous extract	Alcohol extract	Petroleum ether extract
Whole plant of *Stachytarpheta jamaicensis*	Shinods test	-ve	+ve	-ve

6. Chromatographic Study

A. TLC (Thin Layer Chromatography) analysis

Solvent system: Toluene: Methanol: Formic acid (7.8:2.2:0.75 ml).

Sample: Ethanol Extract.

Visualization: Iodine Vapour.

TLC Profile of samples on Silica Gel GF 254.

Sample	No. of Spots	R_f Value
Whole plant of *Stachytarpheta jamaicensis*	5	0.23, 0.49, 0.56, 0.68, 0.75

B. HPLC (High Performance Liquid Chromatography) analysis for alkaloid percentage.

Sample	Weight of Sample	Weight of alkaloid	Alkaloid %
Whole plant of *Stachytarpheta jamaicensis*	5.0 gm	0.00210 gm	0.042 %

Study Photographs

1. Transverse section of different parts of *Stachytarpheta jamaicensis*(L) Vahl.

Note: [co-cortex, per-periderm, Ph- phloem, X- xylem, ep- epidermis, col- collenchyma, cht- cholorochymatous tissue, pt- pith, ue- upper epidermis, le- lower epidermis, gt- ground tissue, sc- seed coat, mes- mesoderm, cot- cotyledon]

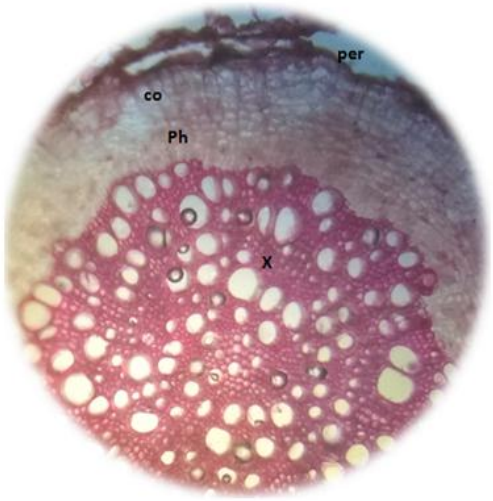


Figure 1.1 T.S of root of *Stachytarpheta jamaicensis.*

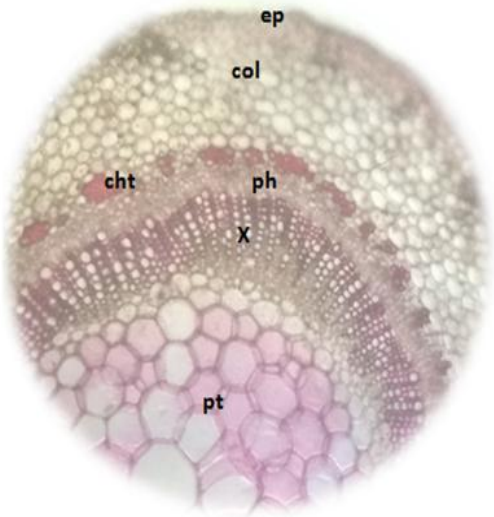


Figure 1.2 T.S of stem of *Stachytarpheta jamaicensis.*

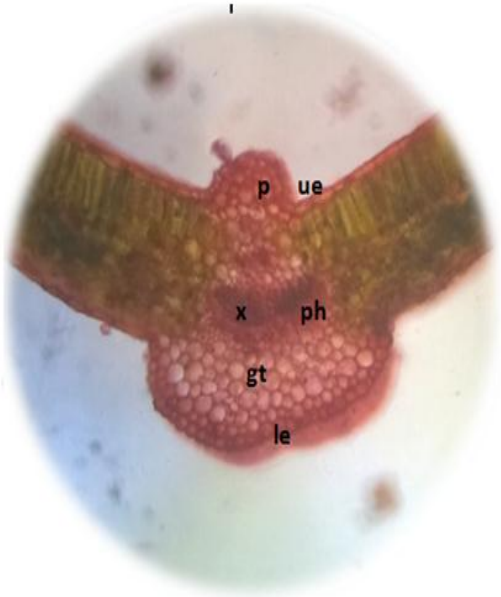
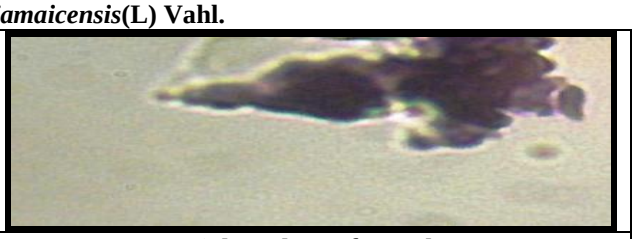
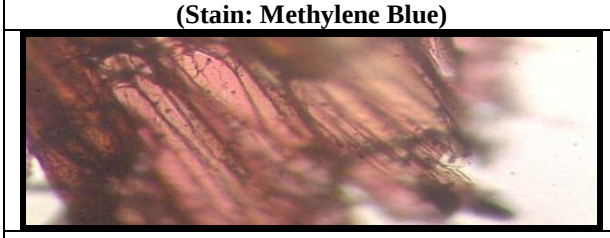
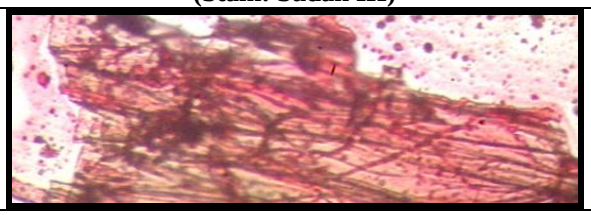


Figure 1.3 T.S of leaf of *Stachytarpheta jamaicensis.* Figure 1.4 T.S of stem of *Stachytarpheta jamaicensis.*

2. Powder Microscopy of whole plant of *Stachytarpheta jamaicensis*(L) Vahl.

	
Deep Blue colour of Mucilage (Stain: Methylene Blue)	**Violet colour of Starch Stain: Iodine Solution**
	
Red colour of Cutin (Stain: Sudan III)	**Pale yellow colour of Cellulose (Stain: Iodine Solution)**
	
Red colour of Lignine (Stain: Phlorogucinol + HCl)	**Red colour of cell nuclei (Stain: Saffarinin)**

3. Thin Layer Chromatography of Whole plant of *Stachytarpheta jamaicensis* (L) Vahl.

Samples	Whole plant of *Stachytarpheta jamaicensis* (L) Vahl.
TLC Plate	
R_f Value	0.23, 0.49, 0.56, 0.68, 0.75

DISCUSSION

Stachytarpheta jamaicensis looks very similar to *Apamarga*, except having blue colour flowers and their seeds are not pricky. In ethnobotanical studies, *Stachytarpheta jamaicensis* is used in respiratory disorders like Asthma and Bronchitis. It was also used in digestive problems like constipation and said to be hypotensive. It is also abortive in nature just like *Apamarga*. *Nighantu Adarsha* has mentioned that *Neelpushpi Apamarga* has good amount of *Kshara* in it. Phytochemical study has proved that *Stachytarpheta jamaicensis* has a good amount of *Kshara* in it. Further similarity in the phytochemical study has made it clear to take *Stachytarpheta jamaicensis* as *Neelpushpi Apamarga*.

CONCLUSION

The morphological features, ethnobotanical study and phytochemical study indicates that *Stachytarpheta jamaicensis* (L) Vahl can be taken as the probable Latin name of *Neelpushpi Apamarga* mentioned in *Nighantu Adarsh*.

REFERENCES

1. Acharya P.V. Sharma & Dr. Guru Prasad Sharma, *Kaideva Nighantu*, Chaukhambha Orientalia, Edition, 2006; Pg. no. 192.
2. Sastrey J.L.N, *Dravyaguna Vigyana*, Vol II, Chaukhambha Orientalia, Varanasi, Edition, 2005; 444.
3. *R. Sivaranjani et al* Morpho-Anatomical And Preliminary Phytochemical Studies Of The Leaf Of Stachytarpheta jamaicensis (L) Vahl., International Journal of PharmTech Research CODEN (USA): IJPRIF, April-June 2013; 5(2): Pg. no. 577-582.
4. Saxena H.O & Brahmam M, The Flora of Orissa, Volume III, Regional Research laboratory and Orissa Forest Development Corporation Ltd., Printed by Capital Business Service & Consultancy Bhubaneswar, Edition, 1995; 1424.
5. *R. Sivaranjani et al* Morpho-Anatomical And Preliminary Phytochemical Studies Of The Leaf Of Stachytarpheta jamaicensis (L) Vahl., International Journal of Pharm Tech Research CODEN (USA): IJPRIF, April-June 2013; 5(2): 577-582.