

Pharmacology and Morphology of Some Species of *Adhatoda Vasica*

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ABSTRACT:

Secondary metabolites got from customary therapeutic plants are known to assume godlike parts in antiquated and present day Medicinal framework. These mixtures are ecofriendly and go about as adaptable wellspring of agrochemicals and different medications. Further, these mixtures have shown various organic exercises like sterile, hostile to asthmatic, diuretic, antispasmodic, antipyretic, diaphoretic, pain relieving, calming, fungicidal, herbicidal, insecticidal, creepy crawly repellent and so on Along these lines, in the current occasions new and effective approaches are should have been created for the creation of medications and agrochemicals of plant beginning. *Adhatoda vasica* ordinarily known as *Vasaka* in Ayurveda has a place with family *Acanthaceae*. This plant has been utilized in the native arrangement of medication in India for more than 2000 years. *A. vasica* is a decent wellspring of pyrroloquinazoline alkaloids, for example, vasicine, vasicol, adhatonine, vasicinone, vasicinol, vasicinolone and so on, which are the main constituents of various concentrates of the plant. These mixtures have shown numerous natural and pharmacological exercises viz. hostile to malarial, calming, cell reinforcement, antidiabetic, against bacterial, hostile to malignancy and so forth Further, *Adhatoda* leaves have been utilized widely in Ayurvedic medication for the treatment of looseness of the bowels, diarrhea, tuberculosis, skin sicknesses, regurgitating and disease and so forth This paper audits the morphology and pharmacological capability of *A. vasica*.

Key words: *Adhatoda vasica*, secondary metabolites, pyrroloquinazoline alkaloids, biological activities.

INTRODUCTION:

Medicinal plants, (rich bio-assets of medications of conventional frameworks of prescriptions, present day meds, nutraceuticals, food supplements, society meds, drugs intermediates and substance elements for engineered drugs) normally incorporate and amass naturally dynamic optional metabolites, similar to alkaloids, sterols, terpenes, flavonoids, saponins, anthraquinones, glycosides, tannins, gums, lactones, quinines, unpredictable oils and so on that have been extricated and utilized in various structures like mixtures, syrups, inventions, decoctions, injected oils, fundamental oils, salves and creams for the prosperity of human existence. Conventional medication (Ayurveda, Unani, Homeopathy, Naturopathy, Siddha therapeutic framework), as old as the beginning of man has been accounted for to be mainstream among more than two-third of the total populace (essentially in the agricultural nations: WHO 80%) for essential wellbeing care. A various groups of Medicinal plants exist, out of which *Euphorbiaceae*, *Asteraceae*, *Labiatae*, *Fabaceae*, *Meliaceae* and *Solanaceae*, *Acanthaceae* end up being critical. The metabolites separated from the plants of these families show critical organic exercises with an extraordinary notice of *Acanthaceae* family. Generally spread *Adhatoda vasica* (presently *Justicia Adhatoda*) of family *Acanthaceae*—a notable medication plant in Ayurvedic and Unani medication has been known to have colossal natural potential. The plant has been utilized in the native arrangement of medication in India for over 2000 years.

1. Justicia Adhatoda:

Synonyms: Adhatoda arborea RAF, Adhatoda adhatoda (L.)Huth, Adhatoda pubescens Moench, Adhatoda vasica Nees, Adhatoda zeylanica Medic, Dianthera latifolia Salisb, Ecobolium adhatoda (L.)Druce, Gendarussa adhatoda (L.)Steud, Justicia caracasana Sieber ex Nees.

Biological Sources: Also known as adhatoda vasica or Malabar nut. It has a place with the Acanthaceae family. The natural wellsprings of vasaca is dried and new leaves of this plant.

Classification:

Kingdom: Plantae

Subkingdom: Tracheobionta

Division: Magnoliophyta

Class: Magnoliopsida

Subclass: Asteridae

Order: Lamiales

Family: Acanthaceae

Genus: Adhatoda

Species: Vasica

Compound Constituents: The leaves of Justicia Adhatoda contains phytochemicals such alkaloids,

tannins, saponins, phenolics and flavonoids. The most significant is vasicine, a quinazoline alkaloids. The vasicine yield of the herbage has been estimated as 0.54 to 1.1% by dry weight. Bromhexine, a serine protease inhibitor with mucolytic properties accessible over the counter in Europe, was initially gotten from Justicia Adhatoda.

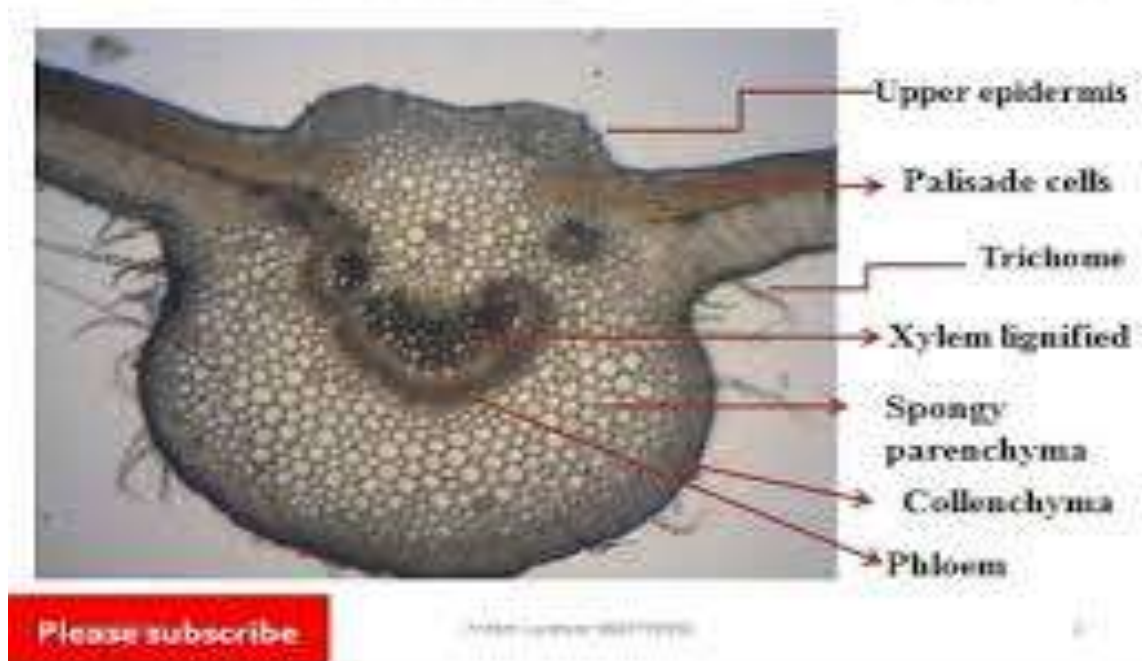
Description: A firm, evergreen, much-spread enduring bush with solid disagreeable request 1.226m tall leaves inverse, elliptic-lanceolate or praise lanceolate, edges whole, pinnacle intense, 5 to 30cm long, bushy, light green above, dim underneath, weathered. Blossoms huge, white with red or yellow-banished throats, borne incompact, axillary, pedunculate demonstrates hatred for with enormous bracts. Natural products (container) clavate, longitudinally directed, 1.9 to 2.2cm long and 0.8cm wide, pubescent. Seeds globular.

Uses: In Ayurvedic medication, Malabar nut (Adhatoda Vasica) has been utilized for a large number of confusion including; bronchitis, thirst, asthma, fever, retching, loss of memory, leucoderma, jaundice, tumors, mouth inconveniences, sore-eye, fever, and gonorrhoea.

Diagram:



Transverse section of Vasaka leaves



2. *Justicia procumbens*:

Synonyms: *Ecbolium procumbens* (L.) Kuntze, *Justicia hayatai* var. *decumbens* Yamam, *Justicia procumbens* var. *hirsuta* Yamam, *Justicia procumbens* var. *linearifolia* Yamam, *Rostellaria procumbens* (L.) Nees, *Rostellularia procumbens* (L.) Nees, *Rostellularia procumbens* var. *hirsuta* (Yamam.) S.S.Ying, *Rostellularia procumbens* var. *linearifolia* (Yamam.) S.S. Ying, *Rostellularia trichochila* Miq.

Biological Sources:

1. Worldwide Distribution
Indo-Malesia and Australia
2. Indian appropriation
State - Kerala, District/s: All Districts

Classification:

Kingdom: Plantae
Subkingdom: Tracheophytes
Division: Angiosperms
Class: Eudicots
Subclass: Asterids

Order: Lamiales
Family: Acanthaceae
Genus: *Justicia*
Species: *J Procumbens*

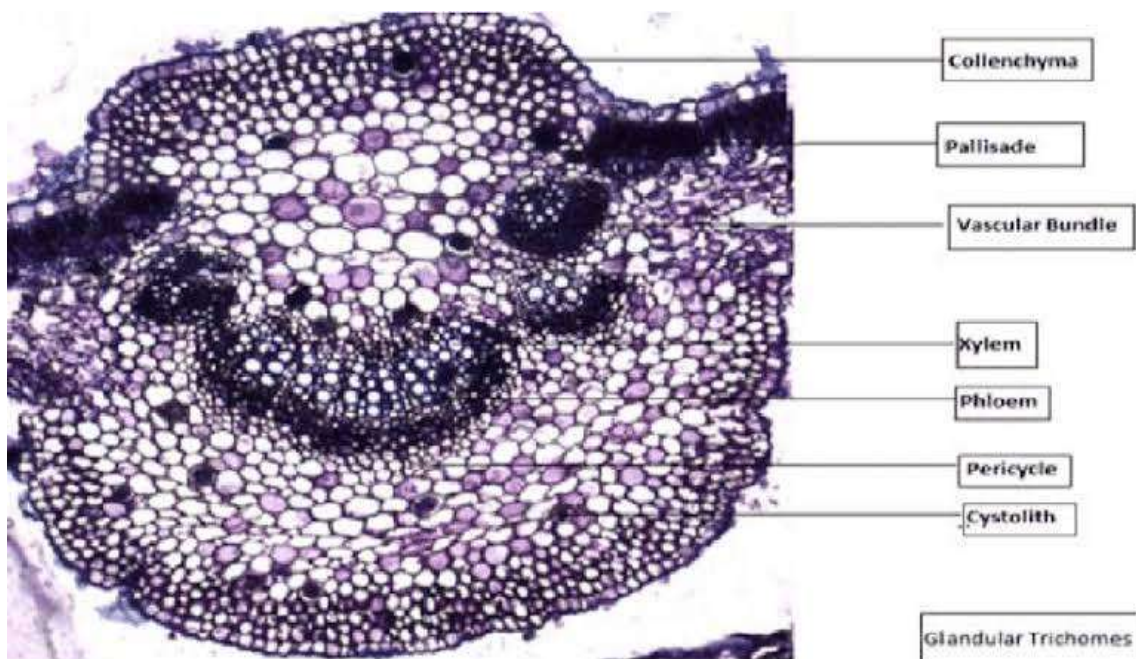
Chemical Constituents: A wide assortment of organically dynamic constituents like flavonoids, alkaloids, steroids, terpenoids, saponins, phenolic mixtures and carbs are available in this plant.

Description: *Justicia procumbens* is a types of bush in the family Acanthaceae. They have a self-supporting development structure. They have straightforward, wide leaves. Blossoms are visited by invalid, *Lasioglossum occidens* (Smith 1873), *Bombus diversus* Smith 1869, and *Paragus*.

Uses: The plant is alterative, anthelmintic, antiphlogistic, depurative, diaphoretic, diuretic, expectorant, febrifuge and purgative. A decoction or a mixture is utilized in the treatment of asthma, hack, spinal pain, fart and many skin conditions.



Diagram:



3. Justicia gendarussa:

Synonyms: Gendarussa vulgaris Nees

Biological Sources: Distributed in Sri Lanka, India, and Malaysia.

Classification:

Kingdom: Plantae

Subkingdom: Tracheophytes

Division: Angiosperms

Class: Eubicots
Subclass: Asterids
Order: Lamiales
Family: Acanthaceae
Genus: Justicia
Species: J.Gendarussa

Chemical constituents: Justicia gendarussa Burm f. (family Acanthaceae) known as Willow-leaved Justicia in English, it is local to china. A wide assortment of organically dynamic constituents like flavonoids, alkaloids, steroids, terpenoids, saponins, phenolic mixtures and sugars are available in this plant.

Description: Habit-Undershrub Bushes, branches dim purple, terete, smooth. Leaves 7-10 x 2cm,

straight or oval lanceolate, summit intense or uncaring, base intense, chartaceous, glabrous, sidelong nerves 5-7 sets, somewhat blue; petiole 2-3mm long. Spikes terminal to 8cm long, slender; bracts direct 4mm long. Blossoms white; calyx flaps direct lanceolate, 5mm long; corolla white with purple streaks, 1.5 cm long; ovary and style puberulus. Case 12mm long, glabrous.

Uses: The leaves of Justicia gendarussa are utilized in the society medication for the treatment of different infirmities like rheumatic agony, jaundice, cephalgia, hemiplegia and skin inflammation, and so on

Diagram:



4. Justicia Japonica Thunb. :

Synonyms: Justicia procumbens var. simplex (D. Wear) Yamazaki, Justicia simplex D.Don, Rostellaria rotundifolia Nees, Rostellularia japonica (Thunb.) J.L. Ellis

Biological Sources:

1. Global Distribution
Indo-Malesia and East Africa
2. Indian Distribution
State – Kerala, District/s: Pathanamthitta, Wayanad
India: Throughout India; Sri Lanka
4. Local Distribution

Bongaigaon, Lakhimpur, Kamrup, Barak Valley
5. Maharashtra: Nashik, Pune, Raigad, Kerala: All areas
Tamil Nadu: Coimbatore, Dharamapuri, Dindigul, Erode, Kanniyakumari, Namakkal, Nilgiri, Salem, Theni, Tirunelveli, Tiruvannamalai, Vellore, Viluppuram, Virudhunagar

Classification:

Kingdom: Plantae
Subkingdom: Tracheophytes
Division: Angiosperms
Class: Eudicots

Subclass: Asterids
Order: Lamiales
Family: Acanthaceae
Genus: Justicia
Species: *J. japonica*

Description: Erect or decumbent spires, branchlets strigose-hispid. Leaves to 2 x 1.5 cm, praise or direct, summit intense, scantily scabrous above and strigose beneath, parallel nerves 5-7 sets; petiole to

2mm long. Spike 4-8 cm, cylindrical; bracts and bracteoles praise, scarious-margined, delicately furry, 4mm long; calyx flaps direct, edges scarious, ciliate, 4mm long, pink. Case pubescent, 4mm long. Seeds 1mm long, concentrically rugose.

Uses: It is used in herbal drugs against tubular activities, cancer and possessed anti-helmitic properties.

Diagram:



5. Justicia Betonica:

Synonyms: Adhatoda arenaria Nees;
Adhatodabetonica (L.) Nees;
Adhatodacheiranthifolia Nees; Adhatoda lupulina (E. Mey.) Nees; Adhatodamosissima (Roxb.) Nees; Adhatodatrineria (Vahl) Nees;
Adhatodavariegata Nees; Diclipterallupulina Pres.;
Diclipteratrineria (Vahl) Juss.; Ecboliumbetonica (L.) Kuntze; Ecboliumtrinerium (Vahl) Kuntze;
Gendarussaarenaria (Nees) Steud;
Gendarussabetonica (L.) Nees ex Steud. ;
Gendarussatrineria Nees ex Steud. ;
Gendarussavariegata Hochst. Ex Nees;
Justicia antidota Sm. ex T. Anders. ;
Justiciabetonicifolia Hort. Berol. Ex Nees;
Justiciabetonicoides C. B. Cl. ;
Justicia cheiranthifolia (Nees) C. B. Cl. ;
Justicialupulina E. Mey. ; Justiciapallidior (Nees) C. B. Cl. ;
Justicia pseudo-betonica Roth. ;
Justiciamosissima Roxb. ; Justiciatrineria Vahl;
Justiciauninervis S.Moore; Justiciavariegata (Nees) Martelli; Nicotebabetonica (L.) Lindau;
Nicotebatrineria (Vahl) Lindau

Biological sources:

1. Global Distribution:
India: Throughout India; Sri Lanka, Indo-Malesia and East Africa
2. Neighborhood Distribution:
Bongaigaon, Lakhimpur, Kamrup, Barak Valley
3. Indian dissemination:
State - Kerala, District/s: Pathanamthitta, Wayanad

Classification:

Kingdom: Plantae
Subkingdom: Tracheobionta
Superdivision: Spermatophyta
Division: Magnoliophyta
Class: Magnoliopsida
Subclass: Asteridae
Order: Scrophulariales
Family: Acanthaceae
Genus: Justicia L.
Species: Justicia Betonica L.

Chemical Constituents: Betonica have steroids and triterpenoids, alkaloids and saponins and these mixtures are accounted for to be dynamic against

intestinal sickness parasite (Bbosa et al., 2013). - (1→2)- b-D-glucopyranosyl-(1→2)- b-D-glucopyranoside (Kanchanapoom et al., 2004).

Description: Squirrel Tail. Squirrel tail is an effortless and rich plant, local to India. An excellent strange shrimp plant, uncommon. Very floriferous plant delivering in wealth erect white bracts with a green netting design.

Uses: *Justiciabetonica* L., family Acanthaceae is a generally utilized conventional people Medicinal spice. It's anything but a special wellspring of jusbetonin and the leaves yield somewhat blue purple color. Generally, the plant is utilized to fix clogging, loose bowels, jungle fever, orchitis, torment, snake nibble, stomach hurt, regurgitating and so forth The entire plant have critical naturally dynamic standards like steroids, triterpenoids, alkaloids, saponins, glycosides, sugars, gum and adhesive, proteins, fixed oils and fat, phenolics and tannins. It is accounted for to show antiviral, cancer prevention agent, mitigating, pain relieving and antimalarial exercises. The aim of the investigation was to enrich an outline of the ethnomedicinal properties, phytochemistry and related pharmacological uses of *J. betonica*, and to make a confirmed proof base for additional exploration on this significant Medicinal plant.

Diagram:



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Table:

	Justicia adhathoda	Justicia procumbens	Justicia japonica	Justicia gendarussa	Justicia betonica
SYNONYMS	Adhathoda vasica	Justicia micrantha	Justicia japonica	Gendarussa vulgaris	Adhathoda betonica (L.) Nees
PARTS USED	Fresh and dried leaves.	Fresh and dried leaves.	Fresh and dried leaves.	Fresh and dried leaves.	Fresh and dried leaves.
BIOLOGICAL SOURCES	Topical region of southeast Asia.	Maleshia, austrelia, India.	Maleshia, East Africa, India, sri lanka.	Topical Asia and Africa.	North Africa, westen Asia, Europe.
CHEMICAL CONSTITUENT S	Alkaloids (0.25), quinazoline types: vasicine, Oxyvasicine, vasicinone; essencial oil: adhathodic acid.	Menthol extract, naphthalide ligans.	O methyl ether, friedenlin, lupeol.	O-di- substituted aromatic amines, campneoside II, forsythoiside B	Phenylthanoi d glycosides, acetosides isomer,
DISCRIPTION	In diffuse form, brached, evergreen shrub.	Diffuse herb, branched.	Erect or decumbent herbs, branched lets Strigose- hispid.	Shrubs, branches dark purple, terete, smooth.	A gregarious shrub, up to 2m.
USES	Expectorant; oxytotic; abortifacient.	Anti-HIV, antiviral, anticancer, anti- hepatitis.	Used in chest diseases, rheumatism, fever, Antispasmodic , antiseptic, diuretic.	anti- inflammatory , antibacterial activity Against both gram-positive & gram- negative.	antidotes for venomou stings, bites,etc.
DIFFERENCE IN T.S.	T.S. of leaf through midrib showing ground tissue of Collenchyma cells with abudant cytolith and Grandular Trichomes.		T.S. of leaf shows midrib shows single layer	T.S. of lamina with midrib(2x) showing Epidermal, Collenchyma, Collenchyma, Xylem, Phloem. Lamina	With Pallisade and Mesophyll.