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A COMPREHENSIVE LITERARY REVIEW OF *VATA – FICUS BENGHALENSIS* LINN

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ABSTRACT

Vata (*Ficus benghalensis* Linn) is a large evergreen tree with numerous horizontally spreading branches that throws down aerial roots that may touch ground. It is described as an immensely useful medicinal plant because most of its parts like stem bark, root bark, aerial roots, leaves, tender leaves, leaf bud, fruit and latex possess therapeutic potency. The stem bark of *Vata* is commonly used along with barks of *Aswatha*, *Plaksha*, *Udumbara* and *Parisha* which constitue *Panchavalkala*. A thorough literary review of Ayurvedic text books, pharmacognosy textbooks and published research articles has been undertaken to compile more information about the drug. The drug has been described beautifully by a handful of synonyms like *nyagrodha*, *padaroha*, *raktaphala* etc in *nighantus*. Its pharmacological properties include *kashaya rasa*, *guru*, *ruksha guna*, *katu vipaka* and *seeta veerya*. The drug is *Kaphapitta samaka* in action and proves effective in *yonidosha*, *raktapradara*, *raktapitta*, *pumsavana*, *vrana*, *visarpa*, *daha*, *jwara*, *sopha* and *twakroga*. Pharmacological activities of *Vata* like antidiarrhoeal, antiulcer, anti-inflammatory, antipyretic, antidiabetic etc have been understood from various experimental studies.

Key words: *Vata* (*Ficus benghalensis* Linn), Ayurvedic drug review, Pharmacognosy, Pharmacological activities

INTRODUCTION

Vata is botanically identified as *Ficus benghalensis* Linn belonging to Moraceae family.[1] The etymology of word *Vata* reveals that it spreads in large area and appears as if surrounded by aerial roots.[2] The English name Banyan is given by the British because under this tree Banias i.e., the Hindu merchants used to assemble for business. It is considered as the National Tree.[3] The description of *Vata* can be obtained from ancient *Vedas*, *Samhitas* and *Nighantu*. This work encompasses a comprehensive literary review of *Vata* (*Ficus benghalensis* Linn) which includes compiling the *vargas* to which it belongs, various synonyms, therapeutic properties and action, therapeutic indications, various useful parts, dosage, therapeutic uses, important formulations, detailed taxonomy and pharmacological activities.

MATERIALS AND METHODS

A thorough literary search of various classical literatures, Ayurvedic text books, text books on pharmacognosy and published research articles has been undertaken for the present review on Vata (*Ficus benghalensis* Linn).

RESULTS AND DISCUSSION

A. Historical background

The description of *Vata* (*Ficus benghalensis* Linn) is available since Vedic period. It symbolizes three Gods of Hindus. The roots, barks and branches represents Lord Vishnu, Brahma and Siva respectively. As per Vedic literature, the *Vata* checks environmental pollution and is one among the source of *Laksha*.[3] During *Samhita* period, *Vata* was included under *Nyagrodhadi gana* and *Mutrasangrahaneeya dasemani*. Detailed description of *Vata* through numerous synonyms like *Nyagrodha*, *Ksheeri*, *Bahupada* etc was observed during *Nighantu* period. The *rasa*, *guna*, *veerya*, *dosha karma* and *anya karma* of *Vata* can be compiled from various *Nighantus*. The *Nighantu* period pave way for the better understanding of pharmacognostical and pharmacological properties of *Vata*.

Figure 1: *Vata* (*Ficus benghalensis* Linn)

B. Classification

The drug *Vata* (*Ficus benghalensis* Linn) has been classified under various *varga* by *Acharyas*. It is one among *Mutrasangrahaneeya dasemani* which can control polyuria according to *Caraka Samhita*.[4] *Acharya Susruta* and *Vagbhata* included it under *Nyagrodhadi gana* which has *vranya*, *sangrahi*, *bhagnasadhana* properties and cures *medoroga*, *pittaasra*, *trit*, *daha* and *yoniroga*.[5,6] In *Abhidhana Manjari* also, *Vata* comes under *Nyagrodhadi gana* with similar indications.[7] In *Abhidhana ratnamala*, *Vata* is mentioned under *Kashaya skanda* which means it possesses astringent taste.[8] In *Dhanwantari Nighantu* and *Raja Nighantu*, *Vata* comes under *Amradi varga*.[9,10] In *Madanadi Nighantu*, the drug is mentioned in 30th varga.[11] *Vata* is included under *Oshadi varga* of *Kaiyyadeva Nighantu, Vatadi varga* of *Bhavaprakasa Nighantu* and *Madanapala Nighantu.*[12,13,14]

Samhita/ Nighantu	***Varga/ Gana***
Caraka Samhita	*Mutrasangrahaneeya dasemani*
Susruta Samhita	*Nyagrodhadi gana*
Ashtanga Hrdaya	*Nyagrodhadi gana*
Abhidhana manjari	*Nyagrodhadi gana*
Abhidhana ratnamala	*Kashaya skandha*
Dhanwantari Nighantu	*Amradi varga*
Madanadi Nighantu	*Trimsa gana*
Kaiyyadeva Nighantu	*Oshadi varga*
Bhavaprakasa Nighantu	*Vatadi varga*
Raja Nighantu	*Amradi varga*
Madanapala Nighantu	*Vatadi varga*

Synonyms

The synonyms helps us for better understanding of morphology and useful parts of *Vata* (*Ficus benghalensis* Linn). The term *Vata* is mentioned in *Abhidhana Ratnamala*, *Dhanwantari Nighantu*, *Madanadi Nighnatu*, *Kaiyyadeva Nighantu*, *Bhavaprakasa Nighantu*, *Raja Nighantu* and *Madanapala Nighantu*. *Raktaphala*, *Upasringi*, *Nyagrodha*, *Skandaja*,

Yakshavasa, *Visramanilayas*, *Bahupada* and *Vanaspathi* are synonyms mentioned in *Abhidhana Manjari*. *Raktaphala*, *Nyagrodha*, *Skandaja*, *Yakshavasa*, *Bahupada*, *Vansapathi* are told in *Abhidhana ratnamala*. *Dhanwanti Nighantu* mentioned *Raktaphala*, *Sringi*, *Nyagrodha*, *Skandaja*, *Druva*, *Ksheeri*, *Vaisravanavasa*, *Bahupada* and *Vanaspathi*. In *Madanadi Nighantu* added *Yuva* and exempted *Druva* from the list of *Dhanwantari Nighantu*. *Kaiyyadeva Nighantu* mentioned *Yakshavasa*, *Ksheeradruma*, *Padaroha* and *Danto* as additional synonyms and didn't mention *Druva* and *Vaisravanavasa* of *Dhanwantari Nighantu*. *Bhavaprakasa Nighantu* mentioned exactly similar synonyms compared to *Dhanwantari Nighantu*. Maximum number of synonyms can be compiled from *Raja Nighantu*. Several new synonyms like *Jatalo*, *Rohino*, *Avarohi*, *Vitapi*, *Skandaruha*, *Mandali*, *Mahacchaya*, *Yakshataru*, *Neela*, *Sipharuha* and *Vabbu* are mentioned in *Raja Nighantu*. *Madanapala Nighantu* included *Raktaphala*, *Nyagrodha*, *Druva*, *Ksheeri*, *Yakshavasa*, *Bahupada*, *Vanaspathi* and *Padaroha* as synonyms of *Vata*.[7, 8, 9, 10, 11, 12, 13, 14]

Synonyms	***Ab.Manj***	***Ab.Rat***	***D.Ni***	***Mad.Ni***	***Kai.Ni***	***BP.Ni***	***R.Ni***	***M.Pa.Ni***
Vata		+	+	+	+	+		+
Raktaphala	+	+	+	+	+	+	+	+
Sringi			+	+	+	+	+	
Upasringi	+						+	
Nyagrodha	+	+	+	+	+	+	+	+
Skandhaja	+	+	+	+	+	+		+
Druva			+			+		+
Ksheeri			+	+	+	+	+	+
Vaisravanavasa			+	+		+		
Yakshavasa	+	+			+		+	+
Visramanilayas	+							
Bahupada	+	+	+	+	+	+	+	+
Vanaspathi	+	+	+	+	+	+	+	+
Yuva				+				
Plava		+						
Gardabhanda		+						
Plavanga		+						
Pippalachada		+						
Ksheeradruma		+						
Padaroha		+			+		+	+

Danto					+			
Kanchanam					+			
Jatalo							+	
Rohino							+	
Avarohi							+	
Vitapi							+	
Skandaruha							+	
Mandali							+	
Mahacchaya							+	
Yakshataru							+	
Neela							+	
Sipharuha							+	
Vabhu							+	

C. Synonyms with interpretations

The synonyms compiled from various *nighantus* can be grouped as those describing the habit, morphological features and description of fruit, leaf bud, latex and hanging roots of *Vata* (*Ficus benghalensis* Linn).[2, 15, 16] From the interpretation of synonyms, *Vata* appears as a large and strong tree with many branches and hanging aerial roots which covers a large area and provide shelter and shade to people and stand as an entertainment to monkeys. Flowers are not visible and fruits appear on trunk. Fruits are red and will appear on trunks when ripen. It is also a tree that exudes latex. Based on ancient beliefs, it is supposed to be abode of *Yaksha* and *Vaisravana.*

Synonyms	**Interpretations**
Vata	Spreads in large area and appears as if surrounded by aerial roots
Nyagrodha	Aerial roots grows downward from the large branches
Padaroha	It sends down aerial roots from branches that enters into ground to form accessory trunk
Rohino	It sends down aerial roots from branches
Avarohi	It sends down aerial roots from branches
Bahupada	It has got numerous roots
Jatalo	Has numerous roots
Vitapi	A tree with lots of branches
Druva	It is a large and strong tree

Yuva	It is a strong and firm tree
Vabhu	A strong and firm tree
Sipharuha	The tree is crested with numerous branches
Mahacchaya	It provides a large area of shade
Pippalachada	That provides shade like Peepal tree
Mandali	A large tree that spreads in all directions
Visramanilayas	It provides a shelter for taking rest under shade.
Plava	Monkeys jumb from one hanging root to another
Plavanga	Monkeys jumb from one hanging root to another
Vaisravanavasa	Where *Vaisravana* (*Kubera* – Lord of wealth) resides
Yakshavasa	Where *Yaksha* resides
Yakshataru	Where *Yaksha* resides
Gardabhanda	Store of money or valued objects, typically one that is secret or carefully guarded.
Sringi	There are numerous leaf buds.
Upasringi	There are numerous leaf buds.
Raktaphala	Fruits are red in color on ripening
Kanchanam	Fruits are red in color
Skandhaja	Fruits appear on trunks
Skandaruha	Fruits appear on trunks
Vanaspathi	Bears fruit, flowers are invisible
Ksheeri	The tree exudes latex
Ksheeradruma	The tree possess latex

D. **Therapeutic properties and actions**

The pharmacotherapeutic properties and actions of *Vata* (*Ficus benghalensis* Linn) have been compiled from *Dhanwantari Nighantu*, *Madanadi Nighantu*, *Kaiyyadeva Nighantu*, *Bhavaprakasa Nighantu*, *Raja Nighantu*, *Madanapala Nighantu* and Ayurvedic Pharmacopoeia of India.[9, 10, 11, 12, 13, 14, 17] Majority of *nighantu* mentioned *Kashaya rasa* wherein *Raja Nighantu* added *Madhura rasa* also. From the references, the drug possess *Guru* and *ruksha guna*. As described in above mentioned *Nighantus*, it possess *seeta veerya* while no mentioning of *vipaka* was found. The Ayurvedic Pharmacopoeia of India mentioned *vipaka* of *Vata* as *Katu*. The drug has shown to pacify vitiated *pitta* and *kapha dosha* and does *rakta-sthambana*, *grahi*, *mutrasangrahaneeya* and *varnya karma*.

Rasa pancha ka & Karma	***D.Ni***	***Mad.Ni***	***Kai.Ni***	***BP.Ni***	***R.Ni***	***M.Pa.Ni***	***API***
Rasa	*Kashaya*	*Kashaya*	*Kashaya*	*Kashaya*	*Kashaya Madhura*	-	*Kashaya*
Guna	*Ruksha*	-	*Ruksha , guru*	*Guru*	-	*Guru*	*Guru, Ruksha*
Veerya	*Seeta*	*Seeta*	*Seeta*	*Seeta*	*Seeta*	*Seeta*	*Seeta*
Vipaka	-	-	-	-	-	-	*Katu*
Dosha karma	-	*Kapha pittahara*	*Kapha pittahara*	*Kapha pittapaha*	*Kapha pittajit*	*Kapha pittapaha*	*Kapha pittahara*
Dhatu karma	*Rakta-sthambhana*	-	-	-	-	-	*Sthambana*
Mala karma	-	*Samgrahi*	*Grahi*	*Grahi*	-	*Grahi*	*Mutrasangrahaneeya*
Anya karma	-	*Varnya*	*Varnya*	*Varnya*	-	-	*Varnya*

E. Therapeutic indications

The drug *Vata* (*Ficus benghalensis* Linn) has been described to be potent in treating *Trishna* (Excessive thirst), *Chardi* (Vomiting), *Murcha* (Fainting), *Raktapitta* (Bleeding disorders), *Yonidosha* (Diseases pertaining to uterus and vagina), *Vrana* (wound), *Visarpa* (Quickly spreading skin diseases), *Daha* (Burning sensation), *Jwara* (Fever), *Moha* (Confusion) and *Sopham* (Edema). [9, 10, 11, 12, 13, 14, 17]

Books	**Therapeutic indications**
Dhanwanatri Nighantu	*Trishna, Chardi, Murcha, Raktapitta*
Madanadi Nighantu	*Yonidosha*
Kaiyyadeva Nighantu	*Yonidosha, Vrana, Visarpa*
Bhavaprakasa Nighantu	*Yonidosha, Vrana, Visarpa, Daha*
Raja Nighantu	*Vrana, Trishna, Jwara, Daha, Moha, Sopham*
Madanapala Nighantu	*Vrana*
Ayurvedic Pharmacopoeia of India	*Yonidosha, Vrana*

G. Officinal parts

Many parts of *Vata* (*Ficus benghalensis* Linn) has been used for therapeutic purposes which include Stem bark, Root bark, Aerial/Prop/Hanging roots, Leaves/ Pallava (tender young leaves), Leaf bud, Milky exudate/latex and Fruit. [16, 17, 18, 19]

H. Dosage

The stem bark, root bark, prop roots, leaves of *Vata* **(***Ficus benghalensis* Linn) can be administered as *churna* (powder) from 3-6g or as *kashaya* (decoction) from 50-100 mL. The latex of drug can be used from 5-10 drops. [15, 16, 18]

I. Therapeutic uses

The various useful parts of *Vata* (*Ficus benghalensis* Linn) can be made into *kwatha*, *kalka*, *swarasa*, *churna*, *taila*, *ghrta* etc and applied in diseases including *atisara*, *vyanga*, *raktapradara* etc. [15, 16, 18]

a. *Sunka*/ *Ankura* (Leaf buds)

i. ***Atisara***: Leaf-buds of *Nyagrodha*, *Udumbara* and *Aswatha* should be crushed and kept in boiled water day and night. With this watery extract, ghee should be cooked and taken mixed with sugar (1/2th) and honey (1/4th).[20]

ii. ***Vyanga***: External application of paste of *Raktachandana*, *Manjishta*, *Kushta*, *Lodra*, *Priyangu*, *Vata ankura* and *Masura* cures hyperpigmentation.[21]

iii. ***Pumsavana***: Leaf buds collected from branches growing east/ north of a *Nyagrodha* tree located in cow shed should be collected during ovulatory time.

iv. ***Pumsavana***: When conception has taken place, on the same day, 3 or 4 drops of juice of *Vatasunga* macerated with milk should be put into right nostril and should not spit it out.[22]

v. ***Trishna***: Leaf bud Of *Vata*, *Sarkara*, *Lodra*, *Dadima*, *Madhuka* and honey all mixed together should be taken with rice-water to check vomiting and thirst.

vi. ***Garbhasthapana***: Leaf bud of *Vata* collected in bright fortnight and *pushya* constellation should be taken with water by the woman having menses.

vii. ***Pradara***: Leaf-bud of *Kasmarya*, *Vata* and *Danti* separately should be used for cooking ghee useful in *Pradara*.

b. Aroha/ Avaroha/ Pada (Prop roots)

i. ***Atisara***: Make fine paste of *Vata aroha* along with *tandulavari*. This should be consumed along with *takra* to relieve *ruja* caused from *atisara*.

ii. ***Jwara, Daha***: Decoction prepared of *Nyagrodha pada* added with *ghrta* relieves *daha* and *jwara*.

iii. ***Raktapitta***: Hanging root/ leaf-bud of *Vata* is efficacious in *raktapitta* especially *gudagata raktapitta*.[23]

iv. ***Chardi***, ***Trishna, Murcha, Jwara, Atisara***: Tender leaves of *Jambu*, *Amra*, *Useera*, leaf buds and hanging roots of *Vata* are made into decoction. After cooling, added with honey which alleviates vomiting, fever, diarrhoea, fainting and thirst.[24]

c. Pallava (Tender leaves)

i. ***Mukhadushika***: Paste made of *Vata pallava* and *nalikerotha sukta*.[25]

ii. ***Raktapitta***: Tender leaves of *Durva* and *Vata* mixed with honey should be taken.[26]

iii. ***Vrana***: Paste of *Salmali* bark, *Bala* root and tender leaves of *Vata* should be applied and wound should be sprinkled with their decoction.[27]

iv. ***Vrana***: *Kashaya* prepared of *Nyagrodha*, *Udumbara*, *Aswatha*, *Kadambha*, *Plaksha*, *Vetasa*, *Karaveera*, *Arka* and *Kutaja* are wound-healers.[27]

d. Twak (Stem bark)

i. ***Paittika vidradi***: The paste of *panchavalkala* added with *ghrita* should be applied.

ii. ***Vranasodha***: *Lepa* with stem barks of *Nyagrodha*, *Udumbara*, *Aswatha*, *Plaksha* and *Vetasa* along with *ghrta* does *nirvapana* of *sodha*.

iii. ***Pittaja visarpa***: Application of paste prepared of *Nyagrodha pada*, *Gundra*, *Kadali garbha*, *Bisagranthi* is useful in *Pittaja visarpa*.

iv. ***Masurika***: *Avachurnana* with *Panchavalkala churna* is beneficial.

v. ***Pradara***: The paste of *Lodra* should be taken with *Nyagrodha twak kashaya* or a cloth impregnated with the above should be kept in vagina.[28]

e. Ksheera (Latex)

i. ***Adhyasthi***: Paste of *Vata* latex, *Kushta* and *Romaka* is applied on the part and bandaged after putting paste of *Vata*. It alleviates the disorder within a week.

ii. ***Jantu***: The latex of *Vata* when applied can destroy maggots in wound.

iii. ***Sukla***: Finely powdered camphor mixed with latex of *Vata* is applied as collyrium which removes corneal opacity.

J. Yoga (Important formulations)

a. ***Kashaya***: *Nyagrodhadi gana Kashaya – Pittaasra*, *trt*, *daha*, *yoniroga*[6]

b. ***Asavam***: *Useerasavam – Raktapitta*, *Pandu*, *Kushta*, *Prameha*, *Arsas*[29]

c. ***Gulika***: *Marma gulika – Marma vikara*[29]

d. ***Taila***: *Arimedadi tailam – Mukharoga*, *Dantaroga*[29]

Dinesavalyadi kuzhampu – Twak roga[29]

Nalpamaradi tailam – Visarpa, *Chori*, *Chirangu*[29]

Kumkumadi tailam – Neelika, *Palita*, *Vyanga*, *Vali*, *Tilaka*[30]

K. Taxonomy[16,19,31]

a. Distribution & habitat

Vata (*Ficus benghalensis* Linn) is commonly found all over India from sea level to an elevation of 3000 feet. The Banyan tree can be found on sub-Himalayan tracts, Circar mountains, Deccan hills and Malabar coast. It is distributed in deciduous and semi-evergreen forests. The trees are widely planted along road sides and in villages for the purpose of shade and shelter.

b. Habit

It is a very large semi-deciduous tree with an average height of 70 feet or more and girth 20-30 feet.

c. External morphology

i. Root

It possesses tap root with branches. It also has prop roots that develop from branches and may reach the soil, providing pillar-like support.

ii. Stem

It has a stout trunk with long thick horizontally growing branches. Branches spreads extensively to form a crown that covers a wide area. Tender shoots are pubescent and latex exudes in plenty from cuts.

iii. Leaves

Leaves are found in clusters at the end of branches, alternate, Petiolate; Petioles stout, with a smooth waxy gland on under surface of distal end, ½ -2 inches long; Stipulate; Stipules coriaceous; 4-8 inches long, 2-5 inches broad; Broadly elliptic to ovate or orbicular-ovate; Base: Rounded, subcordate or narrowed; Apex: Blunt or obtusely cuspidate; Entire, coriaceous, pubescent below when young, glabrous when mature, glandless, 3-5 or occasionally 7 strong ribs from base, 4-6 pairs of secondary nerves and has distinct tertiary reticulations.

iv. Fruit receptacles of Figs

Fruits are axillary, sessile, occur in pairs each with 3 broad rounded basal bracts; Bracts – puberulous, dull green at first, brick red when ripe; Male, female and gall flowers are seen in the same receptacle.

v. Flowers

There are three kinds of flower like staminate flower, pistillate flower, gall flowers.

1. **Staminate flowers:** Situated near the mouth of receptacle, sessile or short stalked, each flower has 4 lanceolate, imbricate perianth and 1 stamen.
2. **Pistillate flowers:** Each flower has 4 lanceolate, imbricate perianth, but shorter. Ovary one-celled, one-ovuled; Style elongated.
3. **Gall flowers:** Perianth similar to pistillate flowers; Style comparatively shorter.

vi. Fruits

Fruits are small with crustaceous seed like achenes enclosed in common fleshy receptacle (Syconium).

Figure 2: Leaves and Fruit of *F. benghalensis* Linn

Figure 3: Leaf bud of *F. benghalensis* Linn

d. Macroscopic appearance of stem bark

Gross appearance and thickness	Varies according to age of stem Outer rind : ¼-3/4 inch thickness Inner part of rind: 1-2 mm thick Inner tissue : Adjoins wood
External characters	Longitudinal and transverse rows of numerous small prominent lenticels. Mottled appearance due to crustose lichens. The outer part of rind flakes off in hard, woody circular or oblong slices with irregular outline. Young bark : Comparatively smooth
External colour	Dark stale grey Masked by thin patches of appressed ash white, light blue-green lichens
Internal characters	Rind: Inner surface is granular Entire bark : Outer 2/3rd – Granular Inner 1/3rd (that adjoins wood)- Fibrous. The fibrous portion is composed of several layers of oblique fibres running in opposite direction in alternate layers.
Internal colour	Rind: Light green, yellowish brown and reddish brown Entire bark: Outer 2/3rd – Deep pink to reddish Inner 1/3rd – Lighter coloured or whitish
Cut surface	Fresh cut surface exudates plenty of latex. Latex: Pale pink or fleshy colour, with scattered specks of deeper tint. Colour and features varies in outer 2/3rd and inner 1/3rd. On exposure, the entire cut surface turns a uniform dull rose brown and ultimately light brown.
Fracture	Outer 2/3rd – Short; Inner 1/3rd – Fibrous
Taste	Astringent

e. Transverse section of young stem bark

i. Cork/ Phellem : Composed of 3-6 rows of thick-walled rectangular cells

ii. Cork cambium : Distinct, composed of 2 rows of narrow rectangular cells rich in protoplasm

iii. Cortex : Wide, composed of several rows of cells. A continuous or annular band of sclereids is present at the periphery of the cortex. Several scattered groups of stone cells with oblong to rectangular/ spherical/ polygonal, thick pitted walls are also present. Parenchyma cells which are thin-walled, cubical to oblong, loaded with starch grains or calcium oxalate crystals or tannins can be seen in cortex.

iv. Inner bark/ Bast : Thin, radial segments of phloem alternating with 2-5 seriate medullary rays. Groups of sclerenchyma, groups of stone cells and latex tubes are present.

v. Wood : Vessels occurring as single or in groups, wood fibres, wood parenchyma packed with starch grains and pitted medullary rays packed with starch grains are present.

f. Transverse section of old stem bark

i. Outer bark/rind : Composed of compressed cork tissue and hard woody dead elements of secondary cortex like stone cells and compressed thick-walled elements.

ii. Cork : Cells are rectangular, thick-walled, most of them with brownish contents.

iii. Cortex : Wide, forms half the thickness of entire bark, secondary in origin, almost completely formed by large groups of stone cells: rectangular oval/ cubical, thin/thick-walled. Sparse parenchyma cells occur in between stone cells which contain tannin/ rhomboidal crystals of calcium oxalate/ starch grains

iv. Inner bark/ Bast : Is formed by very few thick-walled phloem parenchyma cells and fewer sclerenchyma groups. Latex tubes are abundant in middle and inner barks. Medullary rays are 2-5 seriate, extend upto middle bark and contains starch grains which are either pitted walled / thick walled.

v. Cambium : Is composed of small rectangular thin-walled cells.

vi. Wood : Xylem vessels occur singly or in groups of three, wood fibers and wood parenchyma are arranged in alternate bands and medullary rays have pitted walls. Wood parenchyma and medullary rays are thickly packed with starch grains.

f. Macroscopic appearance of Aerial root[17]

Shape	Cylindrical, unbranched or branched
Size	4 to 8 cm long, 0.1 to 1.2 cm thick
External characters	Rough due to longitudinal and transverse cracks and transverse rows of lenticels
External colour	Grey
Cut surface	Reddish brown
Fracture	Fibrous in bark portion and tough and short in wood portion

g. Transverse section of Aerial root[17]

Cork: Consisting of 4 to 6 or more rows of narrow, tangentially elongated cells

Secondary cortex: Consisting of a zone of 4 or 5 rows of stone cells, followed by wide zone of thin-walled parenchymatous cells, filled with reddish-brown contents. Stone cells- oval to elliptical, elongated, thick-walled, with wide lumen and clear pit canals found scattered throughout secondary cortex.

Secondary phloem: A wide zone consisting of sieve tubes, phloem fibres and phloem parenchyma, traversed by phloem rays; phloem fibres numerous, arranged in tangential bands alternating with sieve elements.

Secondary xylem: Very wide consisting of pitted xylem vessels, fibres and xylem parenchyma, all elements being lignified; vessels single or in groups, xylem parenchyma numerous, xylem fibres numerous, thick-walled with blunt tips and wide lumen.

Medullary rays : Numerous, uni to tetra-seriate in xylem portion.

h. Powder microscopy of Aerial root[17]

Oval to elliptical, elongated, thick-walled stone cells with wide lumen and clear pit canals, Fibres, thick-walled with blunt tips and wide lumen, xylem vessels showing pitted thickening are observed.

i. Identity, purity and strength of Aerial root[17]

Foreign matter : Not more than 2 %

Total Ash: Not more than 7 %

Acid-insoluble ash: Not more than 1 %

Alcohol-soluble extractive: Not less than 3 %

Water-soluble extractive: Not less than 4 %

j. Thin Layer Chromatography[17]

T.L.C of alcoholic extract on Silica gel 'G' using Toluene: Ethyl acetate (7:3) shows under U.V. (366 nm) three fluorescent zones at Rf. 0.34 (sky blue), 0.63 (sky blue) and 0.78 (blue). On spraying with 10% Methanolic-Sulphuric acid regent and on heating the plate for about ten minute at 105°C three spots appear at Rf. 0.63 (grey), 0.78 (brownish grey) and 0.96 (brown).

k. Chemical constituents[31]

i. Stem bark

1. Phytosterols : Lanostadienylglucosyl cetoleate, bengalensisteroic acid acetate, α-amyrin acetate, lupeol,
2. Anthocyanidin derivatives: 5,7-dimethylether of leucopelargonidin-3-O-α-L-rhamnoside (05); 3',5,7-trimethyl ether of delphinidin-3-O-αL-rhamnoside (06); 3',5,7-trimethylether of leucocyanidin (07); 3',5-dimethyl ether of leucocyanidin-3-O-β-Dgalactosylcellobioside.
3. Meso inositol, β-sitosterol, -α-D-glucose, 6-heptatriacontene-10-one, 20-tetratriacontene-2-one, Pentatriacontan-5-one

ii. Aerial root

1. Bengalensinone, benganoic acid

iii. Heart wood

1. Tiglic acid ester of taraxasterol

iv. Leaves

1. Sterols : β-sitosterol

2. Flavonoids : Catechin, genistein
3. Flavonols : Quercetin-3-galactoside, rutin
4. Leucoanthocyanidins : Leucocyanidin
5. Triterpene : Friedelin

v. Fruits & Seeds

1. Amino acids : Cysteine, glutamine, methionine, tryptophan, arginine, methionine, citrulline, hydroxyproline
2. Polysaccharides : D-glucose, D-fructose, D-galactose, D-arabinose, D-xylose
3. Glutathione

vi. Seed oil

1. Fatty acids : Palmitic acid, oleic acid, linoleic acid, linolenic acid, vernolic acid, stearic acid, malvalic acid, sterculic acid, lauric acid, myristic acid

l. Toxicity studies

i. Acute and sub-chronic toxicity

Acute oral toxicity study was done with 5000 mg/kg of ethyl acetate extract of aerial roots of *Ficus benghalensis* Linn. It was discovered that this extract did not induce any harmful effects or mortality at the provided dose.[32]

m. Pharmacological activities[31]

Part	**Extract**	**Pharmacological activity**
Fruits, bark, and aerial roots	Ethanolic extracts	Hypoglycemic activity
Bark	Water extract	Hypolipidemic activity
Roots	Methanolic, Chloroform and Petroleum extracts	Anthelmintic activity
Latex of stem bark	Latex	Anti-inflammatory activity
Leaves, aerial roots, and bark	Aqueous and ethanolic extracts	Antibacterial activity
Aerial roots	Aqueous extract	Immunomodulatory activity, Antioxidant activity
Bark	Aqueous, Ethanolic, Ethyl acetate, Petroleum ether, and	Antistress and antiallergic activity

	Chloroform extracts	
Leaves, aerial roots, and bark	Aqueous, Ethanolic, Petroleum ether, and Chloroform extracts	Analgesic and antipyretic activity
Aerial roots (Hanging roots)	Ethanolic extract	Anti-diarrhoeal activity
Bark	Aqueous and ethanolic extracts	Antiatherogenic activity
Bark	Aqueous extract.	Antidiabetic and ameliorative activity
Leaves	Mixture of powdered leaves and Coconut oil.	Wound healing activity
Young prop roots	Alcohol and Aqueous extracts.	Growth promoting activity

n. Experimental studies

The antidiarrhoeal, antiulcer, antiinflammatory, analgesic, antidiabetic, hypolipidemic, wound healing potential, hepatoprotective, antihelminthic activity, antiarthritic activity, antistress and antiallergic potential, antinociceptive and anticataleptic activity were demonstrated for different parts of *Vata* (*Ficus benghalensis* Linn) in experimental animals, some of which are detailed below.[33]

i. Antidiarrhoeal activity[34]

Anti-diarrhoeal effect of ethanolic extract of F. bengalensis hanging roots (EEFB) was evaluated at dose level of 400 mg/kg p.o. against castor oil induced diarrhea, PGE2 induced enteropooling and GI motility in charcoal meal test in rats using diphenoxylate (5 mg/kg p.o) and atropine (0.1 mg/kg i.p) as reference standards. In castor oil induced diarrhea, mean defecations per animal in 4 hours, treated with diphenoxylate and EEFB were1.37 and 2.21 respectively and mean number of wet faeces per animal were 0.0 and 1.96 respectively. In PGE2 induced enteropooling, volume of intestinal fluid in PGE2 and PGE2+EEFB was 2.97 and 1.25 ml respectively. Movement of charcoal meal with atropine and EEFB was 34.2 and 50.2 respectively

ii. Anti-ulcer activity[35]

The effect of aqueous extract of Ficus bengalensis (FBE) was assessed in different acute and chronic gastric ulcer models in rats. Gastric ulcers were induced in swiss albino rats (200g, N=6) by oral administration of aspirin suspension and pylorus ligation. The anti ulcer activity was assessed by determining and comparing the ulcer index in the test drug groups with that of the vehicle control and standard ranitidine & sucralfate. FBE, 250–500 mg/kg administered orally, twice daily for 5 days showed dose-dependent ulcer protective effect in pylorus ligation (51.28, 63.24% protection, $P < 0.01$ to $P < 0.001$), aspirin (28.94, 64.91 protection, $P < 0.001$). The parameters taken to assess antiulcer activity were pH of gastric juice, total acidity and ulcer index. The results indicate that FBE possesses antiulcer activity in a dose dependent manner.

iii. Anti-inflammatory and analgesic activity[16]

Anti-inflammatory and analgesic effect of aqueous extract of leaf of Ficus bengalensis (AEFB) and methanolic extract of F. bengalensis (MEFB) was evaluated in animal models. Preliminary results indicated that MEFB treatment possesses significant anti-inflammatory potential as compared to AEFB. The anti-inflammatory activity of MEFB exhibited in both acute (carrageenan induced hind paw edema and acetic acid induced vascular permeability) and subchronic (cotton pellet-induced granuloma) models of inflammation was found to be significant. In addition, the extract also showed significant analgesic activity in acetic acid induced writhing. Pretreatment with MEFB during inflammatory condition (both acute and sub-chronic) prevented increase in malondialdehyde (MDA) formation and myeloperoxidase activity in edematous as well as granulomatous tissue. Further, serum marker enzymes (AST, ALT and ALP) increased in inflammatory conditions were also inhibited with MEFB treatment. Hence, the anti-inflammatory activity observed in the present study with MEFB could be attributed largely to its antioxidant and lysosomal membrane stabilizing effects.

o. Clinical study[36]

A clinical study on decoction of stem bark of *Ficus benghalensis* in diabetes mellitus was carried out. 40 diabetic patients were randomly divided into 4 groups with 10 patients each.

Two groups were treated with 120 mL decoction of stem bark twice a day for 14 days and one of these groups were kept under diet restriction. The other two groups were provided 120 mL of distilled water and one of these were kept under dietary restriction. The most significant reduction in FBS was observed in the group treated with decoction along with diet restriction.

CONCLUSION

Vata is a highly useful medicinal plant described in literatures of Ayurveda. Numerous synonyms pertaining to morphological characters of *Vata* is observed. These synonyms infact contribute to proper identification of *Vata* and confirms its botanical source to be *Ficus benghalensis* Linn. From various compiled information on therapeutic properties and actions, *Vata* possess *Kashaya rasa*, *guru* & *ruksha guna*, *Katu vipaka* and *Seeta veerya*. It decreases aggravated *Kapha* and *Pitta dosha*. Besides these, it has *grahi*, *varnya*, *mutrasangrahaneeya* and *raktastambhana* action. *Vata* proves useful in multiple ailments like *yonidosha*, *vrana*, *raktapitta*, *chardi*, *trishna*, *jwara*, *daha*, *moha* and *sopham*. Almost all parts of *Vata* like stem bark, root bark, prop roots, leaves, leaf bud, latex and fruits are useful for medicinal preparations. Various therapeutic administration of these officinal parts are described diseases like *Atisara*, *Pradara*, *Vyanga*, *Mukhadooshika*, *Jwara*, *Daha*, *Visarpa* etc. *Vata* is also specially indicated in *pumsavana* and *prajasthapana karma*. Various formulations like *Nalpamaradi tailam*, *Nyagrodhadi kashayam*, *Marma gulika* etc are having *Vata* as an ingredient. *Vata* is an important drug in treating conditions pertaining to *kapha*, *pitta* and *rakta dushti* and especially in diseases like *twak roga*, *yoniroga* and *raktapradara*. Various experimental studies like antidiarrhoeal, antiulcer, antiinflammatory, analgesic, antidiabetic, hypolipidemic, wound healing potential, hepatoprotective, antihelminthic activity, antiarthritic activity, antistress and antiallergic potential, antinociceptive and anticataleptic activity were proven for *Ficus benghalensis* Linn.

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