



A Review on *Avicennia Officinalis*

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Abstract

Avicennia officinalis is a species of mangrove also known as Indian mangrove. *Avicennia officinalis* is an eternal shrub or tree, belonging to the family Acanthaceae. Distributed in India, Coasts of southern Asia to Australia and Oceania. From East Pakistan, Tanasserim, Andaman Islands, and Sri Lanka, Thailand, Malaysia, Sumatra, Madura, Java, Borneo, Celebes, Sunda Islands, Molucca Islands, and New Guinea. Researches on *Avicennia officinalis* gives the evidence that it contains chemical constituents like Alkaloids, Flavonoids, Triterpines, Phenols, Glycosides, saponin, Tannins, However, the researchers also prove that it is used as anti-oxidants, anti-fungal, anti-microbial and anti-inflammatory antiviral, anticancer. This article collates the phytochemicals and pharmacological activities of *Avicennia officinalis*.

Keywords

Avicennia officinalis. Phyto chemicals, Pharmacological properties.

INTRODUCTION

The botanical name of *Avicennia* is *Avicennia officinalis* and it belongs to the family Acanthaceae. The synonyms of species Indian mangrove and is known as baen in Bengali and timirah in Sanskrit. These Mangroves are particular salt-tolerant (halophytic) plant network developing at the interface among land and water¹. The special morphological and physiological adjustments assist the mangroves with coping up with brutal ecological states of high saltiness, anoxia, visit tidal immersion, solid breezes, high streams and so forth. In the tropical and subtropical intertidal estuarine zones. This mangroves having specialized roots or pneumatophore (breathing roots). This roots oxygen dispersion through the springy tissue of the pneumatophores to whatever is left of the plant.

Avicennia officinalis is considered as a medicinal plant having several medicinal uses. Bark extract is used to treat antimicrobial, Bark and Stem groups some therapeutic properties Contraceptive, astringent, diuretic, antiulcer, treatment for snake nibbles².

Botanical classification:

Kingdom: Plantae
(Unranked): Angiosperms
(Unranked): Eudicots
Clade: Asterids
Order: Lamiales
Family: Acanthaceae
Genus: *Avicennia*
Species: *Officinalis*

Vernacular Names: in different areas different names are used by the people. It is commonly called as Indian mangrove.

Synonyms: Indian mangrove, *Avicennia*, *Avicennia oepata*, *Recka ovate*

Language	Name
Hindi	Baen, Bina
Telugu	Tella Mada
Kanada	Ipati, Uppati
Tamil	Venkantal
Bengali	Baen, Bani, Bina
Sanskrit	Timirah

Habitat and distribution: *Avicennia officinalis* is young tree forms a low, dense bushy crown. Distributed in India, Coasts of southern Asia to Australia and Oceania. From East Pakistan, Tanasserim, Andaman Islands, and Sri Lanka, Thailand, Malaysia, Sumatra, Madura, Java, Borneo, Celebes, Sunda Islands, Molucca Islands, and New Guinea³. It is growing in tropical and subtropical regions.

Morphology:

Avicennia officinalis is youthful tree shapes a low, thick rugged crown. When it develops, it frames a columnar tree up to 15 m and may grow up to 30 m. The leaves are 8–10cm long, spoon-shaped, upper side glossy green, underside finely hairy, with salt crystals found in the surface. Flower is 1cm in diameter. The fruits of the plant are 2–3cm long, oval shape, contain a single seed which completely fills

the capsule. The root dark gray to dark brown in color⁴.

Phenology:

The tree is usually leaf less from February to April or May. The flowering and fruiting April–November.

Traditional uses: *Avicennia officinalis* was used as a Contraceptive, astringent, diuretic, antiulcer, treatment for snakebites, rheumatism, smallpox, skin diseases, hepatitis, leprosy, antitumor, Bronchial asthma, antibacterial, gastro protective, aphrodisiac, boils and abscesses.

PHYTOCHEMICAL PROPERTIES

Phyto chemical research is important in developing the herbal medicines form ancient time. Chemical constituents⁵ like alkaloids, phenols, terpenoids, glycosides, flavonoids, saponins, Tannins has been isolated from various parts of *Avicennia officinalis*.

Table 1: Photochemical constituents reported in different parts of plant *Avicennia officinalis* by various authors.

SNO	PLANT PART	CHEMICAL CONSTITUENTS	AUTHOR AND YEAR.	References
1	Aerial root	Betulinaldehyde	Ramanjaneyulu et al.,2015	6
2	Bark, stem, leaf. Aerial root	Betulin, β -amyrin	Majumdar and Patra (1979)	7
3	Leaf	Velutin	Majumdar et al.,(1981)	8
4	Aerial root	AvicenolC,	Anjaneyulu et al.,(2003)	9
5	Leaf	Campesterol, Stigmast-7-en-3 β -o	Ghosh et al.,(1985)	10
6	Aerial root	Rhizophorin-A, Rhizophorin-B, Ent-13S-2,3-seco-14-labden-2,8-olide-3-oicacid, Ribenone, Ent-16-hydroxy-3-oxo-13-epi-manoyloxide, Ent-15-hydroxy-labda-8	Subrahmanyam et al.(2006)	11
7	Leaf	7-O-transcinnamoyl-4-epilogenin ⁷⁵ , geniposidic acid, Cirdoidglucoside	Ghani et al.(1998)	12

8	Leaf	Officinosidic acid, 8-O-cinnamoylmussaenosidic acid, Loganin	Pandey and Garg(1996)	13
9	Bark, stem, leaf.	Betulinic acid, lupeol	Haque et al.(2016)	14

PHARMACOLOGICAL ACTIVITIES

As *A.officinalis* to posse's medicinal properties, it has been used as anti-oxidant from the ancient time. This conviction prompted numerous in vivo and in vitro examinations by different techniques and demonstrated positive outcomes for different exercises. Few of the pharmacological that are shown by *A.officinalis* as follows.

Anti-Diabetic activity: The petroleum ether extract of *A.officinalis* to investigate the possible inhibitory effect to modulate key enzymes involved in diabetes i.e., α -amylase and α -glucosidase. The inhibitory activity of crude petroleum ether and aqueous leaf extracts of *A.officinalis* against both the enzymes were carried out. The potential to inhibit the α -amylase and α -glucosidase enzymes of the PEL and AQL were carried out at 0.1, 0.5 and 1 mg/ml. The results showed that both PEL and AQL inhibit the enzymes in a dose dependent manner. However, the AQL showed better α -amylase and α -glucosidase enzyme inhibition capacity in comparison to PEL. However, the IC50 value of AQL for both the assays was >1 mg/ml¹⁵.

Antiulcer: The studies by Aparna N showed that investigated to evaluate the antiulcer activity of methanol leaf extracts (200 and 400 mg/kg b.w.) by two different models viz. Ethanol-Hydrochloric acid induced and Modified Pyloric ligation in Wistar albino rats¹⁶.

Antinoceptive: The crude ethanol extract of leaves of *A.officinalis* was screened for its antinociceptive

activity. The concentrate delivered critical squirming restraint in acidic corrosive actuated squirming in mice at the oral portion of 250 and 500 mg/kg b.weight ($P < 0.001$) comparable to the standard drug diclofenac sodium at the dose of 25 mg/kg of body weight¹⁷.

Anti-inflammatory: Sumithra et al. (2011a) reported the anti-inflammatory activity of the methanol extract of the leaves on acute (carrageenin), Sub acute (Formalin) and chronic (Freunds Complete Adjuvant) rat paw odema model. The concentrate of portion 200 and 400 mg/kg b.wt given orally and acetyl salicylic corrosive as standard was given intraperitonally. Biochemical parameters like SGOT, SGPT, ALP, add up to cholesterol were likewise assessed as steady investigations. The extract showed its effect on dose dependent manner¹⁸.

Diuretic: The methanolic extract of *A.officinalis* leaves showed that investigated to evaluate the Lipschitz diuretic model Increases the volume of urine with a significant Na⁺/K⁺ excretion ratio¹⁹.

Anticancer: The anti-cancer activity of leaf extract of *A.officinalis* carried out using Brine shrimp lethality Bio-assay. In-vitro studies by Shamsunnahar Khushi et al. showed anticancer activity testing the general toxicity of the DMSO solution of the extract against *Artemia salina* and Vincristine sulphate was used as positive control. LC50 was calculated using LdP line probit analysis software, USA²⁰.

Table 2: Pharmacological Activities reported in *A.officinalis* by various authors.

SNO	EXTRACT	PLANT PART	ACTIVITY	AUTHOR AND YEAR	Reference
1	Petroleum ether	Leaves	Antidiabetic activity	Das SK, Samantaray D, Thatoi H (2017)	15
2	Methanol	Leaves	Antiulcer	Aparna N(2014)	16
3	Methanol	Leaves	Antinoceptive	Shahid et al.,(2007)	17
4	Methanol	Leaves	Anti-inflammatory	Sumithra et al., (2011a)	18
5	Methanol	Leaves	Diuretic	Hossain et al.(2012)	19
6	Methanol	Leaves	Anticancer	Shamsunnahar Khushi et al.,(2016)	20
7	Ethyl acetate	Leaves	Anti-bacterial activity	Valentin Bhimba B et al., (2010)	22
8	Methanol	Leaves	Anti-microbial	R. Shanmugapriya, T. Ramanathan (2012)	23

9	petroleum ether, ethanol, Aqueous	Leaves	Antiviral	Rege AA <i>et al.</i> , (2010)	24
10	Aqueous	Leaves	Antiulcer	Thirunavukkarasu P <i>et al.</i> , (2010)	25
11	Acetone, ethane, methanol	Root	Anti bacterial	Sharief, Umamaheswararao (2011)	26
12	Methanol	leaves	Alzheimer's disease	Natarajan suganthi (2009)	27

CONCLUSION

Avicennia officinalis is a medicinal plant, which is traditionally used as astringent, diuretic, antiulcer, treatment for snake nibbles the ancient time etc. Examines on this plant are expanding step by step due to its strong pharmacological employments. The different phytochemical looks into brought about detachment of various powerful concoction mixes which are reason for its particular pharmacological exercises. As this plant is widely spread across tropical and sub-tropical regions in India, Indonesia, Malaysia, Myanmar, Papua New Guinea, Philippines, Singapore, Sri Lanka, Thailand, Vietnam, more research work is still continued. The moto of this audit was to group the exploration work embraced by different researchers at better places till date with the end goal to give a benchmark to future

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CONFLICT OF INTERST

None of the creators of this paper has a money related or individual association with other individuals or associations that could improperly impact or predisposition the substance of the paper.

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