



Review on *Anthocephalus cadamba* Miq (Kadambu)

Janani S^{*1}, Ajwad M.A.M²

^{*1} PG Scholar, Department of Gunapadam, Government Siddha Medical College, Palayamkottai,

² Ayurveda Medical Officer, Siddha Teaching Hospital, Konesapuri, Trincomalee, Srilanka.

ABSTRACT

Anthocephalus cadamba (Rebox) Miq. belonging to Family Rubiaceae and is widely distributed throughout the world. The plant is used as folk medicine in the treatment of fever, anaemia, dysentery, blood & skin diseases, to reduce pain & inflammation and for improvement of semen quality. The major constituents of the plant are triterpenes, triterpenoid glycosides, flavanoids, saponins, indole alkaloids, indole alkaloids, cadamine, isocadambine, isocadambine. The present study was carried out to review the plant description, medicinal values, traditional uses, pharmacological activity and toxicological studies of *Anthocephalus cadamba* and prove the Siddhar's stanza which was mentioned about the medicinal uses of Cadamba in Siddha text. This review discusses the investigations made by various workers related to chemical constituents, pharmacological action and toxicological studies of this plant.

Keywords:

Anthocephalus cadamba, Review, Medicinal values

Address for correspondence:

Janani S

PG Scholar,

Department of Gunapadam

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INTRODUCTION

Anthocephalus cadamba (Rubiaceae) is a medium sized tree attaining 2 m girth and 18m height, branches spreading horizontally and slightly enlarged at their junction with the main stem. Leaves are about 7.5-18 X 4.5-16 cm in size, flower head globes, yellow, solitary, terminal, 3.7 cm in diameter consisting of small, yellow or orange coloured, scented flowers; fruits are fleshy. [2]

It is widely used as a folk medicine in the treatment of fever, anaemia, uterine complaints, blood diseases, skin diseases, leprosy, dysentery, and for improvement of semen quality. The major constituents of bark are triterpenes, tripernoid glycosides, saponins, indole alkaloids cadambine, 3 a-dihydrocadambine, cadamine, isocadamine and isodihydrocadambine.

The traditional healers use *Kadambu* bark in treatment of eye diseases. It is also used in case of stomatitis. The fruit juice is given to children to treat gastric irritability. A decoction of the leaves is good for ulcers and wounds. The fruits are edible. The timber is used for making pulp and paper, boxes, crates and furniture. The wood is also used as fuel.

The present study was carried out to review the plant description, medicinal values, traditional uses, pharmacological activity and toxicological studies of *Anthocephalus cadamba* and prove the Siddhar's stanza which was mentioned about the medicinal uses of *Kadambu* in Siddha text.

METHODOLOGY

The Siddha text was referred which mentioned about the medicinal property of "*Anthocephalus cadamba* (*Kadambu*)" at library of Government Siddha Medical College & Hospital Palayamkottai and the modern scientific research proofs of *Anthocephalus cadamba* traced in different recognized online research sources like PubMed, Medlar, Medline, Google scholar, Research gate etc. Review includes the following details about the plant of *Anthocephalus cadamba*

Kunapaadam aspect

Medicinal botany aspect

Research findings on the plant of *Anthocephalus cadamba*

Plant details:-

Kunapaadam aspect

Botanical name: *Anthocephalus cadamba* Miq.

Family : Rubiaceae

Tamil name : Kadambu

Other names : Arattam, kadappai, indulam.

Organoleptic characters:-

Suvai (taste) - Astringent, bitter

Thanmai / veeriyam (potency) - Hot

Pirivu / vipaakam- Pungent

Pharmacological actions:-

Bark – tonic, febrifuge

Fruit – refrigerant [3]

Medicinal uses

Quotation of *Anthocephalus cadamba* which is mentioned in ancient siddha's quotation from general character of *Anthocephalus cadamba* in *Gunapadam* textbook (*muthalpaakam- porutpanpunool*) by K.S. Murugesamuthaliyar Page no: 187 [3]

“njhe;jpj; jfyhjNjhlr; Rufkd;W

rpe;ijf; fD\$yQ; Nrntd;why;-te;jpj;Jj;

jhgRuKkwr; rQ;rykpyhjUe;J

ePgg; GuzpFbePu;”

“Thonthiththakalaathathōdachsoramakantru

Sinthaikkanukoolanchēraventraal– vanthiththuth

Thaapasuramumarachsanchalamilatharunthu

Neepappuranikudineer.” [4]

Fruit – fever, abdominal pain, eye diseases & cramps

Leave – aphthous ulcer

Seeds – indigestion, poisonous bites.

Medicinal botany aspect

Botanical name: *Anthocephalus cadamba* Miq.

Family : Rubiaceae

Subfamily : Cinchonoideae

Synonyms:

Anthocephalus chinensis (Lamk.) A. Rich. Ex. Walp.,

Anthocephalus macrophyllus (Roxb.) Haval.,

Nauclea cadamba (Roxb.),

Neolamarckia cadamba (Roxb.) Bosser,

Sarcocephalus cadamba (Roxb.) Kurz.,

Anthocephalus indicus A. Rich.,

Anthocephalus morindaefolius Korth.

Figure: Whole plant of *Anthocephalus cadamba*



Vernacular names:-

Tamil name	: - Arattam, kadambu, kadappai, indulam.
Sinhala name	: - Ela-bakmi, embul-bakmi.
English name	: - Kadam.
Sanskrit name	: - Ashokari, halipriya, haridra, Kadambu, priya, deva.
Hindi	: - Kadam
Indonesian	: - Kelempajan
Malay	: - Kalempayan, kelampo, kelempayan, kelempayan
Thai	: - Krathum

Figure: Flower of *Anthocephalus cadamba***Plant description:-**

A large tree with an erect trunk and horizontally spreading branches and pubescent young parts; leaves simple, large, opposite, stipulate, 15-27.5cm long, oblong – lanceolate, acute or rounded at base, acuminate acute at apex, glabrous and shining on the upper surface, pubescent on veins beneath, petioles 2.5 – 3.1cm long, stipules about 1.2cm long, narrowly lanceolate, acute; flowers regular, bisexual, orange – yellow with white styles, fragrant in dense globose terminal heads 3.1-3.5cm diameter, on short stout peduncles, sepals 5, calyx-tubes closely pressed together but not fused, without bractlets, segments obtuse, pilos at ends, persistent, petals 5, fused in to funnel shaped long tube, lobes imbricate, erect, lanceolate, acute, segments 5, inserted at the mouth of the corolla, ovary inferior, 2-locular below, 4-locular above with numerous ovules in each loculus, style long, stigma large, ovoid; Fruit capsule about 6mm long, compressed, angular, closely packed and crowned by long persistent calyx segments, pericarp transparent in the lower part; Seeds numerous, very small, angular, muricate. [2].

Religious association

The Kadambu tree is popularly associated with Lord Krishna, who is usually, depicted playing his flute under it. Many of Lord Krishna's 'Leelas' (His pranks) are said to have taken place under a Kadambu tree. In the southern part of India, the Kadambu tree is associated with Goddess Parvati, who is believed to dwell in a Kadambu forest (Kadambu-vana-vasini). The tree is hence referred to as 'Parvati's tree' here.

The worship of the tree is supposed to ensure wealth and progeny. The flower is also sacred to Lord Kartikeya. The twigs of the tree are offered to Lord Shiva. The tree is also sacred to the Jains. Bhagwan Vasupujay, the 12th Jain Tirthankara is associated with the tree. [5]

Parts used: -Bark, leaf, fruit, root.

Composition: -The leaves and bark of the tree contain an alkaloid.

Natural Habitat

A. cadamba is an early-succession species which grows best on deep, moist, alluvial sites, often in secondary forests along riverbanks and in the transitional zone between swampy, permanently flooded and periodically flooded areas.

Geographic distribution

Native: Australia, China, India, Ceylon, Indonesia, Malaysia, Papua New Guinea, Philippines, Singapore, Vietnam and Burma. In Ceylon, It is common in the low country in Ceylon up to 2000 feet altitude. Alagalla, Kurunegala, Pussellawa, etc.

Propagation methods

Kadambu can be raised by planting out nursery raised seedlings. Planting of bare root nursery stock also gives good results. Direct sowing is not very successful because of the small-sized seeds and their sensitivity to drought, excessive moisture and direct sun. The optimum IBA concentration for rooting and survival in air layering experiments of *Anthocephalus cadamba* was 5000 p.p.m. [12]

Uses & properties

The bark is prescribed as a tonic and febrifuge. It is given for cough and fever. A decoction of the leaves is used as a gargle for aphthous ulcer and stomatitis. [2]

The roots, fruits, leaves, bark are used for medicinal purpose. Externally the wound and ulcers are dressed with its leaves to alleviate the pain swelling and cleansing and better healing of wounds. The decoction of the leaves is also used for this purpose. The paste of its bark skin is benevolent in conjunctivitis, as an external application. [6].

Internally, the decoction of bark skin is an effective remedy for diarrhea, dysentery and colitis. The juice of bark skin combined with cumin seeds and sugar alleviates vomiting. The excessive thirst in fevers is quenched with its fruit juice. Kadambu is the best panacea for raktapitta, edema and cough. The decoction of roots is salutary in urinary ailments like dysuria, urinary calculi and glycosuria. Menorrhagia is effectively controlled with the fresh juice of its leaves or their decoction. The fruit juice augments the quantity of breast milk in lactating mothers and also works well as a lactodepurant. Kadambu is rewarding in skin diseases as it improves the complexion of the skin. In burning sensation of the body and fever, the bark skin is commonly used. The bark skin and the fruits are salubrious in general debility. [6]

Classical Ayurvedic Preparation

- Kadambutvakurna
- Kadambuphala rasa etc.

Kadambua is bitter, pungent and astringent in taste, pungent in the post digestive effect and has cold potency. It alleviates all the three dosas, predominantly kapha and pitta. It possesses light and dry attributes. By its special potency, it acts as vedanasthapana – analgesic and visaghna – detoxifies the toxins.

In Raja Nighantu, three kinds of Kadambu are mentioned namely, dharaKadambu that is the Kadambu described above, dhuliKadambu – which blooms in the spring and bhumiKadambu – which has small flowers. [7] Traditionally the bark of Kadambu is used as febrifuge and to reduce the pain and inflammation by the traditional physician in Anpupalipuram, Trincomalee. [8] Bark and leaves of Kadambu used for skin diseases, the fruit used to cure the gastritis and the bark preparations used as relieve from the fever & loose motion by the traditional physician in Trincomalee town. [9]

Traditional usage of Kadambu

- The bark decoction is internally used for reduce the fever & externally used for clean the wounds.
- The stem used as firewood.
- The fruit is used as edible part.
- Stem bark decoction of Kadambu used for stop loose motion.
- The stem used as firewood.
- The plant of Kadambu believed as a religious important plant. Therefore they had grown in many temples.
- Fruit is used as edible & bark decoction used for relieve the fever.
- The stem used as firewood.

PHARMACOLOGICAL ACTIVITIES

Analgesic, antipyretic and anti-inflammatory activities

Extracts of the bark and leaf of *Anthocephalus cadamba* possess the analgesic, antipyretic and anti-inflammatory activities. The defatted aqueous extract of the leaves of *Anthocephalus cadamba* showed significant analgesic and anti-inflammatory activity at varying doses (50, 100, 300 and 500 mg/kg). [26,27] The methanolic extract of the bark of *Anthocephalus cadamba* was successfully evaluated for analgesic, antipyretic and anti-inflammatory activities by some workers.

Diuretic and laxative activity

The various extracts of the barks of *Neolamarckiacadamba* were studied for its diuretic and laxative activity and it was found that the methanol extract (300 mg/kg) of the bark of *Neolamarckiacadamba* significantly showed in increases the urinary output (diuresis) as compared with aqueous,

chloroform and petroleum ether extract, whereas the chloroform extract (300 mg/kg) produced significant laxative property.

Antioxidant activity

The extract of *Anthocephalus cadamba* Syn. *A. indicus* possesses potent antioxidant activity by inhibiting lipid peroxidation and increase in the superoxide dismutase (SOD) and catalase activity.

Anthelmintic activity

Aqueous and ethanolic extracts of mature bark of *Neolamarckiacadamba* has been reported for its anthelmintic activity against earthworms, tapeworms, and roundworms.

Hypolipidemic activity

From the experimental studies carried out by the workers showed the marked decrease in the lipid level in alloxan (150 mg/kg body wt.) induced diabetic rats. Oral administration of root extract (500 mg/kg body wt.) of *Anthocephalus indicus* for 30 days in dyslipidemic animals resulted in significant decrease in total cholesterol, phospholipids, triglycerides and lipid peroxides.

TOXICOLOGICAL STUDIES

The methanolic extract of *Anthocephalus cadamba* barks were studied for its toxicity in mouse models. The results suggested that acute toxicity was found in animal models at doses range higher than 300 mg/kg and there was no mortality found at 300 mg/kg dose in animal models. The sub-acute toxicity was carried out at dose 600 mg/kg. From the result it is suggested that *A. cadamba* is non-toxic at doses of 600 mg/kg.

CONCLUSION

Synthetic drugs available for the treatment produce multiple unwanted effects. To avoid this problem search of newer and alternative therapy is getting important. Thus several studies are ongoing worldwide to find natural healing agents with better safety profile. The current study was thus aimed to review the properties of *Anthocephalus cadamba* which is mentioned in ancient siddha's quotation and modern research evidences. Hence it is time to explore its medicinal values at molecular level with the help of various biotechnological techniques.

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CONFLICT OF INTEREST : None declared

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21. Department of Pharmacognosy, NitteGulabhiShetty Memorial Institute of Pharmaceutical Sciences, Deralakatte, Mangalore, India;
22. H.R.Ambujakshi, Silvia Treasa Antony, Y.Kanchana, Shyamnanda InduUmeshSanadhya, MeetaBhot, Jossy Varghese, Naresh Chandra, Department of Pharmacognosy, Smt. S S P College of Pharmacy, Chopda, Maharashtra, India-425107
23. SLN College of pharmacy, chitoor, ap, india. department of chemistry, jawaharlalnehru technological university college of engineering, ananthpur- 01, andhrapradesh, india.