Anthocephalus Cadamba: A Review

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ABSTRACT

Anthocephalus cadamba is one of such ayurvedic remedy that has been mentioned in many Indian medicinal literatures. This article discusses about the medicinal values of *Anthocephalus cadamba*. In this communication, we reviewed the phytochemistry of *Anthocephalus cadamba* and its application in the treatment of various ailments like diabetes mellitus, diarrhoea, fever, inflammation, haemoptysis, cough, vomiting, wounds, ulcers, debility and antimicrobial activity. The major constituents of the plant are triterpenes, triterpenoid glycosides, flavanoids, saponins, indole alkaloids; cadambine, cadamine, isocadambine, isodihydrocadambine. This review discusses the investigations made by various workers related to chemical constituents, pharmacological action and toxicological studies of this plant since years till date.

Key words: *Anthocephalus cadamba*, Indole alkaloids, Pharmacological action, Antimicrobial action and Toxicological studies.

INTRODUCTION

Anthocephalus cadamba Miq., Syn. *A. indicus, A. rich, A.chiensis* (Lam.) Rich. Ex. Walp, *Neolamarckia cadamba* (Roxb.) Bosser. (Family-Rubiaceae) commonly called kadamba enjoys a hallowed position in Ayurveda- an Indian indigenous system of medicine. It is also named as Kadam. Other vernacular names of *Anthocephalus cadamba* have been listed in the Table 1. The tree is a medium to large sized deciduous tree attaining a height of 20-40 m and a girth of about 2-2.5 m with clean cylindrical branches and rounded crown. It is frequently found all over the India on the slopes of evergreen forests up to 500 m. It is found in the sub-himalayan tract from Nepal eastwards on the lower hills of Darjeeling terai in West Bengal where it is common; in Chota Nagpur (Bihar), Orissa and Andhra Pradesh, in the Andamans, it is very common in damp places along large streams, and in Karnataka and Kerala on the west coast, and western ghats at low level in wet places. It is also distributed in Thailand and Indo-china and eastward in Malaysian archipelago to Papua New Guinea.[1, 2] The bark of the plant is reported to possess tonic, bitter, pungent, sweet, acrid, astringent, febrifugal, anti-inflammatory, digestive, carminative, diuretic, expectorant, constipating and antiemetic properties and is given to treat the fever and inflammation of eyes. The flowers are used as vegetable. The leaves are slightly aromatic with unpleasant taste but the decoction of leaves good for ulcers, wounds, and metorrhea. Additionally, it is useful in the treatment of snake-bite. It is often used in the form of powder (nygrodhadi kvatha churna) which is a herbal formulation. A general description about *Anthocephalus cadamba* has been summarized in Table 2.[3-5] The analytical parameters of plant mentioned in Table 3.[6,7]

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PHYTOCHEMISTRY

Anthocephalus cadamba primarily consist of indole alkaloids, terpenoids, sapogenins, saponins, terpenes, steroids,fats and

Table 1: Vernacular names of *Anthocephalus cadamba*

S.No.	Vernacular names
1	Sanskrit: Kadambah, Vrtta puspa, Priyaka
2	English: Wild chinchona
3	Hindi: Kadamb, Kadam
4	Assam: Roghu, Kadam
5	Tamil: Vellaikkatampu, Arattam, Kadappai
6	Malayalam: Katampu, Attutekka
7	Kannada: Kadamba mara, Kadavala, Neirumavinamara
8	Telugu: Kadambamu, Kadimi chettu
9	Indonesia: Jabon
10	Malaysia: Kalempayan
11	Cambodia: Thkoow

reducing sugars.[1,4] The bark also consist of tannins[2] and an astringent principle; which is due to the presence of an acid similar to cincho-tannic acid.[5] A new pentacyclic triterpenic acid isolated from the stem bark *Anthocephalus cadamba* named cadambagenic acid(18α-olean-12ene-3β-hydroxy 27,28-dioic acid) (Fig. 1), along with this acid quinovic acid (Fig. 2) and β sitosterol (Fig. 3) have also been isolated.[8] Dried stem bark of *Anthocephalus indicus* has been investigated for its steroidal and alkaloidal constituents having good therapeutic values.[9,10] Glycosidic indole alkaloids; cadambine ($C_{27}H_{32}N_2O_{10}$) (Fig. 4), 3α-dihydrocadambine ($C_{27}H_{34}N_2O_{10}$) (Fig. 5), isodihydrocadambine ($C_{37}H_{44}N_2O_{15}$) (Fig. 6)[11,12] and two related non-glycosidic alkaloids; cadamine ($C_{23}H_{23}N_3O_4$) (Fig. 7) and isocadamine isolated from the leaves of *Anthocephalus cadamba*.[13] The isolation and structure of 3β-dihydrocadambine and 3β-isodihydrocadambine (Fig. 8) alkaloids reported from the leaves of *Anthocephalus cadamba* with molecular formula ($C_{37}H_{44}N_{15}O_2$).[14] A new saponin named saponin B ($C_{48}H_{76}O_{17}$) reported from *Anthocephalus cadamba* (Miq.).[15] Anthocephalus cadamba also contain an acid called chlorogenic acid (CGA) (Fig. 9).[16] Recently some worker isolated two novel triterpenoid saponins, phelasin A and phelasin B from the bark of *Anthocephalus cadamba* (Roxb.) Miq.[17] Two novel monoterpenoid indole

Table 2: General description of *Anthocephalus cadamba*

S.No.	Description
1	Habitat: The tree is frequently found all over the India and it is also distributed in Thailand, Indo-china and east-ward in Malaysian archipelago to Papua New Guinea.
2	Parts used: Dried fruits, fresh fruits, leaves, flowers, barks, seeds and roots. Bark: Bark is dark brown, roughish, with longitudinal fissures peeling off in thin scales.
3	Leaves: Leaves coriaceous, elliptical-oblong or ovate, entire margin, pulvinus base, acute shortly acuminate, 18-30 cm long and 10-16 cm broad pubescent beneath.
4	Flowers: Flowers are small, yellow or orange in colour, globose heads which are in 3-5 cm in diameter.
5	Fruits: Fruit a fleshy, orange, globose pseudocarp 5-7 cm in diameter and yellow when ripe.
6	Seeds: Seeds are small, muriculate.

Table 3: Analytical parameters of *Anthocephalus cadamba*

S.No.	Parameters	Result
1	Foreign matters	Not more than (nmt) 2%
2	Total ash	8-9%
3	Acid-insoluble ash	0.6-1.5%
4	Water-soluble ash	2-2.5%
5	Sulfated ash	4-4.5%
6	Alcohol-soluble extractive values	4-6%
7	Water-soluble extractive values	4.5-5.0%

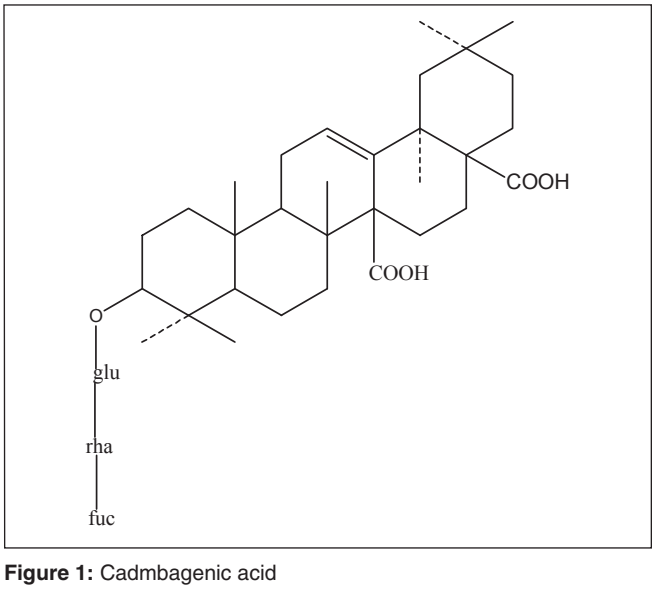

Figure 1: Cadmbagenic acid

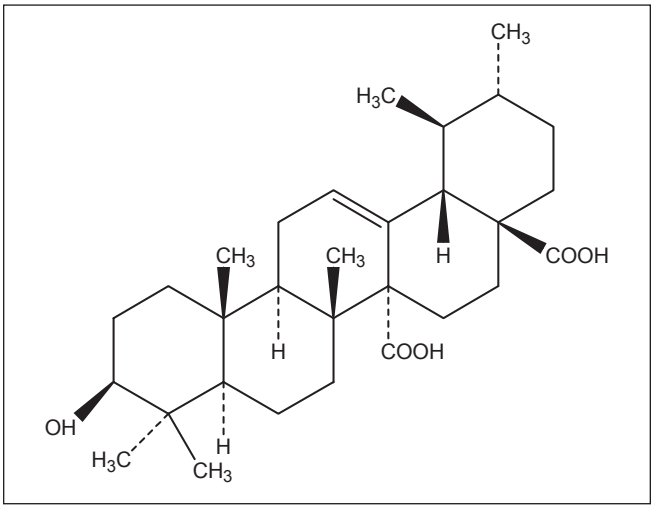

Figure 2: Quinovic acid

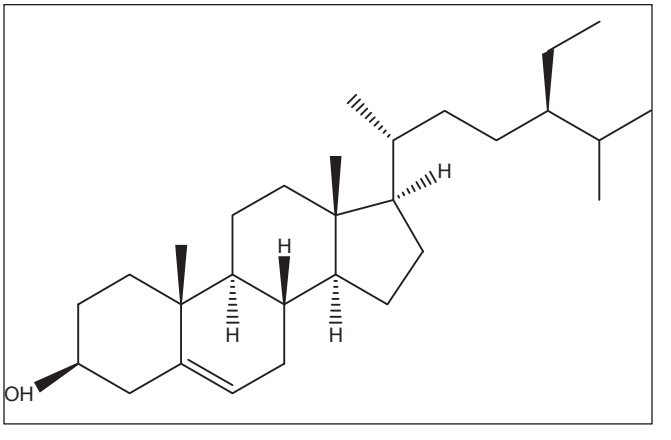

Figure 3: β - sitosterol