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ANTHOCEPHALUS CADAMBA (ROXB) : AN OVERVIEW

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ABSTRACT

ANTHOCEPHALUS CADAMBA (ROXB) (Family-Rubiaceae) commonly called kadamba enjoys a hallowed position in Ayurveda- an Indian indigenous system of medicine. It is also named as Kadam. The study was to evaluate the potential of various extract of various part of Anthocephalus Cadamba (Roxb). 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.

Key words: Anthocephalus Cadamba, Etanolic, Pharmacognosy, Chemical constituents

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INTRODUCTION

The various part of the tree is widely used in Ayurveda, Siddha and Unani system of medicine. Anthocephalus cadamba is a large tree with a broad crown and straight cylindrical bole. The tree: may reach a height of 45 m with trunk diameters of 100-(160) cm. The tree sometimes has small buttresses and a broad crown. The bark is gray, smooth in young trees, rough and longitudinally fissured in old trees. Leaves glossy green, opposite, simple more or less sessile to petiolate, ovate to elliptical (15-50 x 8-25 cm). Inflorescence in clusters; terminal globose heads without bracteoles, subsessile fragrant, orange or yellow flowers; Flowers bisexual, 5-merous, calyx tube

funnel-shaped, corolla gamopetalous saucer-shaped with a narrow tube, the narrow lobes imbricate in bud. Stamens 5, inserted on the corolla tube, filaments short, anthers basifixed. Ovary inferior, bilocular, sometimes 4-locular in the upper part, style exserted and a spindle-shaped stigma. Fruitlets numerous with their upper parts containing 4 hollow or solid structures. Seed trigonal or irregularly shaped.

**PLANT PROFILE :**

Botanical Name: Anthocephalus Cadamba

Family: Rubiaceae

SCIENTIFIC CLASSIFICATION:

kingdom : Plantae

Subkingdom : Tracheobionta

Class : Asteridae

Order : Rubiales

Family : Rubiaceae

Genus : Neolamarckia F.Bosser

Species : Neolamarckia cadamba (Roxb)

VERNACULAR NAMES

Sanskrit : Kadamba, Priyanka, Nipa,

Kannada : Kadava

Filipino : Kaatoan bangkal

Hindi : Kadam

Indonesia : Kelempayan

Malay : Kalempayan, kelampo

Thai : Krathum

English : Common bur-flower,

Assam : Roghu, Kadam

Tamil : Vellaikkatampu, Arattam

Malayalam : Katampu, Attutekka

Kannada : Kadamba mara,

Telugu : Kadambamu, Kadimi

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DISTRIBUTION:

Anthocephalus cadamba grows naturally in the Australia,China, India, Indonesia, Malaysia, Papua New Guinea, Philippines, Singapore, and Vietnam. It is a favoured plantation species inside and outside its native range. It has been planted as an ornamental and plantation tree and has been successfully introducedinto Costa Rica, Puerto Rico, South Africa, Surinam,Taiwan, Venezuela and other tropical and subtropical countries (Orwa; 2009).

PLANT PARTS USED:

Barks, Fruits, Leaves, seeds, and root

MICROSCOPY

The microscopic study of Neolamarckia cadamba leaf showed the presence of simple elongated, unicellular trichomes, rubiaceous types of stomata on the lower side of the leaf, starch grains, crystals of calcium oxalate, wedge-shaped vascular bundles, phloem in the form of ring and oil globules. The leaves of Neolamarckia cadamba having methyl salicylate aroma when crushed by hands [6, 7]. The bark consists of thin-walled, rectangular cells, phloem fibres some cell consists of chlorophyll and prismatic crystals of calcium oxalate.

ACTIVE CHEMICAL CONSTITUENTS :

Phytochemical investigation shows the presence of

chemical constituents such as indole alkaloids, terpenoids, saponins, sapogenins, terpenes, steroids, fats and reducing sugars, glycoside, steroids, fats, and flavonoids. The isolated principle are Glycosidic indole alkaloids; cadambine, 3 α -dihydrocadambine, isodihydrocadambine and two related non-glycosidic alkaloids; cadamine and isocadamine.

The bark also consists of tannins and an astringent principle; which is due to the presence of an acid similar to cincho-tannic acid. A new pentacyclic triterpenic acid isolated from the stem bark *Neolamarckia cadamba* named cadambagenic acid (18 α -olean-12ene-3 β -hydroxy 27, 28-dioic acid) along with this acid quinovic acid and β - sitosterol have also been isolated.

Dried stem bark of *Anthocephalus indicus* has been investigated for its steroidal and alkaloidal constituents having good therapeutic values. Glycosidic indolealkaloids;cadambine3 α -dihydrocadambine ,isodihydrocadambine and two related non-glycosidic alkaloids; cadamine and isocadamine isolated from the leaves of *Neolamarckia cadamba*.

PHARMACOLOGICAL STUDIES

ANALGESIC, ANTIPYRETIC AND ANTI-INFLAMMATORY ACTIVITY

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

ANTI-PYRETIC ACTIVITY

The purpose of the present study was to evaluation estimation and anti-pyretic activity of *anthocephalus cadamba* Roxb. Leaves extracts using Yeast induces hyperpyrexia method. Paracetamol was kept as standard. The study was carried out in Wister strain weighing 150-200gm. The results obtained from the Yeast induced

pyrexia method indicated that Chloroform, ethanol, distilled water extracts have significant onset of action as reduction of temperature by these extracts was found within 30 minutes. Whereas the reduction of temperatures with Petroleum ether and Solvent ether extracts was late. In all extracts the temperatures were reduced to normal till 180 minutes. Even Paracetamol also has significantly reduced rectal temperature to the extent of 37.70c from 30 min. to 180 minutes. All the results were compared with Control group.

ANTIFUNGAL ACTIVITY

The alcoholic and aqueous extracts of fruits (ripened and un-ripened) of this plant showed significant antifungal activity against the organisms: *Trichophyton rubrum*, *Candida albicans*, *Microsporum*, *Aspergillus niger*, with zone of inhibition of the maximum 15.0 mm and 12.0 mm against *Trichophyton rubrum* for ethanolic and hot water extracts, respectively. The minimum MIC determined, was as low as 2.00 mg/ml and 2.5 mg/ml for ethanolic and methanolic extracts of ripened fruit of *A. cadamba* against *Trichophyton rubrum* and

Aspergillus niger, respectively.

DIURETIC AND LAXATIVE ACTIVITY

The various extracts of the barks of *Neolamarckia cadamba* were studied for its diuretic and laxative activity and it was found that the methanol extract (300 mg/kg) of the bark of *Neolamarckia cadamba* significantly showed in increases the urinary output (ie., diuresis) as compared with aqueous, chloroform and petroleum ether extract, whereas the chloroform extract (300 mg/kg) produced significant laxative property.

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.

ANTIOXIDANT ACTIVITY

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

ANTIHEPATOTOXIC ACTIVITY

Neolamarckia cadamba have been reported to be used for its hepatoprotective activity. The hepatoprotective activity is due to the presence of chlorogenic acid (CGA) isolated from *Neolamarckia cadamba*. It was also found that the intraperitoneal administration of CGA to mice at a dose of 100 mg/kg for 8 days exhibited a better liver protective action than silymarin (SM), in CCl₄ administered mice. The antioxidative activity of CGA is responsible for its hepatoprotective nature. CCl₄ is used as a model of liver injury.

ANTIMICROBIAL AND WOUND HEALING ACTIVITY

Neolamarckia cadamba has been reported for antimicrobial activities. The plant has been reported to possess potent antibacterial and antifungal activity against *Escherichia coli*, *Micrococcus luteus*, *Bacillus subtilis*, *Staphylococcus aureus*, *Pseudomonas aeruginosa*, *Salmonella typhi*, *Klebsiella pneumonia*, *Proteus mirabilis*, *Candida albicans*, *Trichophyton rubrum*, *Aspergillus niger*, *Aspergillus flavus* and *Aspergillus nidulans*. The experimental evidence also shows that *A. cadamba* extract has potent wound healing capacity. The aqueous extract of *A. cadamba* also found effective against *Rhizycteria tritici* a causal organism of tundu disease of wheat and effective against foot and mouth disease of animals.

CONCLUSION

Research in medicinal plants has gained a renewed focus recently. The main reason is that the system of medicine associated with number of side effects that often cause serious problems. Though traditionally *Anthocephalus Cadamba* (Roxb) has various medicinal activities but it is time to explore its medicinal values at molecular level with the help of various biotechnological techniques. Few toxicological studies have been

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reported. The work could also be done in this direction to ensure free utility of the plant.

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