

Phytochemical and Traditional uses on *Acanthus ilicifolius* (L).

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Abstract

Acanthus ilicifolius is a spiny herb found in mangrove of southern Thailand. It is also widely distributed in India and other tropical regions of Asia. The plant is reported to contain phytochemicals including alkaloid and wide range of glucosides (lignan and phenylethanoid). In traditional medicine, the plant is used in the treatment of diseases ranging from snake bite to skin diseases. *A. ilicifolius* (sea holly) occurs in tropical Asia and Africa, through Malaya to Polynesia. It is a vine shrub or tall herb, up to 1.5 m high, scarcely woody, bushy, with very dense growth. Common names of which are holy leaved acanthus, sea holly and holy mangrove. *A. ilicifolius* abundantly available in freshwater ecosystem of Pichavaram mangroves located in southeast coast of India. The review analyses traditional medicinal usage, and phytochemical investigations done on the *A. ilicifolius* medicinal plant.

Key words : Phytochemistry, Traditional Uses, Pharmacology, *Acanthus ilicifolius* (L.).

Introduction

A. ilicifolius In folklore and traditional practice, different parts of *A. ilicifolius* (Acanthaceae) have been used to treat rheumatism, asthma, paralysis, psoriasis and leucorrhoea (Kirtikar and Basu 2001). *A. ilicifolius* Linn. (Acanthaceae) is a perennial herbaceous plant, popularly recognized as "Holy leaved acanthus". The plant normally lives in areas of modest salinity, forming bush around mangrove palms. Historically, the plant is employed in traditional systems of medicine, including traditional Indian medicine or Ayurveda and traditional Chinese medicine for treating various ailments (Wostmann and Liebezeit 2008 and Liu et al., 2013). 'Acanthus' is derived from Greek word 'Acantha' which means thorn or thistle, referring to spiny leaves of some species. The word 'ilicifolius' means 'ilex' leaves in Latin and refers to holly-like leaves. Acanthus is the only genus of family Acanthaceae which occupies mangroves habitat (Arumugam saranya et al., 2015). Moreover, the plant possesses anti-inflammatory, antioxidant, antileishmanial, osteoblastic, hepatoprotective, anticancer, antiulcer and antimicrobial activities (Ganesh 2010).

Study of the plant



Fig1: plate of *Acanthus ilicifolius* Linn

Classification

Class : Dicotyledones
Sub class: Gamopetalae
Series : Bicarpellatae
Order : Personales
Family : Acanthaceae
Genus : *Acanthus*
Species : *ilicifolius*

Plant morphology

Shallow tap roots, but occasionally stilt roots are conspicuous. Leaf simple, opposite, decussate, cauline, exstipulate, petiole short, flattened, glabrous, pulvinous to sheathing base. Flower bisexual, typically zygomorphic, complete, erect, sessile, hypogynous. Fruit 1 cm green and 2.5 - 2.0 cm long, kidney shaped 4 seed drupe, Seed 0.5 - 1.0 cm long (Xie et al., 2005).

Phytochemical

Phytochemical screening of *A. ilicifolius* leaf extracts revealed the presence of proteins, resins, steroids, tannins, glycosides, sugars, carbohydrates, saponins, sterols, terpenoids, phenol, alkaloids, cardiac glycosides and catechol (Chinnavenkataraman Govindasamy and Mani Arulpriya 2013). Two new cyclolignan glycosides, (+)-lyoniresinol 3a-O- β -D-galactopyranosyl-(1 \rightarrow 6)- β -D-glucopyranoside and (+)-lyoniresinol 2a-O- β -D-galactopyranosyl-3a-O- β -D-glucopyranoside have been reported from aerial parts of *A. ilicifolius* (Zhang et al., 2004).

Chemical constituents

The chemical constituents (salts, organic acids, carbohydrates, hydrocarbons, benzoquinone, naphthofurans, sesquiterpenes, triterpenes, alkaloids, flavonoids, polymers, sulfur derivatives and tannins) isolated from mangrove plants have potential application in medicine (Kanchanapoom et al., 2001 and Wu et al., 2004).

Traditional Medicinal Uses

Substances in mangroves have long been used in folk medicine to treat diseases. *A. ilicifolius* is a shrub present along the Indian coastal regions. *A. ilicifolius* popularly traditional usage in Indian and

Chinese systems of medicine. Folklore claims for this plant are as aphrodisiac, blood purifier, diuretic, for treatment of asthma, diabetes, dyspepsia, hepatitis, leprosy, neuralgia, paralysis, ringworm, rheumatism, skin diseases, snakebite, stomach pains, leucorrhoea, leukemia (Mastaller et al., 1997 and Bandaranayake 2002). Tea brewed from the leaves relieves pain and purifies blood (Mastaller et al., 1997). A decoction of the plant with sugar candy and cumin is used in dyspepsia with acid eructations. Leaves are bruised and soaked in water for external application and are also used as an expectorant. It is also considered to be a diuretic and it is used as a remedy for dropsy and bilious swellings (Chakraborty et al., 2007).

In Ayurveda, the plant is known as Sahachara. According to Nadkarni the drug is astringent and makes a good nervine tonic, expectorant, and stimulant. He says that the root is expectorant, and is used in coughs and asthma. The root, boiled in milk, is largely used in leucorrhoea and general debility. Loureiro says that the Siamese and Indo-Chinese consider the roots to be cordial and attenuant, and useful in paralysis and asthma. The tender shoots and leaves are used in India for bite. In Goa, the leaves, which abound in mucilage, are used as an emollient fomentation in rheumatism and neuralgia (Mastaller 1997).

Pharmacology

Anti Inflammatory Activity

Whole plant extract was reported to have analgesic and anti-inflammatory actions. Methanolic fraction of *A. ilicifolius* leaf extract produced significant and dose dependent inhibition of rat paw edema, when administered both prior to and after carrageen an administration (Arumugam Saranya et al., 2015). Its activity was similar to that of BW755C, a dual cyclooxygenase (COX) and lipoxygenase (LOX) inhibitor. Anti-inflammatory action was attributed to inhibition of COX/LOX enzymes along with significant suppression of cytokine generation. In addition, superior free radical trapping activity of components present in the leaf extract may have influenced its anti-inflammatory action (Mani senthil kumar et al., 2008).

Anticancer Activity

Alcoholic extract of *A. ilicifolius* exhibited antioxidant (Wostmann and Liebezeit 2008, Babu et al., 2001, Firdaus et al., 2008) and anti-tumour activities (Babu et al., 2002). It was found to be effective against tumour progression and carcinogen induced skin papilloma formation in mice. The free radical hypothesis supports that antioxidants can effectively inhibit carcinogenesis and observed properties

may be attributed to antioxidant principles present in the extract (Babu et al., 2002).

Antiprotozoal Activity

2-Benzoxazolinone was obtained from leaves of *A. ilicifolius* (Murty and Solimabi kamat., 1984). This compound exhibited significant anti-leishmanicidal activity against *Leishmania donovani* (Kapil et al., 41994).

Antimicrobial Activity

A. ilicifolius possesses bioactive compounds that have potential for use as antibacterial (Manilal et al., 2009). Roots showed activity against leukemia virus in erythro leukemic Swiss mice. Alcoholic and chloroform extracts of leaves exhibited strong inhibitory action against *B. subtilis*, *S.aureus*, *C.albicans*, *A.fumigatus* and *A.niger* and moderate inhibitory action against *P.aeruginosa* and *P.vulgaris* (Bose and Bose 2008).

Anti-osteoporotic activity

The effects of the compounds isolated from *A. ilicifolius* on the function of osteoblastic MC3T3-E1 cells were tested. Acteoside, isoacteoside, and (+)-lyoniresinol 3a-O-beta-glucopyranoside (30 microM) increased the growth and differentiation of osteoblasts significantly (P<0.05), indicating that *A. ilicifolius* leaves may help

prevent osteoporosis (*Van Kiem et al., 2008*).

Conclusion

The present study of Phytochemical screening of *A. ilicifolius* leaf extracts revealed the presence of proteins, resins, steroids, tannins, glycosides, sugars, carbohydrates, saponins, sterols, terpenoids, phenol, alkaloids, cardiac glycosides and catechol. The potential of plant extracts are due to presence of secondary metabolites, and the extract were proven in containing various beneficial compounds for antioxidant and anti-inflammatory effects the antimicrobial activity of *A. ilicifolius* against the skin infecting bacterial and fungal pathogens. Hence further studies are planned for isolation and purification of bioactive constituents from these plants will be useful for control the infection pathogen and also perform in vivo animal studies to confirm these observations obtained in the present study

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