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ACANTHUS ILICIFOLIUS (ACANTHACEAE); AN ENDANGERED WOUND HEALING MANGROVE PLANT

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ABSTRACT

Wounds are inevitable incident of life, they often occur as a result of physical injury, chemical injury and microbial infections. Healing of wounds is a complex process in which the skin (or another organ-tissue) repairs itself after injury, once the protective barrier is broken; the normal (physiologic) process of wound healing is immediately set in motion. Though, the healing process takes place naturally, an infection may seriously delay this process. However, sometimes the degree of wounds crosses beyond its natural healing capacities and also there is a chance of microbial infection around the wounded tissues, which requires a number of drugs ranging from simple non-expensive analgesics to complex and expensive chemotherapeutic agents. In modern biomedical area, development for the management of wound healing is an expensive program for the peoples of developed countries. Several drugs obtained from natural sources are known to increase the healing and repair process of different types of infected wounds. Some of these natural drugs already been screened scientifically for their therapeutic efficacy to repair wounds in different pharmacological models, but many of the traditionally used herbs and herbal formulations remains unexplored for their usefulness against infections and wounds. In this current review, one of the endangered wound healing mangrove plant, *Acanthus ilicifolius* (Acanthaceae) have been highlighted.

Key words: Wounds, Microbial infections, Herbal formulations, *Acanthus ilicifolius*, Acanthaceae.

INTRODUCTION

Acanthus ilicifolius L (Acanthaceae) is a mangrove plant which has leaves looking like the spiny holly leaves. Unlike some mangrove plants, *Acanthus ilicifolius* do not exclude salt at the root level. In fact, their sap is salty and excess salt is secreted through the leaves, to be removed by rain or wind. Sometimes, the salt can be seen as a white crystalline layer on the upper surface [1-3].

Healing is the response to injury in an attempt to restore normal structure and function. The entire wound healing process is a complex series of events.

In India, the leaf of this plant is popularly used for its wound healing effects [4]. Literature survey reveals that there is no related work done in the plant previously. Healing is the body response to injury in an attempt to restore normal structure and function. The process of healing involves 2 distinct processes:

1.Regeneration when healing takes place by proliferation of parenchymal cells and usually results in complete restoration of the original tissues.

2.Repair when the healing takes place by proliferation of connective tissue elements resulting in fibrosis and scarring.

Healing of skin wounds provides a classical example of combination of regeneration and repair described above. This review works highlights the Pharmacognosy, Phytochemistry, Phytopharmacology, Phytopharmacology and uses of *Acanthus ilicifolius* (Acanthaceae) [5] briefly.

BOTANY AND PHARMACOGNOSY

Figure 1. Habit of *Acanthus ilicifolius*

Acanthus ilicifolius belongs to the family Acanthaceae, has typical spinose margins on its evergreen leaves and stipular spines at stem nodes.

It is generally found in tropical Asia and Africa. It is a shrub or tall herb, up to 1.5 m high, scarcely woody,bushy, with very dense growth. Leaf is simple and opposite. Flowers are bisexual, typically zygomorphic, complete, erect, sessile, hypogynous. Stem is differentiated into distinct node and inter nodes. Leaf simple opposite, exstipulate, pulvinous to sheathing, lamia oblong, spiny to very spiny margine and wavy, apex acute, Inflowresence recemose, Flowers bracteates, bisexual, complete, gymorphse, calyxsepalous, polyscpalos, corolla petals 1, large, vioate, Androecium stamen 4 filament, anther bilobed, basifixed, Gynoecium carpel 2, Synncarpy, chambered, two ovale in each chamber Fruit is capsule, kidney shaped. Germination epigeal, non vivipatous [6].

Common Name: Holy Mangrove

Habitat and Ecology:

It commonly grows on the river banks or tidal canal sides or low swampy areas in the mangrove forests and its vicinity.

Systems: Freshwater; Marine

Native: Australia, Bangladesh, Cambodia, China, Hong Kong, India, Indonesia, Macao, Malaysia, Pakistan, Papua New Guinea, Singapore, Sri Lanka, Taiwan, Province of China, Timor-Leste, Viet Nam.

Main features: A shrub that grows to 1.5 m tall.

Roots: May develop small prop roots

Leaves: Thick, shiny, waxy, may have prickly edges.

Flowers: Cluster at the branch tip. The species *A. ilicifolius* (holic) has light violet flowers, while *A. ebracteatus* has white flowers.

Fruits: Shiny green pods in a cluster

PHYTOCONSTITUENTS REPORTED:

Two new cyclolignan glycosides, (+)-lyoniresinol 3a-O-β-D-galactopyranosyl-(1→6)-β-D glucopyranoside and (+)-lyoniresinol 2a-O-β-Dgalactopyranosyl- 3a-O-β-D glucopyranoside have been reported from aerial parts of *A. ilicifolius*. A phenylethanoid glycoside (ilicifolioside A) and an aliphatic alcohol glycoside (ilicifolioside B) have been isolated from the aerial parts Two lignanglucosides, (+)-lyoniresinol 3a-[2-(3,5- dimethoxy-4-hydroxy) benzoyl]-O-beta-glucopyranoside, and dihydroxymethyl-bis (3, 5-dimethoxy-4-hydroxyphenyl) tetrahydrofuran-9(or 9')-O-beta-glucopyranoside have been isolated from the aerial parts [7-20].

Table 1. Chemical compouds isolated from *A.ilicifolius*

S.No.	Plant Part	Type of Extract	Compounds Isolated
1	Powdered plant material	Ethanolic extract	Alkaloid-acanthicifoline
2	Root	Ethanolic extract	Triterpenoidsaponin
3	Leaves	Aquous methanolic extract	2-benzoxazolinone
4	Leaves	Chloroform extract	Pentacyclictriterpenids and sterols
5	Leaves	Ethanolic extract	Methylapigenin 7-o-β-D-glucuronate flavone glycosides
6	Leaves	Methanolic extract	Bisoxazolinone
7	Aerial part	Methanolic extract	Lignin and cyclolignin glycosides
8	Pods	Methanolic extract	1,4- benzoxazolinone
9	Dried aerial part	Methanolic extract	Benzoxazinoidglucosides
10	Dried aerial part	Ethanolic extract	Aliphatic alcohol glycoside-ilicifolioside C and two Z-4 coumaric acid glycosides.
11	Dried aerial part	Ethanolic extract	Phenylethanoid glycoside (ilicifolioside A) and an aliphatic alcohol glycoside (ilicifolioside)
12	Stem	Hexane extract	Homologous series of 15 saturated odd and even fatty acids
13	Leaves	Methanolic extract	Coumaric acid derivative-Acancifoliuside
14	Spiny herb		Megastigmane and flavone glycosides

PHARMACOLOGICAL ACTIVITY AND MEDICINAL USES [21-30]:

The plant has been reported for its Anti-inflammatory activity, Anti-leishmanial activity, Osteoblastic activity, Hepatoprotective activity, Anti-cancer activity, Antimicrobial, Antifungal, Hepato protective, Antioxidant, Cytotoxic, Antiulcer and Gastroprotective, Analgesic and Anti-inflammatory.

A decoction of the plant with sugar candy and cumin is used in dyspepsia with acid eructations. It is also considered to be a diuretic and is used as a cure for dropsy and bilious swellings. The plant is reported to be used in asthma. The leaves are used as expectorant, employed as an emollient fomentation in rheumatism and neuralgia. The leaves and tender shoots are used in snake bite. The root is also used as expectorant and used in asthma. This when boiled in milk is used in leucorrhoea and general debility.

CONCLUSION

The development of novel natural compounds from the mangrove plants is becoming popular. The global

consumers were aware on the benefits of the natural products. *A.ilicifolius* has been well known traditional medicine in the treatment of wounds and inflammation. It is also used in dryness, swelling, itching and redness of the skin. It has proven in having various beneficial compounds. The limited number of wound healing agents is available in the market and most of those are expensive. Further those drugs also have the potential to cause adverse side effects. Considering these adverse effects, availability and cost of treatment, there is a need to search for newer, safer and more potent agents to combat wounds. The development of formulation like ointment on this mangrove plant will be beneficial in the treatment of wounds caused by natural or infection, etc.

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