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A COMPLETE PROFILE ON *ACROSTICHUM AUREUM* - TRADITIONAL USES, PHARMACOLOGICAL ACTIVITES AND PHYTOCONSTITUENTS

Raja. S* and Ravindranadh. K

GITAM Institute of Pharmacy, GITAM University, Visakhapatnam- Andhra Pradesh, India-Pincode-530 045.

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***Correspondence for Author**
Dr. Raja Sundararajan
GITAM Institute of Pharmacy, GITAM University, Gandhi Nagar, Rushikonda, Visakhapatnam-530 045, Andhra Pradesh, India.

ABSTRACT

Indian Medicinal plants are used as ancient style of providing helps too many ailments. Presently, variant peoples are looking on healthful plants for his or her primary health care wishes. The current review designates the morphological, active principles and ethnopharmacological aspects of *Acrostichum aureum*. Being it's a vital healthful plant in Chinese medication this are supposed to vary medical specialty activities like analgesic, antiinflammatory, antifertility, antioxidant, and cytotoxic activities. Different active constituents such as alkaloids, saponins, tannins, sterols, triterpinoids patriscabratine, tetracosane, ponasterone, pterosterone, kaempferol, quercetin, and sulphated protein C are a unit to date according in *Acrostichum aureum*. Well conducted biological studies area unit still required for many indications of this species. This review is useful to make interest towards *Acrostichum aureum* and should be helpful in rising new formulations with additional therapeutic and economical worth.

KEYWORDS: *Acrostichum aureum*, patriscabratine, ponasterone, pterosterone, formulation.

INTRODUCTION

Acrostichum aureum Linn (Family- Pteridaceae), common name: Swamp Fern, Mangrove Fern, occurs Worldwide in mangrove swamps, salt marshes, canal margins, and low hammocks. It is widely distributed throughout South Florida [1], Brazil, South & West Mexico, Guyanas, Central Ameri`ca, Colombia, Venezuela, Ecuador, Paraguay, Barbados,

Trinidad, South china, Taiwan, Japan, North Australia, India, Sri Lanka and Bangladesh. [2] It is an evergreen shrub, can be grown as annual which is locally used as choice of medicinal plant in the treatment of major and minor complaints. The taxonomical classification and vernacular names of *Acrostichum aureum* were mentioned in below table 1 & 2.

Taxonomical classification

Kingdom	Plantae
Subkingdom	Tracheobionta
Phylum/Division	Pteridophyta
Class	Filicopsida
Order	Polypodiales
Family	Pteridaceae
Genus	*Acrostichum*
Species	*aureum*
Common names	Golden leather Fern, paku laut, mangrove fern, coarse swamp fern, golden leather fern, piairaya, larat, pia

Vernacular names of Acrostichum aureum

Bangladesh	Hudo
India	Minni(Tamil)
Indonesia	Paku tiai(Sunda); Kalakeok, Kerakas, wihakas(java)
Jamaica	Alligator rush, crab thatch, Golden fern, Gold fern
Malaysia	Piuai raya, paku bulu emas, paku laut, larat, peye, piai, piai lasa, Umbi piai, Pebsi
Philippines	Lagolo,Piai, Pakupakuan, Lapole
Singapore	Tiger Fern, Piai raya
South Florida	Golden Leather Fern
Srilanka	Karen koku
Veitnam	Cary rang la, Rang bien thoung

MORPHOLOGY

Acrostichum aureum, the golden leather fern, is a large understory fern that occurs in mangrove forestsand other wetlands. Plants measure approximately 1.2 - 1.8m (4 -6 feet) in height and are as broad as they are tall. Fronds are usually arching around the periphery of the plant, but tend to be more erect near the center. The thick, leathery leaves are compound and large, measuring over 1m (3.3 feet) in length, and 12 - 50 cm (4.8 - 19.7 inches) in width. There are 24 - 30 pairs of alternate leaflets (pinnae) that are non-overlapping, rounded at the tips, and measure approximately 10 - 34 cm (3.9 - 13.3 inches) in length X 1.3 - 7 cm (0.5 - 2.8 inches) in width. Leaves are shiny and typically dark green above, but paler on the leaf underside. Leaf margins are somewhat uneven and wavy in appearance. No sori are present

as in other ferns. Rather, sporangia are distributed over the entire underside of reproductive pinnae (the most distal 5 or more pairs), lending a felt-like texture to these leaves. Sporangia are brick red to rust red in color, with spores measuring 37 - 72 and 181; m in diameter.

ETHNOMEDICAL INFORMATION OF *ACROSTICHUM AUREUM*

In Malaysia, the powdered or granted rhizomes of *Acrostichum aureum* are used to treat wounds, non healing ulcers and boils. [3] In India the frond is applied over venomus snakebites as an antidote. Others, the fertile fronds and roots are used traditionally for syphilitic ulcers. [3] In Fiji, *Acrostichum aureum* was used to treat sore throat, chest pains, elephantiasis, purgative and febrifuge. [4] In Bangladesh the leaves of *Acrostichum aureum* are used to cure cloudy urine in women. [3] In Malaysia leaves of this plant is used for stop bleeding. [5] Different parts of *Acrostichum aureum* with ethnomedical information are stated in Table No.3.

Table 3: Ethnomedical information of *Acrostichum aureum*

Country	Part used	Uses	Reference
Malaysia	Rhizomes	wounds, non healing ulcers and boils	[3]
-----	Fertile fronds and roots	Syphilitic ulcers	[3]
Fiji	Plant	Sore throat, chest pains, elephantiasis, purgative and febrifuge	[4]
Bangladesh	Leaves	Cure cloudy urine in women	[3]
Malaysia	Leaves	Stop bleeding	[5]

PHARMACOLOGICAL ACTIVITIES OF *ACROSTICHUM AUREUM*

Different parts of *Acrostichum aureum* with pharmacological information are mentioned in Table 4.

Anti-inflammatory activity of *Acrostichum aureum*

The anti-inflammatory activity in ethanol (95%) extract of *Acrostichum aureum* by varied carrageenan-induced inflammation rat models was studied. [6] Results indicated highly significant maximum inhibition in carrageenan induced oedema test in rats showing 65.90% reduction in the paw volume ($P<0.01$) comparable to that produced by the standard drug Indomethacin (66.66%) after 24h.

Antioxidant activity of *Acrostichum aureum*

Ethanol extract of *Acrostichum aureum* possesses a robust in vitro antioxidant activity. [5] This study was focused on invitro inhibitor activity by victimization completely different parameters like 2, 2-diphenyl-1-picrylhydrazyl (DPPH) assay, superoxide scavenging impact, reducing power and in-vitro lipid peroxidation. Results prompt that ethanol extract of *Acrostichum aureum* was found to be significantly effective in scavenging DPPH (EC_{50} =41.95µg/ml).

Analgesic activity of *Acrostichum aureum*

The analgesic activity of *Acrostichum aureum* plant was deliberated. [5] Numerous parameters like tail flick latency (TFL) and writhing number was calculated. Results suggested that samples of *Acrostichum aureum* showed 28.86% (P<0.001) and 46.77% (P<0.01) writhing inhibition at the doses of 250 and 500 mg/kg body weight respectively in a dose dependent manner, that was extremely comparable with standard diclofenac sodium 69.15% (P<0.001) at the dose of 25 mg/kg body weight.

Anti fertility activity of *Acrostichum aureum*

Ethanol and acetone extracts of *Acrostichum aureum* showed potent anti-implanation activity in rats was proved. [7] The water soluble fraction of ethanolic (95%) extract was found to have prevented pregnancy in female rats during administration on day 1-7 postcoitus. The fraction does not have neither oestrogenic and anti- oestrogenic activities.

Cytotoxicity activity of *Acrostichum aureum*

The methanolic extract from *Acrostichum aureum* leaves showed selective cytotoxicity (IC50: 1.02 mg/ml) against different cancer cell lines such as AGS, MDAMB-231 and MCF-7 cells, and AGS, MDA-MB-231, HT-29, and NIH 3T3. [4]

Table 4: Pharmacological activities of *Acrostichum aureum*

Plant part	Solvent used for extraction	Use	Reference
Root	Ethanol	Anti-inflammatory activity	[6]
Whole plant	Ethanol	Antioxidant activity	[5]
Whole plant	Ethanol	Analgesic activity	[5]
Whole plant	Ethanol and acetone	Anti fertility activity	[7]
Leaves	Methanol	Cytotoxicity activity	[4]

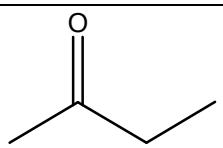
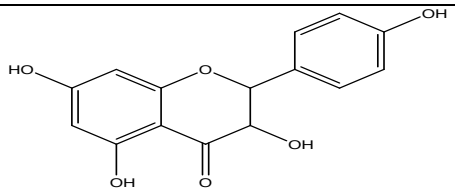
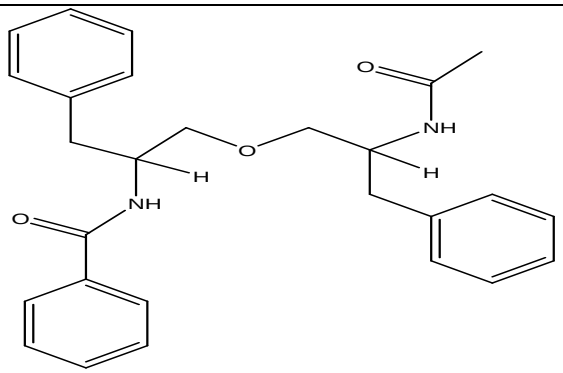
ACTIVE CONSTITUENTS PRESENT IN *ACROSTICHUM AUREUM*

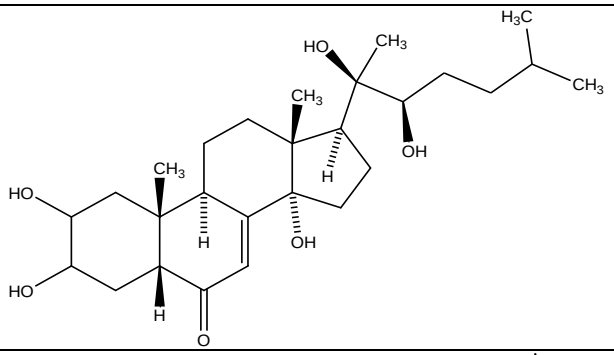
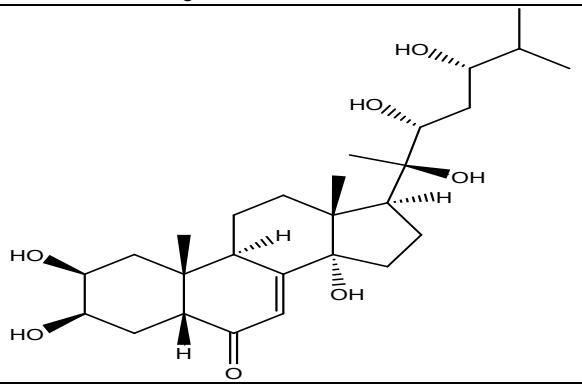
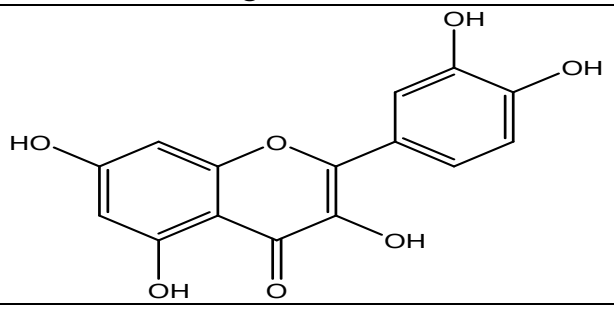
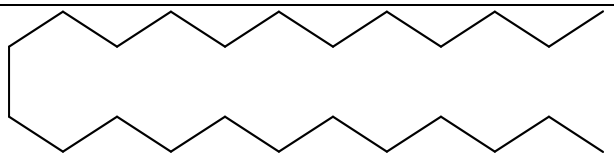
Phytoconstituents 2-butanone, ponasterone, pterosterone, kaempferol and quercetin were isolated from ethanolic extract of *Acrostichum aureum.* [8] The whole plant contains glycosides, saponins, steroids and fronds. [9] Patriscabratine and tetracosane, isolated from the Bangladesh mangrove fern, *Acrostichum aureum.* [4] The sesquiterpene, (2R, 3S)-sulfated pterosin C, isolated from the same fern demonstrated an apoptotic effect on AGS cells within 24 hours of treatment. [10] Active constituents with their IUPAC names and structures are given in Table 5 and 6.

Table5 Active constituents present in *Acrostichum aureum*

Part of the plant	Solvent used for extraction	Active constituent	References
Whole plant	Ethanol	2-Butanone, ponasterone, pterosterone, kaempferol and quercetin	[8]
Whole plant	--------	Glycosides, saponins, steroids and fronds	[9]
Leaves	Methanol	Patriscabratine and tetracosane	[4]
Leaves	Methanol	(2R, 3S)- Sulfated pterosin C	[10]

6: Phytoconstituents with IUPAC names and structures

Butanone	Butan-2-one	
Kaempferol	2,3-dihydro-3,5,7-trihydroxy-2-(4-hydroxyphenyl)chromen-4-one	
Patriscabratine	(2-acetamido-3-phenylpropyl) 2-benzamido-3-phenylpropanoate	

Ponasterone	(5R,9R,10R,13R,14S,17S)-1,2,3,4,5,10,11,12,13,15,16,17-dodecahydro-2,3,14-trihydroxy-17-((2R,3R)-2,3-dihydroxy-6-methylheptan-2-yl)-10,13-dimethyl-9H-cyclopenta[a]phenanthren-6(14H)-one	
Pterosterone	(2S,3R,5R,9R,10R,13R,14S,17S)-1,2,3,4,5,10,11,12,13,15,16,17-dodecahydro-2,3,14-trihydroxy-17-((2R,3R,5S)-2,3,5-trihydroxy-6-methylheptan-2-yl)-10,13-dimethyl-9H-cyclopenta[a]phenanthren-6(14H)-one	
Quercetin	3,5,7-trihydroxy-2-(3,4-dihydroxyphenyl)-4H-chromen-4-one	
Tetracosane	Tetracosane	

CONCLUSION

The extensive literature survey exposed that *Acrostichum aureum* is important medical plant with diverse ethnomedical and pharmacological information. The plant shows the occurrence of some natural constituents which are answerable for wide ranging pharmacological and medicinal properties. The evolution needs to be carried out on *Acrostichum aureum* in order to uses and preparation of the plant in their pratical clinical applications, which can be recycled for the welfare of the mankind.

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