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PHYTOCHEMICAL AND PHARMACOLOGICAL STUDIES OF FLOWERS OF *ARECA CATECHU*

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ABSTRACT

Areca catechu (Fam: Arecacea) is a medium sized palm has a slender single trunk, 30 meter tall and 20 centimeter wide with annual rings are formed from the remains of leaf scars and the seeds are popular for chewing through some Asian countries. The seed is pungent, bitter, spicy, sweet, salty, and astringent. In old Indian scripts, Areca nut has been described has a therapeutic agent for leucoderma, anemia, obesity and is used to remove tapeworms and other intestinal parasites. The flowers are used by the tribes for treat inflammations associated with wounds and snake bites, they used the flowers for worship snake gods. The alkaloids of arecanut can be used to enhance the healing of burns and wounds. Most of the research works are reported on the seeds that it have hypoglycemic activity, anti oxidative property, decrease the Alzheimer's disease sypmtoms, strong molluscicidal activity against snails. But very few studies are reported in flowers. The present study highlights the phytochemical, pharmacognostical and in-vitro anti-inflammatory studies on the flowers of Areca catechu.

KEYWORD: *Areca catechu* Anti-inflammatory property.

INTRODUCTION

The relationship between plants and people started from the creation of human the man has been using herbs and herbal products for curing disease. Numerous types have been well recognized and categorized by botanist by high range of Himalayan tract up to sea shore of Kanyakumari. The extensively flora has been greatly utilized as a source of many drugs in the Indian traditional system of medicine.[1]

Areca cultivation is one of the traditional indigenous agricultural activities in the region. The plant is considered to be as old as the history of the tribes or communities in the region. Arecanut, a palm species grows in a heavy rainfall areas or where frequent irrigation is available. Meghalaya is among the wettest places on earth and is the home of an extra ordinary diversity of people that includes the Khasis, Jaintia and Garo tribes.[1]

Traditionally, it has been used as an aphrodisiac, appetite suppressant, digestive aid, and diuretic; and as a treatment for asthma, cough, dermatitis (used on the skin), fainting, glaucoma, impotence, intestinal worms, leprosy, and toothache. It has also been indicated for use with leucorrhoea (vaginal discharge) and vaginal laxity. The nut contains several alkaloids belonging to the pyridine group, the most important being arecoline. The others are arecaidine, guvacine, and isoguvacine. Arecaidine has no parasympathomimetic effects, only stimulating properties.[2]

Fig no 1

MATERIALS AND METHODS

COLLECTION

The flowers of areca catechu was collected from Kozhikode dried and powdered.

PHARMACOGNOSTIC STUDIES

A] DETERMINATION OF MOISTURE CONTENT[3]: Five grams of plant powder were placed in a tarred evaporating dish. Drying was carried out at 105˚C for 5 hours. The drying was continued at 1 hr interval until difference between two successive weighing corresponded to not more than 0.25%. Constant weight was reached when two consecutive weighing's, after drying for 30 minutes and cooling for 30 minutes in desiccators, showed not more than 0.01 gm difference.

B] DETERMINATION OF ASH VALUE[4, 3]: The ash value is an important parameter for the evaluation of crude drugs, due to variation of values within fairly wide limits. The ash value of any organic material is composed of inorganic materials like metallic salts and silica.

Total ash: Two grams of ground air dried material were accurately weighed out in a crucible previously ignited for 30 minutes. The material was spread in a even layer and ignited at a temperature not more than 450˚C until it was white indicating the absence of carbon. Cooled in desiccators and weighed. Calculated the content of total ash per gram of air dried material.

Acid insoluble ash: To the crucible containing the total ash, 25 ml of 2N hydrochloric acid was added, covered with a watch glass and boiled gently for 5 minutes. The watch glass were rinsed with 5 ml each of hot water and added in to the crucible. Collected the insoluble matter on an ashless filter paper and washed with hot water until the filtrate was neutral. Filter paper containing the insoluble matter was transferred to original crucible, dried on a hot plate and ignited to constant weight. The residue was allowed to cool in a desiccator for 30 minutes; then weighed. The constant of acid insoluble ash per gram was calculated.

Water soluble ash: To the crucible containing the total ash, 25 ml each of water was added and boiled for 5 minutes. The insoluble matter was collected in a sintered glass crucible. Washed with hot water and ignited in a crucible for 15 minutes at a temperature not exceeding 450˚C. The weight of this residue in mg substracted from the weight of total ash. The content of water soluble ash was calculated per gram of air dried material.[4]

C] DETERMINATION OF EXTRACTIVE VALUE: This method determines the amount of active constituents in a given amount of plant material when extracted with the solvent. The extractive value is used as a means of evaluating the crude drug which are not readily estimated by other means.

Alcohol soluble extractive: Macerated 5 grams of coarsely powdered air dried plant of *Acacia catechu* with 100ml ethanol in a stoppered flask for 24 hours, with occasional shaking during the first 6 hours and then allowed to stand undisturbed for another 18 hours. Filtered rapidly, by taking precaution against loss of alcohol. Then 25 ml of the filtrate was evaporated to dryness in a tarred flat bottomed shallow dish, dried at 105˚C and weighed. Calculated the %w/w alcohol soluble extractive with reference to air dried material.

Water soluble extractive value: 5 grams of coarsely powdered air dried plant of *Acacia catechu* was macerated with 100ml chloroform water in a stoppered flask for 24 hours, with occasional shaking during the first 6 hours and then allowed to stand for another 18 hours. Filtered rapidly, then 25 ml of the filtrate was evaporated to dryness in a tarred flat bottomed shallow dish and dried at 105˚C and weighed. Calculated the percentage w/w of water soluble extractive with reference to air dried material.

D] ORGANOLEPTIC EVALUATION: Color, size, odour, taste, texture, and fracture were examined.

E] QUANTITATIVE MICROSCOPY: The length and width of stained fibers was measured by focussing them on the caliberated eye peice micrometer.

F] EVALUATION OF FOREIGN MATTER: About 200g of powder was weighed spread out as thin layer. The foreign matter was detected.

G] EXTRACTION: Successive solvent extraction of flowers of *Areca catechu* using solvents of increasing polarity viz.pet ether, chloroform, ethyl acetate, acetone, methanol, and water.

H] PRELIMINARY PHYTOCHEMICAL SCREENING[3,8,9]: Various chemical test was carried out using extract was performed for identify the presence of alkaloid, glycoside, phenolic compound, flavanoids, flavones, terpenoids and sterols.

I] *INVITRO* ANTI INFLAMMATORY ACTIVITY[5,6,7]

Protein denaturation method: The reaction mixture (0.5 ml) consisted of 0.45 ml bovine serum albumin (5% aqueous solution) and 0.05 ml of plant extract of 50,100,150,200 mcg/ml concentration (total alcoholic and aqueous) and Ph was adjusted to 6.3 using 1N HCL. The sample were incubated at 37°C for 20 min and then heated at 57°C for 3 min. Diclofenac was used as standard drug (50, 100, 150, 200 mcg/ml). After cooling the samples, 2.5 ml phosphate buffer saline (PH 6.3) was added to each tube. Absorbance was measured spectrophotometrically at 660 nm. For control tests 0.05 ml distilled water was use instead of extracts while product control lacked bovine serum albumin. The percentage inhibition of protein denaturation was calculated as follows.

Percentage inhibition= $[(A_0-A_1)/A_0]/100$

Where, A_0=Absorbance of control, A_1=Absorbance of sample/standard

RESULTS AND DISCUSSION

PHARMACOGNOSTIC STUDIES

Studies were conducted on extractive value, moisture content; water soluble extractive value was found to be more than alcohol soluble extractive value. The results are shown in the table-1.

Table-1 pharmacognostics of the flower of *Areca catechu.*

S.NO	STUDIES	VALUES
1	1. Moisture content	1.15% w/w
2	2. Extractive value a) Alcohol soluble extractive b) Water soluble extractive	10.66% w/w
3		13.80% w/w
4	3. Foreign matter	0.22% w/w

QUANTITATIVE MICROSCOPY

Table-2 Length and Width of phloem fibers of the flower of *Areca catechu.*

	Maximum	Minimum	Average
Length	864.8	244.4	539.56
Width	47.00	18.8	32.9

EXTRACTION

Successive solvent extraction method was done using petroleum ether, chloroform, ethyl acetate, acetone, methanol, Water. The charecteristics of extracts shown in the table-3.

Sl No.	Solvent used for Extraction	Colour	Consistency	Percentage yield (%w/w)
1	Petroleum ether	Light green	Semisolid	01.27
2	Chloroform	Brownish black	Semisolid	00.72
3	Ethyl acetate Acetone	Greenish brown	Semisolid	01.60
4	Methanol	Brownish black	Semisolid	00.08
5	Aqueous	Brown	Semisolid	02.36
6		Brownish black	Solid	04.57

PRELIMINARY PHYTOCHEMICAL SCREENING

Results of preliminary phytochrmical screening of different extracts of flowers of *Areca catechu* shown in table-4.

Table -4 Results of preliminary screening of different extracts of the flowers of *Areca catechu.*

Sl. no:	Phytoconstituent test	PEE	CE	ACE	EAE	ME	AE
1	Alkaloids	-	+	+	+	+	+
2	Glycosides	+	+	+	+	+	+
3	Phenolic compounds	-	+	+	+	+	+
4	Flavanoids	-	+	+	+	+	+
5	Carbohydrate	-	+	+	+	+	+
7	Terpenoids	+	-	-	-	+	+
8	Sterols	+	-	-	-	+	+

***INVITRO* ANTI INFLAMMATORY ACTIVITY**

In-vitro anti inflammatory activity done using protein denaturation method by using diclofenac as standard. Methanol and aqueous extracts were have significant Antibacterial activity. The results are shown in the table -5.

Table-5 IC_{50} VALUES OF *Areca catechu* in various extracts.

SL. NO	SAMPLE	IC50 (mcg/ml)
1	Standard	41.8
2	Pet. ether extract	235
3	Chloroform extract	210
4	Ethyl acetate extract	203
5	Acetone extract	191
6	Methanol extract	39
7	Aqueous extract	42

CONCLUSION

Areca catechu is a species of palm grown mainly in Asian countries for seed crop. Information from extensive literature review indicates that Areca catechu has a broad spectrum of pharmacological effects. There are a number of studies which conclude that Arecanut is main constituent responsible for oral cancer. However, the flowers of Areca catechu was traditionally accepted for treatment of wound healing and skin disorders. This study reveals the flower of Areca catechu have significant anti-inflammatory activity for its

methanolic and aqueous extracts, may be due to presence of phytoconstituents like alkaloids, glycosides, flavanoids.

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