

# In-vitro Study of Anti-Bacterial Activity and Phytochemical Investigation of *Cyperus rotundus*.

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## Abstract:

The main aim of study, to evaluate the antibacterial activity and phytochemical analysis of *Cyperus rotundus* rhizomes and tubers (family: cyperaceae). The antibacterial activity was determined by disc diffusion method. The antibacterial activity is evaluated by two gram positive organism such as staphylococcus aureus, S.epidermitis and two gram negative organism such as Escheerichia coli, Klebsiella pneumonia in compared with ceftriaxone as an standard. The zone of inhibition is measured. The phytochemical constituents was detected by using chemical test.

**Key words:** *Cyperus rotundus* tuber, antibacterial activity, phytochemical investigation.

## INTRODUCTION:

The plant *Cyperus rotundus* is a perennial plant, it's family cyperaceae. *Cyperus rotundus* was called muthakach in tamil (korai in some villages) It may reach a height up to 140cm (55 in).it is also called nutgrass and nutsedge, which are derived from its tubers. The leaves sprout in ranks of three from the base of the plant around 5 to 20cm(2-8in) long. Its flower stems have a triangular cross-section. Its flower is bisexual, with three stamina and three stigmas pistil with the inflorescence having 3 to 8 unequal spikes. Its fruit is three angled achene. Then the young plant initially forms white, fleshy rhizomes up to 25 mm (1.0 in) in dimension in chains. Some rhizomes(tubers) grow upward in the soil, then form a bulb-like structure from which new shoots & roots grow, other rhizomes grow horizontally or downward and form dark reddish-brown tubers or chains of tubers. It was found in all countries like India, Assam, Afghanistan, Japan, Pakistan, Philippines, Srilanka, western Australia, etc. The antibacterial activity of crude drugs of *Cyperus rotundus* has efficiency against some clinical isolate of bacteria. The world health organization plants belonging to the clinical aspect, are considered as the worthiest choice in drug production. It is locally used in traditional medicine decoction for flatulence, vomiting, nausea, regulating hormones, diuretics, tonic hypoglycemic.

## MATERIAL AND METHODS:

### Plant material:

The entire herb of *Cyperus rotundus* was collected from sangiyam, keezhapalayam and E.N. palayam village lake. That village 30km away from kallakurichi.

### Chemicals:

The all chemicals, reagents used for our entire experiment work are procured from our college lab (Smt. Gandhimathi college of pharmacy).

### Experimental activity:

After the *Cyperus rotundus* tubers were collected including leaves. Then, it is washed with fresh water to

remove the soil and adhered matters. Then the rhizomes, tubers are collected separately. Then the tubers of *Cyperus rotundus* was dried under shade at room temperature. After drying tubers was powdered by using an electronic device and sieved with 40mesh size. About 2kg of powdered drug was weighed and subjected to the successive Soxhlet extraction with ether, benzene, water (60 to 70oC) for 48 hours. Then the dried marc was further subjected to cold maceration using acetone, ethanol (1:1) for consecutive days respectively. Finally obtained extract was filtered through a muslin cloth. Then it is dried in the vacuum condition to get a semisolid mass. The dried extract was subjected to various chemical tests to detect the phytochemical constituents.

### Phytochemical investigation:

The dried extract of *Cyperus rotundus* was subjected to various chemical test for analysis of phytochemical constituents.

### Selection of micro-organism:

We are selected two gram positive organism such as *Staphylococcus aureus*, *staphylococcus epidermidis*, and two gram negative organism such as *Escherichia coli*, *Klebsiella pneumonia* for anti-bacterial activity.

### Evaluation Antibacterial activity:

The anti-bacterial activities are carried out by the disc diffusion method. The study was evaluated in two-gram positive *Staphylococcus aureus*, *staphylococcus epidermidis* and two gram-negative *Escherichia coli*, *Klebsiella pneumonia* organism with comparing standards(ceftriaxone). The nutrient agar media is used for the growth of bacteria. And each bacteria in agar media was distributed to a sterile Petri dish separately. The agar disc was removed using a sterile wire loop. The extract was inoculated and incubated at 37oC for 18hrs. Finally, the zone of inhibition is measured. The ethanol and aqueous extract of *Cyperus rotundus* were more effective in compared to other extracts.

## RESULT AND DISCUSSION:

Phytochemical screening of *Cyperus rotundus* tubers:

S.No.	Chemical constituent	Hexane extract	Ethanol extract	Aqueous extract
01	Alkaloids	-	+++	+
02	Glycosids	+	+	Not clear
03	Flavonoids	-	+++	+
04	Anthroquinone	-	+	-
05	Phenols	-	+++	+
06	Phlobatannins	-	+	+++
07	Saponins	-	+++	+++
08	Steroids	-	+	+
09	Tannins	-	+++	+
10	Terpenoids	+	+++	Not clear

'+' positive, +++ strongly positive, - negative.

### Antibacterial activity:

The extract of *Cyperus rotundus* was subjected to antibacterial studies with gram-positive (*Staphylococcus aureus*, *S.epidermitis*) and gram-negative (*Escherichia coli*, *Klebsiella pneumonia*) organisms. The ethanol extract of *Cyperus rotundus* showed antibacterial activity against *Staphylococcus aureus*, *S.epidermitis* and *Escherichia coli*, *Klebsiella pneumonia* compared with ceftriaxone as a standard. The ethanol, the aqueous extract has more antibacterial activity compared to another extract.

Name of organism	Zone of inhibition		
	Standard (mm)	Ethanol extract (mm)	Aqueous extract (mm)
<i>Staphylococcus aureus</i> ,	38	32	22
<i>S.epidermitis</i>	33	28	20
<i>Escheerichia coli</i> ,	37	28	21
<i>klebsiella pneumonia</i>	36	27	19

The study agrees with result, the ethanol and aqueous extract of *Cyperus rotundus* was high antibacterial activity in compared with other extract, the antibacterial activity was observed in compared with standard.

### CONCLUSION:

In this study, rhizomes-tubers of *Cyperus rotundus* have the highest antibacterial activity due to presence of secondary metabolites. The ethanolic extract of *Cyperus rotundus* more effective in compare to aqueous extract.

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