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PHTYOCHEMICAL SCREENING AND ANTIMICROBIAL ACITIVITY OF LEAVES AND RHIZOME EXRACTS OF *FIMBRISTYLIS OVATA.*

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ABSTRACT

The various extracts of leaves and rhizomes of the sedge Fimbristylis ovata (Burm. F.) Kern (Cyperaceae) were investigated for its antimicrobial activity. The methanolic extracts of leaves and rhizomes which were screened, depict the presence of tannins, saponins, flavonoids, anthocyanins and β-cyanines, quinines, cardiac glycosides, phenol, coumarins, alkaloids and tannins, saponins, flavonoids, anthocyanins and β-cyanines, quinines, terpenoids, phenol, alkaloids respectively.

The antimicrobial activity studied showed an ideal length of zone of inhibition in both leaves and rhizome extracts

KEYWORDS : *Fimbristylis ovata, phytochemical screening and antimicrobial activity.*

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INTRODUCTION

Medicinal plants are valuable natural resources and regarded as potentially safe drugs and have been tested for biological, antimicrobial and hypoglycemic activity also play an important role in the modern medicine[1]. With the continuous use of antibiotics, microorganisms have become resistant. In addition to this problem, antibiotics are sometimes associated with adverse effects on host which include hypersensitivity, depletion of beneficial gut and mucosal microorganism, immunosuppression and allergic reactions. This has created immense clinical problem in the treatment of infections diseases. Therefore there is a need to develop alternative antimicrobial drugs for the treatment of infectious diseases, one approach is to screen local medicinal plants for possible antimicrobial properties. Plant materials remain an important resource to combat serious diseases in the world[2]. Phytochemistry, in the strict sense is the study of chemicals contained in plants in a more descriptive and illustrative manner. The term

is often used to describe the large number of secondary metabolic compounds found in plants. Most of these chemicals are medicinal and they are used to prevent and treat both external and internal diseases. The medicinal value of these plants lies in some chemical substances that produce a definite physiological action on the human body and these chemical substances are called phytochemicals[3].

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Fimbristylis ovata (Burm. f.) Kern belonging to the family Cyperaceae is a perennial sedge possessing orange rhizome. *Fimbristylis ovata* is distributed in the pantropics[4], tropics and subtropics and low lying grasslands. The entire plant is reported to be medicinally important in traditional systems. The entire plant is used by the Digo tribes of Kenya to treat ailments such as rheumatism, cough, bronchitis, asthma, urinary tract infection and arthritis[5.] The ayurvedic name is Ibha-muulaka. It is active against adenitis, scrofula, syphilis; also in cough, bronchitis and asthma[6]. Hence in the present study we have concentrated on the phytochemical screening of various extracts of *Fimbristylis ovata* and its antimicrobial activity.

MATERIALS AND METHODS

Fresh plant samples of *Fimbristylis ovata* were collected from the campus of Madras Christian College in the month of February 2012. The plant was authenticated by taxonomist Dr. Aris Dason Wilson, Department of Plant Biology and Plant Biotechnology, Madras Christian College, Chennai.

Rhizome was separated from leaf spur and washed thrice and shade dried for forty eight hours and powdered. The powder of both leaves and rhizome were subjected to the extraction of methanol, ethanol, distilled water (aqueous), ethyl acetate and chloroform.

Phytochemical screening

Phytochemical screening was carried to assess the phytochemicals present in the plant sample such as, anthocyanins, β-cyanins, quinines, cardiac glycosides, terpenoids, phenols, coumarins, steroids and alkaloids. Phytochemical screening of various extracts of leaves and rhizomes of *Fimbristylis ovata* were subjected to many reagents to assess the chemical constituents mentioned above.

Anitmicrobial activity

A comparative antimicrobial assay was done with the rhizome and leaf extract of *Fimbristylis ovata* against four selected human bacterial pathogens following disc diffusion method[7, 8]. Mueller Hinton Agar (MHA) plates were prepared by pouring 15% of molten agar in each Petri plate dedicated for each bacterial strain and was solidified. 20µl of strain was swabbed by applying the streak method on the agar medium of one of the plates as a control. Four bacterial strains (*Escherichia coli, Staphylococcus spp., Bacillus cereus* & *Pseudomonas spp.*) were streaked on four different plates with media. Three different µl (10, 20 & 30) of the plant extract was loaded on three different discs. Fourth disc was loaded with the respective solvent as control disc. The loaded disc was placed on the surface of the bacteria streaked media. The plates were kept for incubation at 37˚C for 24 hours. Antibacterial activity was recorded by measuring the zone of growth inhibition around the well[9].

RESULT AND DISCUSSION

The phytochemical screening results of leaves and rhizomes are tabulated in table 1 & 2 respectively. The result of the phytochemical screening shows that methanolic extract have a higher percentage in comparison to other solvents. The methanolic extracts of *Fimbristylis ovata* leaf revealed the presence of tannins, saponins, flavonoids, anthocyanins, β-cyanins, quinines, cardiac glycosides, phenols and coumarins. Alkaloids and terpenoids were absent in the extract. The preliminary phytochemical tests are helpful in finding chemical constituents in the plant material that may lead to their quantitative estimation and also in locating the source of pharmacologically active chemical compound.

Table 1: Phytochemical Screening Of *Fimbristylis ovate* Leaf Extract

Tests	Methanol	Ethanol	Distilled Water	Ethyl Acetate	Chloroform
Tannin	+	+	+	+	-
Saponins	+	+	+	+	+
Flavonoids	+	+	+	-	+
Anthocyanins and Beta cyanine	+	-	+	+	-
Quinines	+	+	+	-	-
Glycosides	-	-	-	+	-
Cardiac Glycosides	+	+	+	-	-
Terpenoids	-	+	-	-	+
Phenol	+	+	+	-	-
Coumarins	+	-	-	-	-
Steroids	-	+	-	-	-
Alkaloids	-	-	+	+	+

+ = Positive - = Negative

Table 2: Phytochemical Sreening Of Fimbristylis ovate Rhizome Extract

Tests	Methanol	Ethanol	Distilled water	Ethyl acetate	Chloroform
Tannin	+	+	+	-	-
Saponins	+	+	+	-	-
Flavonoids	+	+	+	+	-
Anthocyanins	+	+	+	+	+
Quinine	+	+	-	+	-
Glycosides	-	-	-	-	-
Cardiac glycosides	-	-	-	-	-
Terpenoids	+	+	+	+	+
Phenol	+	+	+	+	-
Coumarins	-	+	+	+	+
Steroids	-	+	+	+	+
Alkaloids	+	-	+	+	+

+ = Positive - = Negative

The result of the antimicrobial activity of the methanolic extract of both leaves and rhizomes are tabulated in table 3 & 4 respectively. The bacterial action of plant extracts can be made promising by using methanol extracts. The antimicrobial study help in understanding the effect of plant against microbes. The methanol extract of rhizome of *Fimbristylis ovata* showed a zone of inhibition measuring 16mm against *Escherichia coli* which was the maximum inhibition zone obtained. The methanol extracts from rhizome failed to elicit any reaction against *Pseudomonas spp.* The observed activity was due to the presence of some metabolites, saponins and terpenoids which have been implicated in various biological activities. These findings can be considered as a preliminary,

authentic and scientific validation for the use of *Fimbristylis ovata* for anti bacterial activity.

Table 3: Antimicrobial Activity Of *Fimbristylis ovata* Leaf Extract

Microorganisms	Methanol Extract	Zone of inhibition
Escherichia coli	10µl	8mm
	20 µl	10mm
	30 µl	13 mm
Staphylococcus	10µl	8mm
	20 µl	10mm
	30 µl	13mm
Bacillus cereus	10µl	-
	20 µl	10mm
	30 µl	10mm
Pseudomonas	10µl	-
	20 µl	13mm
	30 µ	13mm

Table 4: Antimicrobial Activity Of *Fimbristylis vata* Rhizome Extract

Microorganisms	Methanol Extract	Zone of inhibition
Escherichia coli	10µl	10mm
	20 µl	16mm
	30 µl	16mm
Staphylococcus	10µl	9mm
	20 µl	10mm
	30 µl	14mm
Bacillus cereus	10µl	9mm
	20 µl	14mm
	30 µl	15mm
Pseudomonas	10µl	-
	20 µl	-
	30 µ	-

REFERENCES

1. Hassawi, D. and Kharma, A., 2006. Antimicrobial activity of medicinal plants against *Candida albicans*. Journal of Biological Sciences, 6: 104-109.
2. Parmar Namita & Rawat Mukesh. 2012. Medicinal Plants Used As Antimicrobial Agents: A Review. International Research Journal Of Pharmacy. Vol 3(1) pp 31-40. ISSN 2230 – 8407.
3. R. Subhashini, U.S. Mahadeva Rao, P.Sumathi and Gayathri Gunalan. 2010. A comparative phytochemical analysis of cocoa and green tea. Indian Journal of Science and Technology. Vol. 3 No. 2. pp 188-192. ISSN: 0974- 6846.
4. www.iucnredlist.org
5. Burkill, H.M. 1985. Entry for Fimbristylis ovata (Burm. f.) Kern [family – Cyperaceae]. Herbarium – Royal Botanic Gardens, Kew (K).
6. Khare C.P.. Indian Medicinal Plants, An illustrated Dictionary. Springer 2007. pp 269 ISBN: 978-0-387-70637-5.
7. Barry AL. 1980. Procedures for testing antimicrobial agents in agar media. In: Antibiotics in Laboratory medicines, Williams and Wilkins Co., Baltimore, USA.
8. Bauer A.W, Kirby WMM,. Sherris JC, Truck M. 1966. Antibiotic susceptibility testing by a standard Basingle disc method. Am J Clin Pathol. 45: 493-496.
9. Bhat, S., Mercy Lobo, S., Chethan Kumar, K.V., Sukesh and Chandrashekar, K.R., 2009.

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