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ANTIMICROBIAL EFFECT OF MEDICINAL PLANT PEDALIUM MUREX AGAINST DIFFERENT MICROORGANISMS

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Abstract: Indian medicinal plants have a traditional background that they have potential to use as antimicrobial agents. Pedalium murex showed broad spectrum antimicrobial activity against three fungal strains Aspergillus niger, Aspergillus flavus, Candida albicans and five bacterial strains Escherichia coli, Staphylococus epidermis, Klebseilla pneumonia,Citrobactor diverses, Enterococus faecalis.The Ethanolic extracts were tested against selected test bacteria and fungi through disc diffusion assay where amoxicillin was used as standard. The results showed that alcoholic extract possess good antimicrobial activity against selected test bacteria and fungi. The present results therefore offer a scientific basis for traditional use of the various extract of Pedalium murex.

Key words: Antimicrobial activity, Pedalium murex, Bacillus subtilis.

I. INTRODUCTION

It is generally believed that around 25% of the active compounds used in modern medicines were derived from plants. At the same time, hardly 5000 of the over 2,50,000 flowering plants have been looked at scientifically for their medicinal properties. Presently there is an increasing interest in the use of plant microbicides because of the necessity of finding safer microbicides and the need for preventing environmental degradation.

Pedalium murex is an important medicinal plant that contains several alkaloids [1]. The leaf decoction is used to control white discharge due to excessive body heat. Root decoction is used as an anti bilious agent, while the juice of the fruit is used as an emmenagogue and to promote lochial discharge [2]. The decoction of the seeds and glycosides obtained from it showed mild diuretic activity and the alcoholic extract of the fruits reduced blood pressure in dog and rat [3]. It is reported that many Indian medicinal plants show beneficial effects against renal injury [4]. A good example is a succulent herb, *Pedalium murex* Linn, commonly called Gokhru a member of family Pedaliaceae. It is commonly found in Deccan and in some parts of Ceylon and Gujarat and in the coastal areas of southern India [5]. The fruits are rich in flavonoids, saponin soluble proteins [6]. An infusion extract prepared using cold water from the leaves, stems and fruits of *P.murex* is demulcent, diuretic and also found to be useful in the treatment of disorders of urinary systems such as gonorrhea, dysuria, incontinence of urine, etc. [7-8]. The knowledge of the chemical constituents of plants would further be valuable in discovering the actual value of folkloric remedies [9]. Research on medicinal plants has been increased and screened for their antimicrobial activities in number of studies. The knowledge of the chemical constituents of plants would further be valuable in discovering the actual value of folkloric remedies [9]. Research on medicinal plants has been increased and screened for their antimicrobial activities in number of studies.

II. METIRIAL AND METHODS

Plant parts of *Pedalium murex* for the proposed study were collected from Karaikal district, U.T of Puducherry and care was taken to select healthy plants and for normal organs. The identity of the plant specimens was confirmed by the use of local floras [10-12] and standard references [13-14]. The botanical identify was also authenticated by Dr. M. Jegadeesan, Associate Professor, at the Department of Environment and Herbal Science. Tamil University, Thanjavur, Tamil Nadu. Herbarium specimens of the taxa (Plate 1 – 4) were deposited Tamil University Herbarium during study period. Medicinally useful parts of the plants were studied in both fresh and dried conditions [15-18].

ANTIMICROBIAL STUDIES

The concentrate of all the extracts and isolated compounds were tested for antimicrobial activities against human pathogens.

A. Media preparation

a) Bacterial Media (Muller lfindo Media)

36g of molar find media (Hi–Media) was mixed with distilled water and then sterilized in autoclave at 15 lb pressure for 15 minutes. The sterilized media were poured in to petri dishes. The solidified plates were pored with 5 mm dia cork pores. The plates with wells used for antibacterial studies.

b) Fungal Media (PDA)

200g of potato slices were boiled with distilled water. The potato infusion was used as water solute of media preparation. 29g of dextrose was mixed with potato infusion. 20g of agar was added as a solidifying agent. This constituent ware mixed and autoclaved. The solidified plates were pored with 6mm dial cork borer.

c) Bacterial Strains

The bacterial and fungal pathogenic strains were obtained from the Microbial Type Culture Collection (MTCC), Institute of Microbial Technology, Chandigarh, India. Bacterial strains used were *Escherichia coli, Staphylococcus aureus, Klebsiela pneumoniae, Acetobactor diversus*.

d) Fungal strains

Fungal strains were *Aspergillus niger* (MTCC – 1344) *aspergillus floavus* (MTCC – 1973) and *Candida albicans*.

e) Anti Bacterial Activity of the Plant Extract:

The aqueous extract of dried leaves plant parts was used through our study. The aqueous extract 10% 20% and 40% were tested against different bacterial pathogens such as *Escherichia coli*, S*taphylococcus aureus*, *klebsielia pneumonia*, *Acetobactor diversus* and *Escherichia faccalic* for their antimicrobial activity. It was demonstrated by well diffusion assay.

f) Antifungal Activity of the plant Extract:

The aqueous extract of 10 % 20 % and 40% were tested against different fungal pathogens such as *Aspergillus flavus*, *Aspergillus niger* and *Candida albicans* for their antifungal activity. It was demonstrated by well diffusion assay.

g) Well Diffusion Method:

Antibacterial and antifungal activity of plant extract was test using well diffusion method (Banel et al, 1996). The prepared culture plates were inoculated with different strains of bacteria and fungi using streak plate method. Wells were made on the agar surface with 5mm cork borer. The extracts were pound into the well using sterile syringe. The plates were incubated at 37$\pm$2ºC for 48 hrs for fungal activity and for 24 hrs for bacterial activity. The plates were observed for the lone formation around the wells.

The zone of inhibition was calculated by measuring the diameter of the inhibition zone around the well (in mm) including the well diameter. The readings were taken in three different fixed directions in all three replicates and the average values were tabulated.

III. RESULTS

A. Anti-microbial activities of Pedalium murex extracts

The extracts of the plant were screened for anti-fungal activities against *Aspergillus niger*, *Aspergillus flavus and Candida albicans* in three different concentrations (10%, 20% and 40%) of petroleum ether, benzene, chloroform, alcohol and water extracts by disc method. In extracts of PM, *Aspergillus niger* displayed the inhibition zones in 10% and 20% of concentrations of petroleum ether, 20 % and 40% of benzene and all the concentrations of alcohol extracts. *Candida albucans* formed the inhibition zone only against chloroform extracts of PM (Table 1).

Extracts of *Pedalium murex* (PM) were also tested for antimicrobial activities against *Escherichia coli*, *Staphylococcus epidermidis*, *Klebsiella pneumoniae*, *Citrobactor diversus* and *Enterococcus faecalis*. Three different concentrations, namely 10%, 20% and 40% of petroleum ether, benzene, chloroform, alcohol and water extracts of both plants were used to screen anti-microbial activity by well and disc method (Table 2) (Plate 1-2).

Benzene, chloroform and alcohol extracts of PM were showed inhibition zone against the Escherichia *coli* but *Staphylococcus epidermidis* formed the inhibition zone only in benzene and chloroform extracts. Benzene, chloroform and petroleum ether (20% and 40 %) extracts of PM showed the zone of inhibition against *Klebsiella pneumoniae* and *Enterococcus faecalis* whereas *Citrobactor diversus* did not expressed the anti-bacterial activity against PM extracts.

Pedalium murex is a valuable plant source of medicinally useful compounds that has been traditionally used for several applications. The bioactive compound of plant are that exhibited good antimicrobial properties. However a detailed study is required to find out the specific bioactive compounds responsible for antimicrobial property through various advanced techniques.

Table 1.Antifungal activity of pedalium murex

S.No	Organism	Zone inhibition of different extracts (mm)														
		Pet.ether			Bezene			Chloroform			Ethyl alcohol			Water		
		10%	20%	30%	10%	20%	30%	10%	20%	30%	10%	20%	30%	10%	20%	30%
1.	Aspergillus niger	0.4	0.1	-	-	0.3	0.4	-	-	-	0.4	0.1	0.7	-	-	-
2.	Aspergillus flavus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3.	Candida albicans	-	-	-	-	-	-	0.1	0.7	0.6	-	-	-	-	-	-

Table 2.Antibactirial activity of pedalium murex

S. No	Organism	Zone inhibition of different extracts (mm)														
		Pet.ether			Bezene			Chloroform			Ethyl alcohol			Water		
		10%	20%	30%	10%	20%	30%	10%	20%	30%	10%	20%	30%	10%	20%	30%
1	Escherichia coli	-	-	-	0.6	0.7	0.9	1.2	1.6	2.5	1.5	1.9	1.2	-	-	-
2	Staphylococcus epidermis	-	-	-	0.7	1.0	1.8	0.4	1.2	1.2	-	-	-	-	-	-
3	Klebsiella Pneumoniae	-	1.3	0.4	0.6	1.5	1.3	0.6	1.6	0.7	-	-	-	-	-	-
4	Citrobactor diverses	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5	Enterococus faecalis	0.7	-	0.3	0.4	0.7	1.6	1.2	1.9	0.6	-	-	-	-	-	-

- Standard: Amoxycyllin

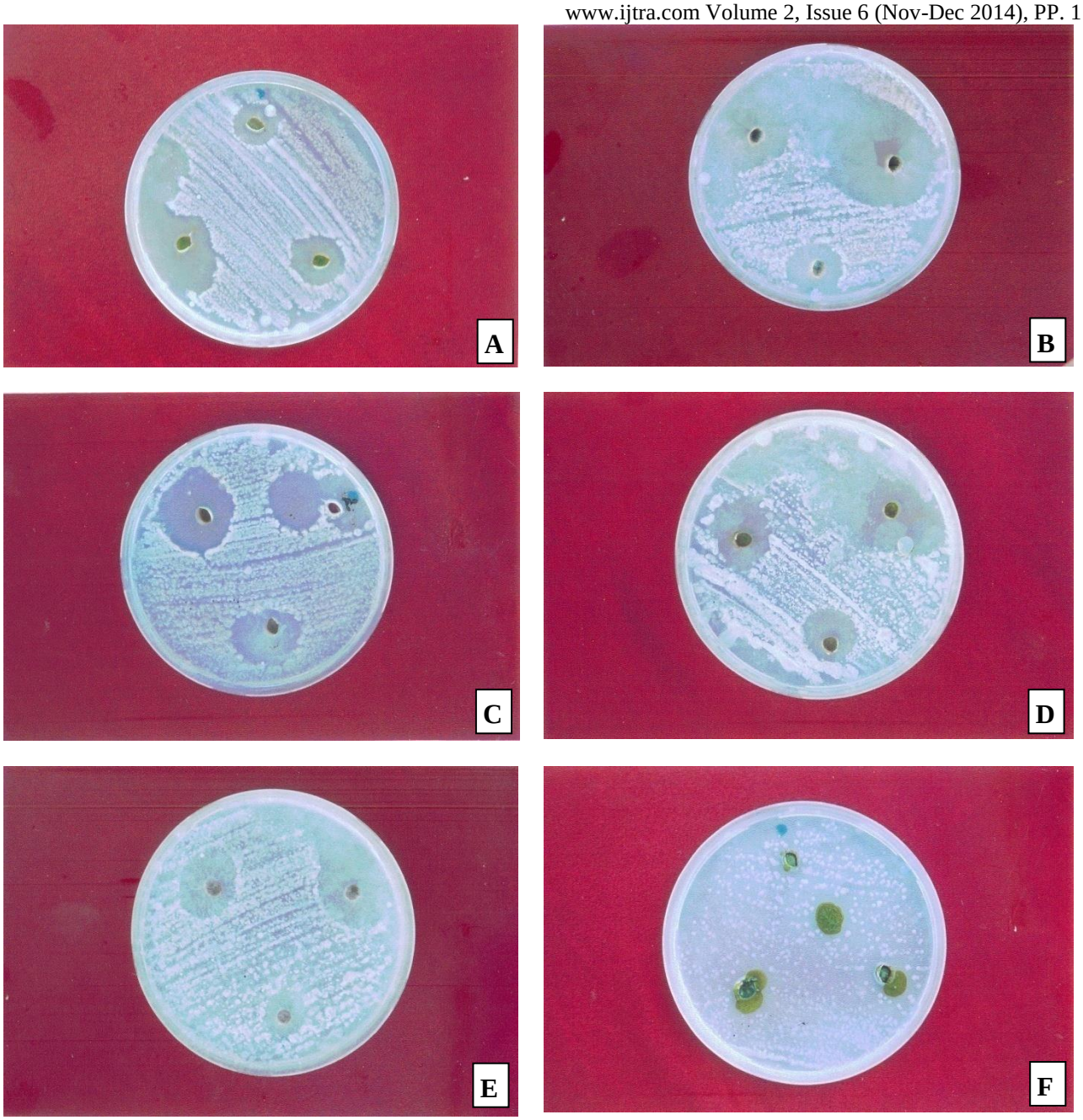

Plate – 1

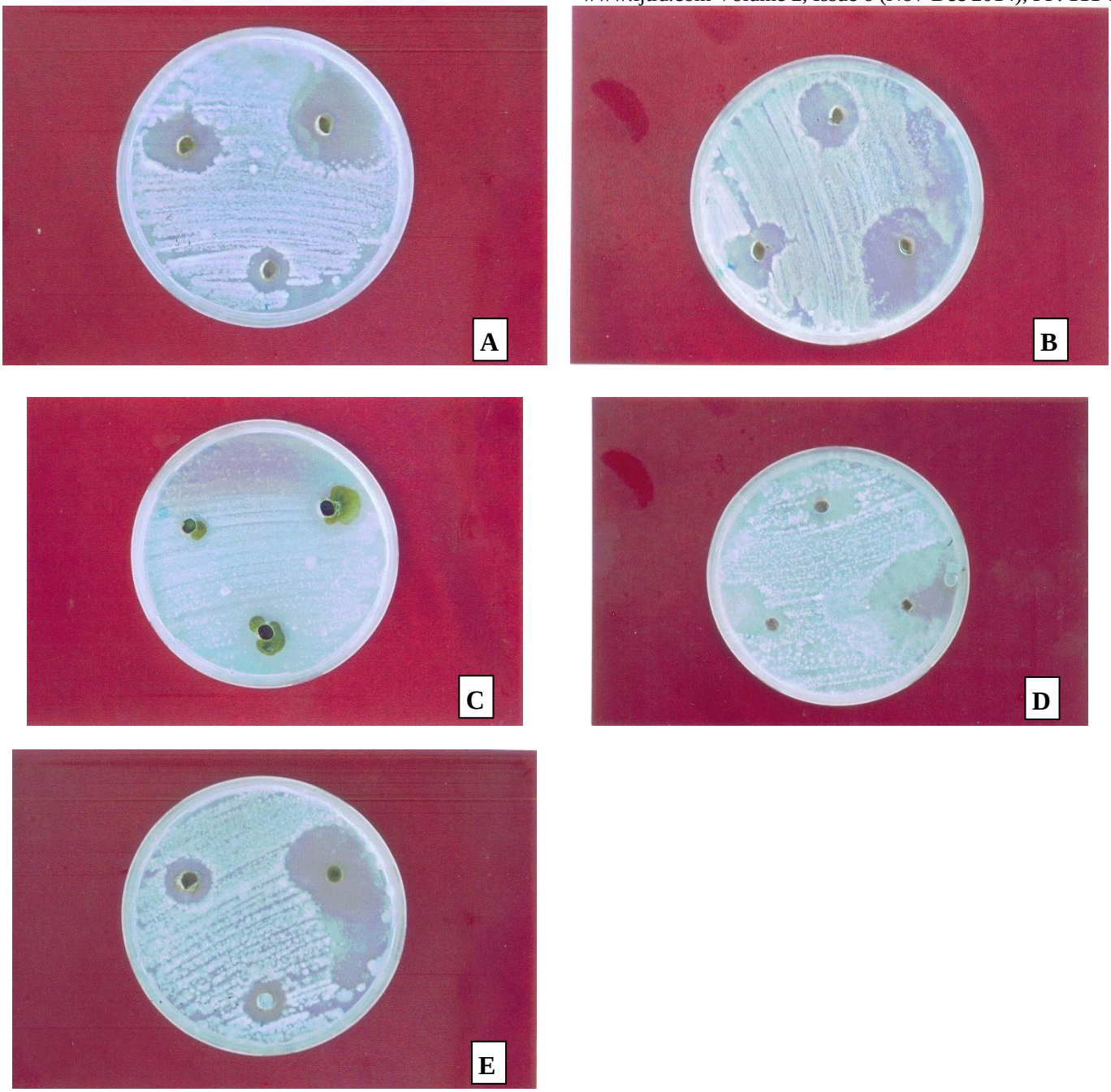

Plate –2

Plate 1: Anti-microbial activity of *Pedalium murex* extract

A. Inhibition zone formed by *Escherichia coli* against benzene extract
B. Inhibition zone formed by *Escherichia coli* against chloroform extract
C. Inhibition zone formed by *Escherichia coli* against alcohol extract
D. Inhibition zone formed by *Staphylococcus epidermidis* against benzene extract
E. Inhibition zone formed by *Staphylococcus epidermidis* against chloroform extract
F. Inhibition zone formed by *Klebsiella pneumoniae* against petroleum ether extract

Plate 2: Anti-microbial activity of *Pedalium murex*

A. Inhibition zone formed by *Klebsiella pneumoniae* against benzene extract of *Pedalium murex*
B. Inhibition zone formed by *Klebsiella pneumoniae* against chloroform extract of *Pedalium murex*
C. Inhibition zone formed by *Enterococcus faecalis* against petroleum ether extract of *Pedalium murex*
D. Inhibition zone formed by *Enterococcus faecalis* against benzene extract of *Pedalium murex*
E. Inhibition zone formed by *Enterococcus faecalis* against chloroform extract of *Pedalium murex*

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