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Research Article

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Anti-Bacterial Activity of *Abutilon indicum* leaf extracts by using various solvents

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ABSTRACT

Abutilon indicum (Linn.) is a shrub distributed throughout India which belongs Malvaceae family. In traditional systems of medicine, various plant parts such as roots, leaves, flowers, bark, seeds, and stems have been used as antioxidant, demulcent, laxative, diuretic, analgesic, anti-inflammatory and antiulcer agents. The present study was focused on anti-microbial activity of *Abutilon indicum*. From the results it revealed that Methanolic extract showed anti-microbial activity when compared to other solvent extracts.

Keywords: *Abutilon indicum*, Anti-microbial activity, Methanolic extract

ARTICLE INFO

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1. Introduction

India has a rich heritage of knowledge on plant based drugs both for use in preventive and curative medicine. Medicinal plants are used for the ailment of several microbial and non-microbial originated diseases due to their valuable effects in

health care [1]. The affordability, reliability, availability and low toxicity of medicinal plants in therapeutic use has made them popular and acceptable. Plants are indeed the first material used in alternative medicine type of remedy

against many diseases. In ancient times, herbs and plants that grew in the environment were used in the treatment of various diseases [2]. Several plants have therapeutic and pharmaceutical effects, for antimicrobial, antioxidant, anti-infectious and antitumor activities. Medicinal plants are used in the treatment of different types of diseases as asthma, diabetes, cancer etc. In different diseases, parts of plants are used in the treatment for life. Near about 80% plant species compounds are used as medicine [3]. In India, 45,000 plant species are officially recorded and 7500 medicinal plant species growing in its 16 agro-climatic zones under 63.7 million hectares of forest coverage. It also shows medicinal activities by primary and secondary metabolites. When a plant shows medicinal properties it will be categorized into medicinal plant [4]. Primary metabolites are directly involved into metabolic activities while secondary metabolites are supporting part means they do not involve directly but their presence is compulsory. In India, 500 medicinal plant species are used to pathogenic bacteria [5]. Plants have been used as traditional medicine since time immemorial to control bacterial, viral and fungal disease. Recently, research has been initiated to evaluate the feasibility of using herbal medicines in disease management [6]. Moreover, the bacterial infections are considered the major cause of mortality in aquaculture. Because of the growing bacterial resistance against commercial standard and reserve antibiotics, the search for new active substances with antibacterial activity against pathogenic bacteria is of increasing importance [7]. Recently several reports have carried out with antimicrobial activity against bacteria and fungi. Hence the present study was made an attempt to find out the potential effect of coastal medicinal plants against isolated ornamental fish bacterial and fungal pathogens [8].

2. Materials and Methods

Preparation of powder:

After the leaves were collected, they were washed with fresh water to remove the soil and adhered matters. Sufficient leaves were dried under the shade at room temperature then they were powdered using a grinding mixer to obtain a coarse powder and then passed through a 40-mesh sieve [9].

Solvent extraction by continuous hot soxhlet extractor

The extraction was then carried out by using the solvent chloroform (CHCl_3), Benzene (C_6H_6), Carbon tetra chloride (CCl_4) Methanol (CH_3OH) for about 72 hrs until the Marc becomes colorless. Then the extract was concentrated under reduced pressure and dried in vacuum condition to get a solid mass. The dried extract thus obtained was dark greenish in color was kept in a desiccators and was used for further experiment as well as used for identification of their chemical groups present [10].

Antibiotic Screening of the Extract:

Microbiological assay:

Microbiological assays or microbial assay is a type of bio assay and are designed to analyze the compound or substance which has effect on microorganism. Microbial assay is defined as the estimation of concentration or potency of an antibiotic by means of measuring and comparing the area of zone of inhibition or turbidity

produced by test substance with that of standard over a suitable microbe under standard condition. So as the definition says the hypothesis is that when an antibiotic is administered, there is inhibition in the growth of microbes as indicated by decreased in area of zone of microbial colony on nutrition media or decreased in turbidity due to decreased in microbial concentration.

Agar plate:

A specified microbe are suspended in the suitable nutrition media, and then this nutrient medium is poured into a Petri dish and allowed to incubate at suitable temperature. This supports the growth of microbes exponentially.

Sample Preparation:

10mg of each sample was diluted by adding 10ml of respective solvent so as get the concentration of 1000 $\mu\text{g/ml}$. From the 1000g/ml solution dilutions were done to obtain 100 $\mu\text{g/ml}$ and 10 $\mu\text{g/ml}$ solution. Wattman filter paper was used to prepare discs of 3mm, and then those filter paper discs were soaked in sample solutions of different concentration. Discs were introduced in to the medium after complete evaporation of the respective solvent.

Standard Antibiotic Preparation:

The standard drug Ciprofloxacin was taken and accurately weighed 10mg was dissolved in 10ml of water. From the standard solution of concentration 1000 $\mu\text{g/ml}$, by making proper dilutions standard solution 100 $\mu\text{g/ml}$ solution was prepared. Then standard Ciprofloxacin antibiotic sample solution in the concentration of 10 $\mu\text{g/ml}$ was prepared.

Disc diffusion method:

Samples are dissolved in to required concentration and taken in to watch glasses. Watt man filter paper disc are prepared and placed in watch glasses containing different concentration of test sample. Paper discs were removed and dried. A cell or spores suspension of Enterobacter is prepared and 0.2ml of suspension was shifted to sterile petridish then sterilized agar medium was poured in to medium and allowed to solidify. Discs with samples were placed into Petri plates carefully then allowed it to incubation at 37°C for 2 days. The plate are removed and the diameter of zone of inhibition of the test and standard samples are measured

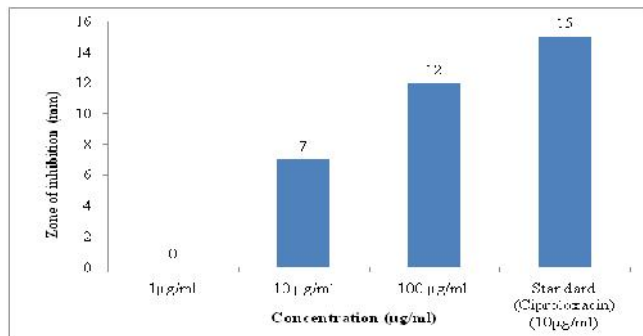
3. Results and Discussion

Anti Biotic Activity:

The antibiotic effect was carried for the carbon tetra chloride, benzene, chloroform extracts of leaves of *Abutilon indicum* and the zone of inhibition of the above stated extracts at different concentration are measured and tabulated below.

Table 1: Zone of inhibition of carbon tetra chloride extract of *Abutilon indicum* Enterobacter species

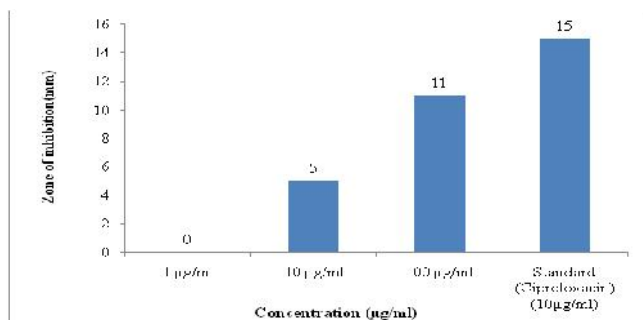
Enterobacter species	
Concentration ($\mu\text{g/ml}$)	Zone of inhibition (mm)
1 $\mu\text{g/ml}$	0
10 $\mu\text{g/ml}$	7
100 $\mu\text{g/ml}$	12
Standard (Ciprofloxacin)	15



Graph 1: Effect of carbon tetra chloride extract of *Abutilon indicum* Enterobacter species in different concentration

Table 2: Zone of inhibition of benzene extract of *Abutilon indicum* Enterobacter species

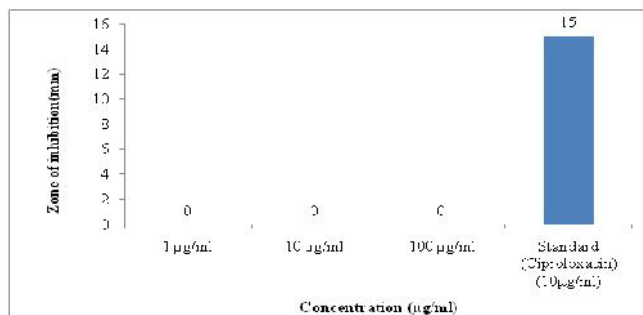
Enterobacter species	
Concentration (µg/ml)	Zone of inhibition (mm)
1 µg/ml	0
10 µg/ml	5
100 µg/ml	11
Standard (Ciprofloxacin)	15



Graph 2: Effect of Benzene extract of *Abutilon indicum* Enterobacter species in different concentration

Table 3: Zone of inhibition of chloroform extract of *Abutilon indicum* Enterobacter species

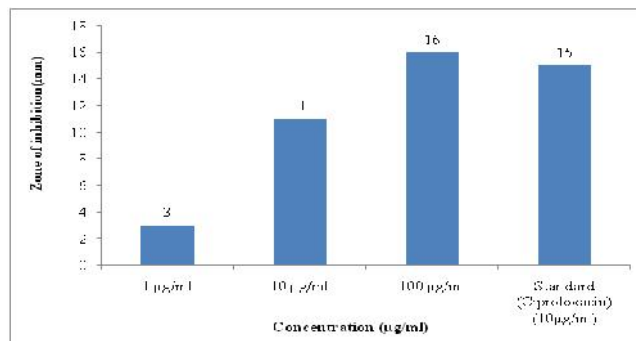
Enterobacter species	
Concentration (µg/ml)	Zone of inhibition (mm)
1 µg/ml	0
10 µg/ml	0
100 µg/ml	0
Standard (Ciprofloxacin)	15



Graph 3: Effect of Chloroform extract of *Abutilon indicum* Enterobacter species in different concentration

Table 4: Zone of inhibition of Methanolic extract of *Abutilon indicum* Enterobacter species

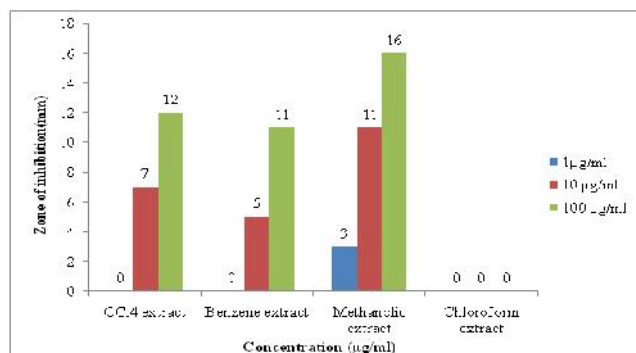
Enterobacter species	
Concentration (µg/ml)	Zone of inhibition (mm)
1 µg/ml	3
10 µg/ml	11
100 µg/ml	16
Standard (Ciprofloxacin)	15



Graph 4: Effect of Methanolic extract of *Abutilon indicum* Enterobacter species in different concentration

Table 5: Comparison of carbon tetra chloride, benzene, chloroform, Methanolic extracts of *Abutilon indicum* on Enterobacter species

S.No	Conc. µg/ml	Zone of Inhibition (mm)			
		CH ₃ OH Extract	Benzene Extract	CCl ₄ Extract	CHCl ₃ Extract
1	1	3	0	0	0
2	10	11	5	7	0
3	100	16	11	12	0
4	Standard Ciprofloxacin (10 µg/ml)			15	



Graph 5: Effect of carbon tetra chloride, benzene, chloroform, Methanolic extract of *Abutilon indicum* Enterobacter species in different concentration

Methanolic extract of *Abutilon indica* showed more anti-microbial activity when compared to other solvent extracts like Benzene and Carbon tetra Chloride. Chloroform extract did not show any zone of inhibition.

4. Conclusion

The present study was focused on anti-microbial activity of *Abutilon indicum*. From the results it revealed that

Methanolic extract showed more anti-microbial activity when compared to other solvent extracts like Benzene and Carbon tetra Chloride. Chloroform extract did not show any zone of inhibition.

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