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Antimicrobial activity of Ethanolic extracts of *Plumeria rubra* flowers

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ABSTRACT

A large number of medicinal plants are claimed to be useful in skin disease in all traditional system of medicine. *Plumeria rubra* is a deciduous tree, widely distributed in common rather moist garden and in lawns. Plant loses leaves for a short time during the winter. Slowly grows up to 25 feet. *Plumeria rubra* is nowadays, is gaining interest by the scientific researchers due to its folklorics and because of its therapeutic value, easy availability. The result showed that a ethanolic extract exhibited a significant activity with specific standard (chloromphenicol) and antifungal activity with specific standard (Fucanazole). Hence this study proves that *Plumeria rubra* possess antimicrobial activity.

Keywords: *Plumeria rubra* Flowers, Antibacterial Activity, Antifungal Activity,etc.

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INTRODUCTION

There are many natural products, which are used as potential antimicrobial agents. Looking to the scope of herbal drug and increasing demand especially in disease of liver cancer, diabetes, hypertension, renal disease, inflammation, infectious diseases and skin diseases etc, the selection of the plant *Plumeria rubra*. is made on the basis of its easy availability, therapeutic value and degree of research work which is not done. A large number of medicinal plants are claimed to be useful in skin disease in all traditional system of medicine. While these plant remedies are being used orally or by local application since ancient, the mechanism whereby such effects elicited has not been looked into. These effects have been brought about by their inherent antibacterial activity by different plants. As part of research for new biological active compounds from higher plants, the crude organic extracts of *Plumeria rubra* flowers are screened. The purpose of this study is to investigate Indian plants potential antibiotic activity by preliminary bio-screening.

MATERIALS AND METHOD

Collection of flowers

Fresh flowers of *Plumeria rubra* were collected from Roever engineering College garden, Perambalur district, Tamil Nadu, India, during the month of August and Identified by Head, PG & Research Department of Botany, Periyar E.V.R. College, Trichy. Tamil Nadu.

Flower extraction

2 kg of fresh flowers were soaked with 90% ethanol at room temperature (25⁰C-30⁰C). After 72 hrs the ethanolic extract was filtered. This extract was concentrated in vacuum and the dry powder obtained was dissolved in ethanol to get required concentrations and were used for screening antimicrobial activities.

ANTIMICROBIAL PROCEDURE

Screening of Antibacterial Activity

Bacteria tested

Four bacterial strains were *S. typhi*, *E. coli*, *E. facecalis* and *B. cereus* used throughout this investigation. All the bacterial cultures were obtained from Microbial Type Culture Collection (MTCC), Institute of Microbial Technology, Chandigarh, India. The young bacterial broth cultures were prepared before the screening procedure.

Preparation of inoculums

Stock cultures were maintained at 4⁰C on slopes of nutrient agar. Active cultures of experiment were prepared by transferring a loop full of cells from the stock cultures to test tube of Muller-

Hinton Broth (MHB) that was incubated without agitation for 24 hrs at 37°C. The cultures were diluted with fresh Muller-Hinton broth to achieve optical densities corresponding to 2.0×10^6 colony forming units (CFU/ml).

Antibacterial susceptibility test

The disc diffusion methods (Bauer et al. (Am. J. Clin. Pathol. 45:493-496, 1966; National Committee for Clinical Laboratory Standards, Performance standards for antimicrobial disc susceptibility tests, approved standard ASM-2, 2nd ed., 197)) was used to screen the antibacterial activity. In-vitro antibacterial activity was screened by using Muller Hinton Agar (MHA) obtained from Himedia (Mumbai). The MHA plates were prepared by pouring 15 ml of molten media into sterile petriplates. The plates were allowed to solidify for 5 minutes and 0.1% inoculum suspension was swabbed uniformly and the inoculums were allowed to dry for 5 minutes. The extracts of concentration 10mg/ml, 20mg/ml, 30mg/ml, 40mg/ml were loaded on 6 mm sterile disc. The loaded disc were placed on the surface of medium and the extract was allowed to diffuse for 5 minutes and the plates were kept for incubation at 37°C for 24 hrs. At the end of incubation, inhibition zones formed around the disc were measured with transparent ruler in millimeter. Standard antibiotic chloromphenicol of concentration 1mg/ml was used as positive control.

Screening of Antifungal Activity

Culture Media

The media used for antifungal test was Sabouraud's dextrose agar/broth of Hi media Pvt. Bombay, India.

Inoculum

The fungal strains were inoculated separately in Sabouraud's dextrose broth for 6 h and the suspensions were checked to provide approximately 105 CFU/ml.

Determination of antifungal activity

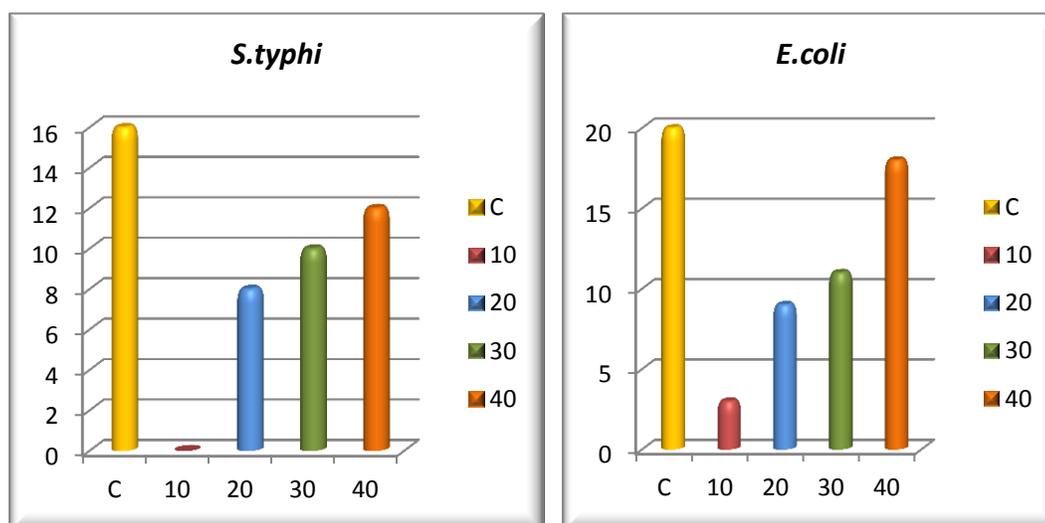
The agar well diffusion method (Perez, 1993) was modified. Sabouraud's dextrose agar (SDA) was used for fungal cultures. The culture medium was inoculated with the fungal strains separately suspended in Sabourauds dextrose broth. A total of 8 mm diameter wells were punched into the agar and filled with plant extracts and solvent blanks (hydro alcohol, and hexane). Standard antibiotic (Fucanazole, concentration 1 mg/ml) was used as positive control and fungal plates were incubated at 37°C for 72 h. The diameters of zone of inhibition observed were measured.

RESULTS AND DISCUSSION

Antibacterial activity

Table 1: Antibacterial activity of ethanolic extract of flowers of *Plumeria rubra*

S.No	Organisms	Zone of inhibition(mm)				
		Standard C	Sample Concentration (mg/ml)			
			10	20	30	40
1	<i>S.typhi</i>	16	0	8	10	12
2	<i>E.coli</i>	20	3	9	11	18
3	<i>E.faecalis</i>	20	9	11	12	16
4	<i>B.cereus</i>	16	0	8	10	16

*S.typhi**E.coli**E.faecalis**B.cereus*Figure.1: Antibacterial activity of ethanolic extract of flowers of *Plumeria rubra*.

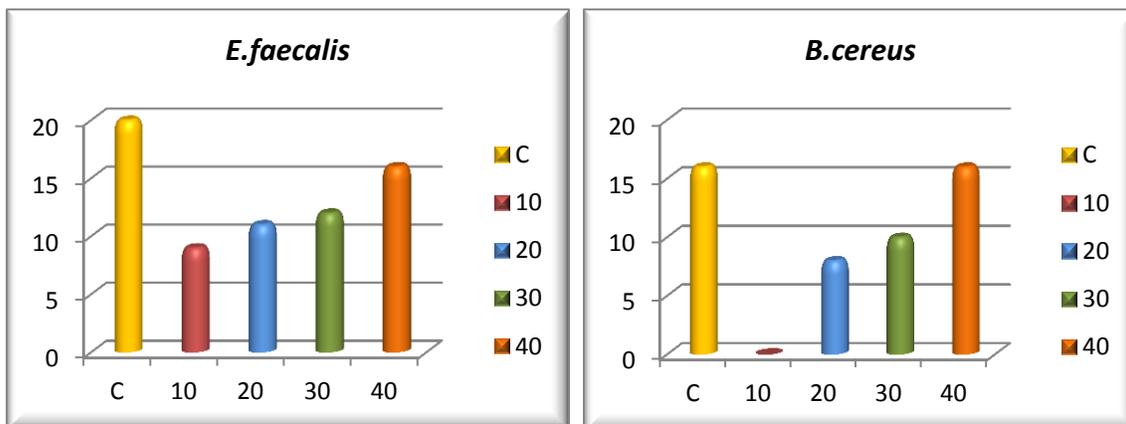


Figure.2: Graphical representation of anti bacterial activity of ethanolic extract of flowers of *Plumeria rubra*. (Standard: Chloromphenicol, concentration 1 mg/ml)

Antifungal activity

Table 2: Antifungal activity of Ethanolic extract of flowers of *Plumeria rubra*

S.No	Organisms	Zone of inhibition(mm)				
		Standard C	Sample Concentration mg/ml			
			10	20	30	40
1	<i>C.lunata</i>	20	2	4	10	14
2	<i>C.albicans</i>	19	0	3	10	13

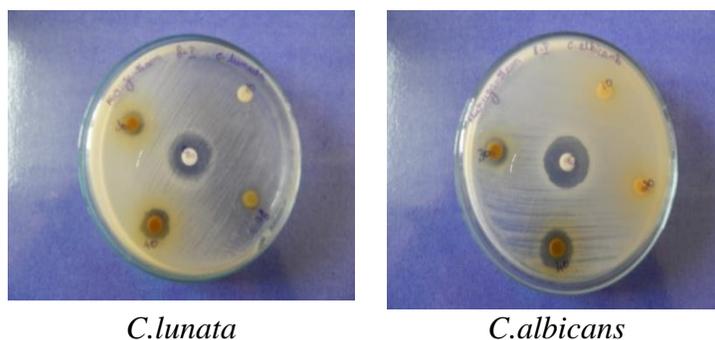


Figure 3: Antifungal activity of ethanolic extract of flowers of *Plumeria rubra*

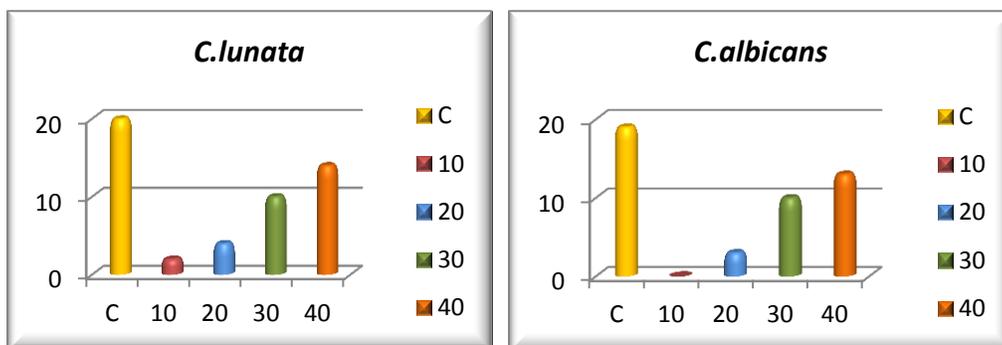


Figure 4: Graphical representation of anti fungal activity of ethanolic extract of flowers of *Plumeria rubra*. (Standard: Fucanazole , concentration 1 mg/ml)

In the present study, ethanolic extract of *P. rubra* flowers exhibited significant antimicrobial activity when compared with standard drug. It is evident from the data presented in Table I that the ethanolic extract possesses antibacterial activity. The disc diffusion method result showed the zone of inhibition for 10 mg/ml as 0 mm, 3 mm, 9 mm and 0 mm, for 20 mg/ml as 8 mm, 9 mm, 11 mm and 8 mm, for 30 mg/ml showing 10 mm, 11 mm, 12 mm and 10 mm, for 40 mg/ml as 12 mm, 18 mm, 16 mm and 16 mm, for ethanolic extract against *S. typhi*, *E. coli*, *E. faecalis* and *B.cereus* respectively when compared with standard drug chloromphenicol showing 16mm, 20 mm, 20 mm and 16mm zone of inhibition respectively. Then it is evident from the data presented in Table II that the ethanolic extract possesses antifungal activity the disc diffusion method result showed the zone of inhibition for 10 mg/ml as 2 mm and 0 mm, for 20 mg/ml as 4 mm and 3 mm, for 30 mg/ml as 10 mm and 10 mm, for 40 mg/ml as 14 mm and 13 mm for ethanolic extract against *C.lunata*, and *C.albicans* respectively when compared with standard drug Fluconazole showing 20mm and 19 mm of inhibition respectively. The result indicates that all the test extracts shows good inhibitory activity against all these bacterial and fungal strains. The pharmacognostical studies on this plant give an idea about identification, standardization and monograph of the plant. It is also important in long term study of plant to evaluate the medicinal action of this plant.

CONCLUSION

We are continuously searching for new molecules having better action and less side effects, In recent years molecules from natural origin had gaining more popularity due to less side effects and better therapeutic action, Particularly in antimicrobial field because of rapidly developing resistance to synthetic molecules. Present study indicates that the plant extracts shows good pharmacological action. That means *Plumeria* species has wide scope to isolate various phytochemical constituent and evaluate their pharmacological screening to get better therapeutic value.

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