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## Antibacterial activity of ethanol extract of *Calotropis gigantea* leaves against *Staphylococcus aureus*, *Streptococcus pyogenes*, *Salmonella typhi*, and *Pseudomonas aeruginosa*

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### Abstract

*Calotropis gigantea* is a common plant that most known for their medicinal properties, various categories of Phytochemical are present in this plant that have antibacterial, antifungal and anti allergic properties. In this study *C. gigantea* leaves is tested against selected bacteria to check the antibacterial activity. The ethanol extract of *C. gigantea* was tested against *S. aureus*, *S. pyogenes*, *S. typhi*, *P. aeruginosa* for antibacterial testing. Antibacterial (Antimicrobial) testing is performed *in vitro* by Kirby-Bauer disc diffusion method in Muller Hinton agar. Extracts showing the antibacterial effects on selected tested organisms. Ethanol extracts show the maximum zone of inhibition against *S. pyogenes* (20.5), lowest against *P. aeruginosa* (15.25). Minimum Inhibitory Concentration (MIC) was measured in mg/mL. Extracts showing the 13.5.4.5, 1.5, and 0.50 mg/MI Minimum Inhibitory Concentration value for *S. aureus*, *S. pyogenes*, *S. typhi* and *P. aeruginosa*, respectively.

**Keywords:** antibacterial activity, *Calotropis gigantean*, minimum inhibitory concentration, Kirby-Bauer disc diffusion method

### Introduction

In present situation of medical and development that is pharmaceutical microbes have in the trade of these metabolic process and hereditary framework to get resistant towards the medicine found in the treating commonplace infectious disorder [1, 2]. Those drug resistant applicants are greater pathogenic with exorbitant mortality cost and find yourself a marvelous challenge in the pharmaceutical and medical industry. to conquer medication that is microbial, experts are looking ahead for the enhancement of alternate and unique pills. An resource that is natural contains flowers, algae and pets gifts a myriad of organic medicinal substances for the treating different infectious conditions. Flowers are exploited as medicinal supply in view that ancient age. The standard and folks unit that is medicinal the plant items for the treatment of diverse infectious sicknesses. in recent years, vegetation are increasingly being extensively explored for harboring medicinal homes. tests by way of different scientists have proved that plant life are one of many sources which are prevalent medication development and development [3, 4, 5]. vegetation are pronounced to own antimicrobial, anticancer, anti inflammatory, anti diabetic, hemolytic, anti-oxidant, larvi cidal domiciles and so on. *C. gigantea* is really a wasteland weed greater referred to as milkweed, habitat of parts of asia which includes, Asia, Indonesia, Malaysia, Philippines, Thailand, Sri Lanka and Asia. Tribal people had been the utilization of this plan parts to therapy numerous health problems toothache that is including earache, sprain, anxiety, discomfort, epilepsy, diarrhoea and psychological problems. *C. gigantea* is scientifically mentioned because of its anti-Candida task, cytotoxic pastime, antipyretic pastime and wound recuperation interest [6, 7, 8, 9]. Contemporary appearance at become focused to research the game that is anti-bacterial of crude leaves extract of *C. gigantea* against medical isolates of germs.

### Materials and Methods

#### Plant material

The plant specimen of *C. gigantea* was collected from the Greater Noida, U.P, and India in September 2019. The sample was identified in Microbiology and Molecular Laboratory of

Noida International University and plant sample was maintained in laboratory with Plant Identification Number NIU/MB/CG225/2019.

### Processing of the plant

Leaves of plant are washed well with water and distilled water and permit drying at room temperature for twenty-four- forty eight hours. After, that the leaves is transformed into powder form in mixer grinder. Now the powdered leaves specimen became extracted in ethanol, wherein 25 gram of powder became soaked in 250 ml in a flask and loaded on a shaker at a hundred and fifty rpm for twenty-four Hours. The aggregate is authorized filtering thru Whatman Filter paper no-1 permit for evaporation and save in air tight box and saved at 4 °C. Now the numerous dilutions is ready with the aid of using the integration the plant extract in distilled water.

### Test microorganism

*S. aureus*, *S. pyogens*, *S. typhi*, and *P. aeruginosa* those 4 bacterial species are used for the study. All those cultures have been maintained in Nutrient agar plates at 4 °C.

### Positive and negative control

Azithromycin (10 µg/disc) was used as positive control for *S. aureus* and *S. pyogens*, Tetracyclin (10µg/ disc) for *S. typhi* and Streptomycin disc (10 µg/disc) *P. aeruginosa* and distilled water was used as negative control.

### Antibacterial assay

Antimicrobial hobby of the crude extracts turned into determined through the agar well diffusion approach 10. All take a look at organisms have been inoculated in Mueller

Hinton broth (pH 7. four.) for eight hours. The awareness of the suspensions became adjusted to zero.5 (optical density) by the use of a spectrophotometer. Isolates were seeded on Mueller Hinton agar plates with the aid of the use of sterilized cotton swabs. Agar surface become bored with the aid of the use of sterilized gel borer to make wells (7 mm diameter). One hundred µl of the test extract and a hundred µl of sterilized distilled water (bad control) were poured in to split wells. The usual antibiotic disc become located on the agar floor as advantageous manipulate. Plates have been incubated at 37 °C for 48 hours. Triplicate plates have been maintained for each organism.

### Determination of MIC

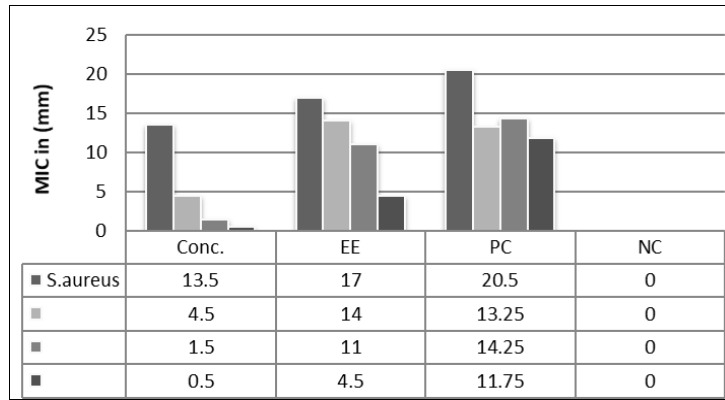
MIC of the leaf extract end up accomplished with the resource of changed agar properly diffusion approaches. Fold serial dilution of the stock answer become prepared in sterilized distilled water to make a attention variety from 0.1-one hundred mg/ml <sup>[12, 13]</sup>. The attention of take a look at cultures become adjusted to zero.5 McFarland standards. The bacterial suspensions were seeded on MHA plates using a sterilized cotton swab. In each of these plates four wells were reduce out using a widespread cork borer (7 mm). Using a micropipette, 100 µl of each dilution end up added in to wells. All the plates have been incubated at 37 °C for twenty-4 hours. Antimicrobial hobby of the leaf extract modified into evaluated via way of means of measuring the area of inhibition.

Take a look at modified into executed in triplicates for every take a look at organism.

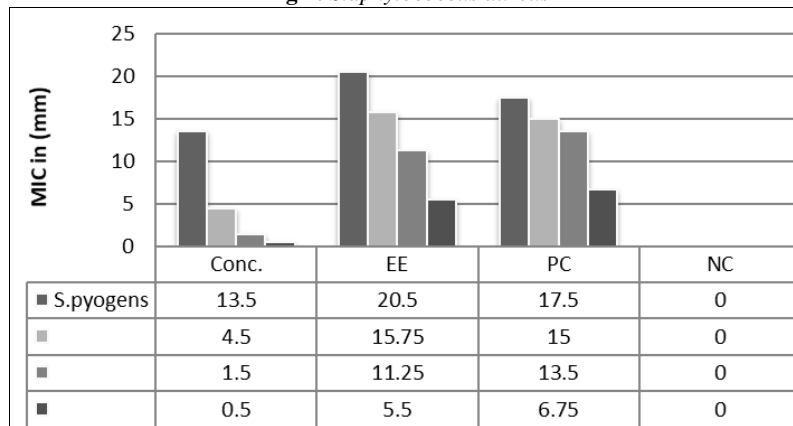
### Statistical analysis

**Table 1:** The values of antimicrobial hobby of the aqueous leaves extract of *C. gigantea* had been expressed as suggest ± standard deviation for each sample

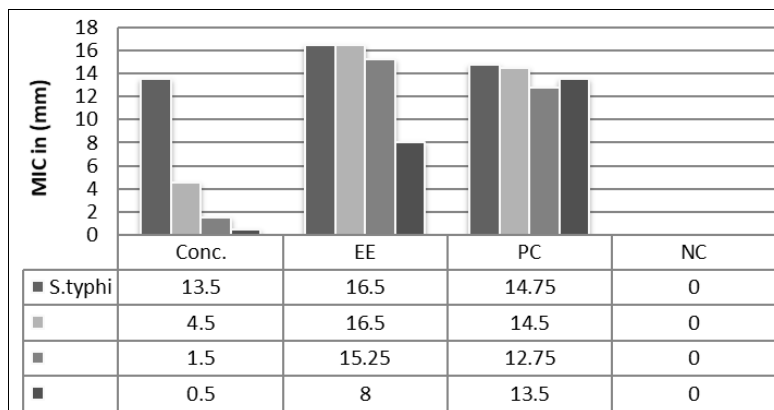
Bacterial Species	Conc.(mg/ml)	Zone of Inhibition(mm)		NC
		EE	PC	
<i>S. aureus</i>	13.5	17±2.58	20.5±3.10	0
	4.5	14±2.16	13.25±2.50	0
	1.5	11±1.82	14.25±2.62	0
	0.5	4.75±3.59	11.75±2.75	0
<i>S. pyogens</i>	13.5	20.50±2.64	17.50±5	0
	4.5	15.75±2.50	15±2.94	0
	1.5	11.25±1.50	13.50±3.41	0
	0.5	5.50±4.04	6.75±2.21	0
<i>S. typhi</i>	13.5	16.50±2.38	14.75±4.42	0
	4.5	16.50±3.41	14.50±2.08	0
	1.5	15.25±2.62	12.75±2.75	0
	0.5	8±2.16	13.50±3.69	0
<i>P. aeruginosa</i>	13.5	15.25±2.21	17.25±2.98	0
	4.5	12.75±1.70	16.50±3.10	0
	1.5	7.25±4.25	21±2.94	0
	0.5	4±3.36	13.25±3.09	0



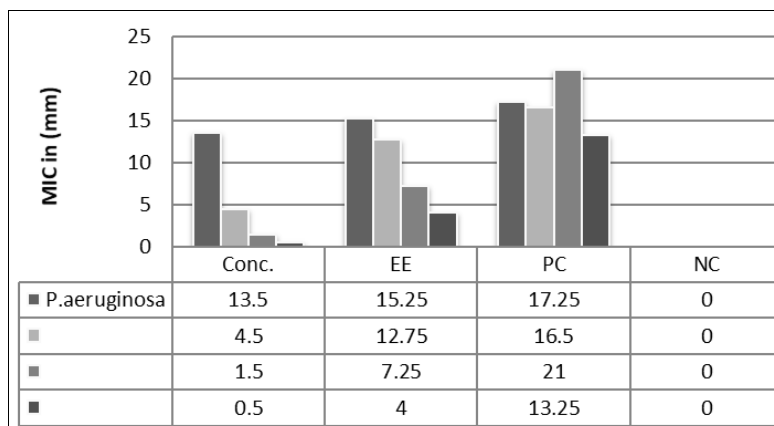
**Fig 1:** *Staphylococcus aureus*



**Fig 2:** *Streptococcus pyogenes*



**Fig 3:** *Salmonella typhi*



**Fig 4:** *Pseudomonas aeruginosa*

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### Conflict of interest

I declare that there is no conflict of interest.

### References

1. Raghunath D. Emerging antibiotic resistance in bacteria with special reference to India, *J Biosci.* 2008;33:593-603.
2. Fred CT. Mechanisms of antimicrobial resistance in bacteria, *The American Journal of Medicine.* 2006;119:S3-S10.
3. Rates SMK. Plants as source of drugs, *Toxicon.* 2001;39:603-613.
4. De Pasquale A, Pharmacognosy: the oldest modern science, *Journal of Ethnopharmacology.* 1984;11:1-16.
5. Gordon MC, David JN, Biodiversity. A continuing source of novel drug leads, *Pure Appl Chem.* 2005;77:7-24.
6. Gaurav Kumar, Karthik L, Bhaskara Rao KV. *In vitro* anti-*Candida* activity of *Calotropis gigantea* against clinical isolates of *Candida*, *Journal of Pharmacy Research.* 2010;3:539-542.
7. Wang Z, Wang M, Mei W, Han Z, Dai H. A New Cytotoxic Pregnane from *Calotropis gigantea*, *Molecules.* 2008;13:3033-3039.
8. Chitme HR, Chandra R, Kaushik S. Evaluation of antipyretic activity of *Calotropis gigantea* (Asclepiadaceae) in experimental animals, *Phytotherapy Research.* 2005;19:454-456.
9. Saratha V, Subramanian S, Sivakumar S. Evaluation of wound healing potential of *Calotropis gigantea* latex studied on excision wounds in experimental animals, *Med Chem Res.* 2009. DOI: 10.1007/s00044-009-9240-6.
10. Tagg TR, Dajani AS, Wannamaker LW. Bacteriocin of Gram positive bacteria, *Bacteriological Reviews.* 1976;40:722-756.
11. Ajay KK, Lokanatha RMK, Umesha KB, Evaluation of antibacterial activity of 3, 5-dicyano-4, 6-diaryl-4-ethoxycarbonyl-piperid-2-ones, *Journal of Pharmaceutical and Biomedical Analysis.* 2003;27:837-840.
12. Rios JL, Recio MC, Vilar A. Screening methods for natural products with antimicrobial activity: A review of literature, *Journal of Ethnopharmacology.* 1988;23:127-149.
13. Okunji CO, Okeke CN, Gugnani HC, Iwu MM. An antifungal saponin from fruit pulp of *Dracaena mannii*, *International Journal of Crude Drug Research.* 1990;28:193-199.
14. Alam MA, Habib MR, Nikkon R, Rahman M, Karim MR. Antimicrobial activity of akanda (*Calotropis gigantea* L.) on some pathogenic bacteria, *Bangladesh J Sci Ind Res.* 2008;43:397-404.
15. Usha K, Singh B, Praseetha P, Deepa N, Agarwal DK, Agarwal R, *et al.* Antifungal activity of *Datura stramonium*, *Calotropis gigantea* and *Azadirachta indica* against *Fusarium mangiferae* and floral malformation in mango, *European Journal of Plant Pathology.* 2009;124:637-657.
16. Ali M, Gupta J. New pentacyclic triterpenic esters from the roots of *Calotropis procera*, *Indian J Chem.* 1999;38:877-881.