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## Evaluation of anti-bacterial activity of ethanolic leaf extract of *Acalypha indica* linn

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### Abstract

The present study was evaluate the anti-bacterial activity of ethanolic leaf extract of the medicinal plant *Acalypha indica* using the well diffusion method against five bacterial species viz., *Staphylococcus aureus*, *Micrococcus luteus*, *Escherichia coli*, *Pseudomonas aeruginosa*, *Klebsiella Pneumonia*. *Acalypha indica* plants could serve as useful source of new antimicrobial agents. The root, stem and leaf of *Acalypha indica* possess anti-bacterial activity against human pathogens. Historically, plants have provided a good source of anti – infective agents and many of them remain highly effective in the fight against microbial infections.

**Keywords:** *Acalypha indica*, anti-bacterial activity, well diffusion method, nutrient agar, gentamycin

### Introduction

Medicinal components from plants play an important role in conventional as well as western medicine. Plant derived drugs have been a part of the evolution of human, health care for thousands of years. At the same time, indigenous people of the rest of the plant were also utilizing plants for curing diseases [1]. Today, nearly 88% of the global populations turn to plant derived medicines as their first line of defense for maintaining health and diseases [2]. The root, stem and leaf of *Acalypha indica* possess herbal activity. The plant traditionally used as an expectorant against asthma and pneumonia and also as an emetic, emenagogue and anthelmintic [3].

*Acalypha indica* contain acalyphine which is used in the treatment of sore gums and to have a post – coital anti fertility effect [4], anti-venom properties [5], wound healing effects [6], anti-oxidant activities [7], anti-inflammatory effects [8], acaricidal effects [9], diuretic effects [10], and anti-bacterial activities [11]. The roots of *Acalypha indica* is used as laxative and leaves for scabies and other cutaneous diseases [12].

It has also been reported to useful in treating pneumoniae, asthma, rheumatism and several other ailments [13]. The dried leaves of *Acalypha indica* was made in to a poultice to treat bed sores and wounds and the juice of *Acalypha indica* is added to oil or lime and used to treat a variety of skin disorders [14].

### Materials and Methods

#### Anti-bacterial activity (Well Diffusion Method)

The bacterial used included *Staphylococcus aureus*, *Micrococcus luteus*, *E. coli*, *Pseudomonas aeruginosa*, *Klebsiella Pneumonia* were maintained on Nutrient agar media (NA).

#### ASSAY

The dried plant extracts were dissolved in the DMSO to a final concentration of 100 mg ml<sup>-1</sup>. Each bacterial strain was suspended in nutrient broth and incubated for 8h at 37 °C. Nutrient Agar (NA) plates were seeded with 0.1 ml 8 h broth culture of different bacteria. In each of these plates, wells were cut out using sterile cork borer. Using sterilized dropping pipettes, different concentration (500, 1000, 1500 and 2000 mg ml<sup>-1</sup>) of plant extract was carefully added into the wells and allowed to diffuse at room temperature for 2h. The plates were then incubated at 37 °C for 18-24 h.

Gentamycin (10 mg disc<sup>-1</sup>) was used as positive control and the solvent DMSO as negative control. The anti-bacterial activity was evaluated by measuring the diameter of inhibition zone [15, 16].

## Results and Discussions

These plants could serve as useful source of new antimicrobial agents. *Acalypha indica* possessed antimicrobial factors that reduced the growth of pathogenic bacteria. Various pathogenic bacteria have developed resistance to many of the currently available antibiotics. The leaf, stem and root of *Acalypha indica* possess anti-bacterial activity against human pathogens, (Table – 1).

The use of medicinal plants plays a vital role in covering the basic health needs in developing countries and these plants may offer a new source of antibacterial, anti-fungal and

antiviral agents with sufficient activity against infective micro-organisms.

Bio molecules of plant origin appear to be one of the alternatives for the control of these antibiotic resistant human pathogens. Hence, more studies pertaining to the use of plants as therapeutic agents should be emphasized, especially those related to the control of antibiotic resistant microbes. The present study supports to evaluate the potentiality of plant extracts on standard micro-organism strains as well as on the multi-drug resistance bacteria. Ethanolic leaf extract of *Acalypha indica* (Table – 1) exhibited anti-bacterial activity against all the tested organisms viz., *Staphylococcus aureus*, *Micrococcus luteus*, *Escherichia coli*, *Pseudomonas aeruginosa* and *Klebsiella pneumoniae*.

**Table 1:** Anti-bacterial activity of *Acalypha indica* leaf

Sample conc. (mg)	Zone of inhibition														
	<i>Staphylococcus aureus</i>			<i>Micrococcus luteus</i>			<i>Escherichia coli</i>			<i>Pseudomonas aeruginosa</i>			<i>Klebsiella pneumoniae</i>		
	A1	A2	RMI	A1	A2	RMI	A1	A2	RMI	A1	A2	RMI	A1	A2	RMI
500	0.6	13	21	0.6	-	-	0.6	14	23	0.6	12	20	0.6	11	18
1000	0.6	15	25	0.6	-	-	0.6	16	26	0.6	14	23	0.6	12	20
1500	0.6	16	26	0.6	12	20	0.6	17	28	0.6	17	28	0.6	14	23
2000	0.6	18	30	0.6	13	21	0.6	18	30	0.6	18	30	0.6	15	25
Gentamicin 10	0.6	24	40	0.6	21	35	0.6	23	38	0.6	24	40	0.6	23	38

A1 = Area of well in mm

A2 = Area of zone of inhibition in mm

RMI = A2/A1 (Relative Magnitude of Inhibition)

= No inhibition zone

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