



UTILIZATION OF WILD EDIBLE *ACALYPHA INDICA* L. AS PROPHYLAXIS AGAINST NOSOCOMIAL INFECTION

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ABSTRACT: *Acalypha indica* L. is used as wild edible plant having various medicinal benefits. This research aims to highlight the use of *Acalypha indica* leaves as antibacterial against Nosocomial infection causing bacterial species. Aqueous, chloroform, methanol and petroleum ether extract of *Acalypha indica* were examined against gram negative *Escherichia coli* and gram positive *Staphylococcus aureus* by agar cup method. Among different extracts, aqueous and petroleum ether extract showed zone of inhibition for all selected bacterial strains but it was maximum for *Escherichia coli*.

Keywords: *Acalypha indica*, Antibacterial, Nosocomial infection, Wild edible plant.

I. INTRODUCTION

The *Acalypha indica* L. belonging to Euphorbiaceae family is used as wild edible plant having various medicinal benefits. It is acrid, bitter, expectorant, purgative, emetic, gastrointestinal irritant and diuretic. The roots and leaves are used to treat skin diseases, constipation, ulcers, bronchitis, and vitiated conditions of *vata* [1-6]. Investigation of effect on opportunistic fungal pathogens associated with HIV was carried out that showed remarkable results [7]. The whole plant is used for pneumonia, asthma, bronchitis and rheumatism [8]. Plant is used for the treatment of malarial fever, diabetes, neutralizing snake venom and dysentery [9] and [10]. *Acalypha indica* possess significant nutrient content and hence potential source of nutraceutical [11]. The ayurvedic formulation “Charu” prepared from leaves of *Acalypha indica* shows good antifungal activity [12]. Bacterial infection is a serious and often fatal complication of patients with liver disease. Patients with alcoholic cirrhosis or decompensate chronic liver disease, or cases of acute liver disease are at greatest risk who progress to hepatic failure or hepatic necrosis. Some bacterial strains are economically important that cause common to severe infectious diseases to human being. *E. coli* are already present in human gastrointestinal tract but when they acquire certain genetic material they can become pathogenic [13]. Virulent strains are responsible for gastroenteritis, urinary tract infection, peritonitis, septicaemia and pneumonia [14] and [15]. *Staphylococcus aureus* is the major cause of nosocomial and community acquired infections [16]. *S. aureus* is causal organism for wide range of diseases like skin infections, arthritis, bacteraemia, sepsis, food poisoning and lung abscess etc. [15]. Nosocomial bacterial infections have increased significantly, resulting in prolonged hospitalization and hospital stay [17]. Increase in resistance in bacteria to multidrug treatment emphasizes the need to develop new and more effective antibacterial drugs [18]. Currently 25 to 50 % of all pharmaceuticals dispensed in United States having plant origins and few are used as antimicrobials since pharmaceutical industries have relied on microbial sources for these activities. Adventives of antibiotics, the use of plant derivatives as antimicrobials has been virtually decreasing [19]. Present work deals with the study of antibacterial activity of extracts of *Acalypha indica* leaves against multidrug resistant gram negative and gram positive isolation nosocomial infections.

II. MATERIALS AND METHODS

A. Collection of plant material and preparation of extract

Leaves of *Acalypha indica* were collected in premises of Agriculture school of Nanded city (MS). The plant material was identified by using standard Floras and voucher specimen was deposited at Botanical Survey of India, Pune. Shade dried plant material was extracted in soxhlet extractor in Methanol, chloroform, distilled water and petroleum ether.

B. Antibacterial activity

Clinical isolates of *Escherichia coli* and *Staphylococcus aureus* were selected for this study. The antibacterial activity was measured by agar cup method on Nutrient agar (Himedia). Cups of 10mm diameter were bored in the agar plate with sterile cork borer. 100 µl compound solutions prepared in Dimethyl sulphoxide (DMSO) (1%) was added in the cup under aseptic condition with the help of micropipette. 100 µl DMSO was also placed in one of the cup as blank (negative control). A standard antibiotic disc impregnated with 10 units of Penicillin was also placed on the seeded nutrient agar surface as standard reference antibiotic (Positive control). The plates were shifted to incubator at 37°C and incubated for 24 hours. After incubation plates were observed for the Zone of inhibition of bacterial growth around the agar cup. Results were recorded by measuring the zone of inhibition in millimetre (mm) using zone reader [20].

III. RESULTS AND DISCUSSION

Among different extracts of leaves of *Acalypha indica*, aqueous and petroleum ether extract showed zone of inhibition for all selected bacterial strains but it was maximum for *Escherichia coli*. All solvent extracts showed excellent inhibition of *Escherichia coli* than the standard antibiotic penicillin. Whereas, methanol and chloroform extracts were active against only *Escherichia coli*, no inhibition zone was recorded on *Staphylococcus aureus*. All results are shown in Table I.

TABLE I: Antibacterial activity of extracts of *Acalypha indica* leaves

Sr. No.	Extracts	<i>Escherichia coli</i>	<i>Staphylococcus aureus</i>
1	<i>A. indica</i> leaf extract	Aqueous	15mm
		Methanol	17mm
		Chloroform	12mm
		Petroleum ether	14mm
2	Control	Penicillin	20mm
		DMSO	00mm

Among all extracts of tested wild edible plants, petroleum ether leaf extract of *Acalypha indica* shows superb antibacterial activity against *Escherichia coli* (14mm). Petroleum ether extract of *Acalypha indica* leaves showed antibacterial activity against *E. coli* and *S. aureus*. Previously Reference [21] worked on antibacterial activity of different fractions of *Acalypha indica* against *E. coli* and several other bacterial strains, they concluded methanol fraction of *Acalypha indica* found to have good antibacterial activity against all studied bacteria including *E. coli*, similar result was obtained in present work. Aqueous extract of *A. indica* leaf showing zone of inhibition against *S. aureus* (11mm) but in chloroform extract there was no zone of inhibition were observed. Reference [22] also investigated antibacterial activity of methanol extract of leaves of *A. indica* which showed zone of inhibition 18mm for *E. coli*, 8mm for *S. aureus*. These results when compared with results of present work, it was favouring the antibacterial activity of *A. indica* against *E. coli* but in case of *S. aureus* methanol extract was found to be ineffective i.e. no zone of inhibition were detected. According to reference [23], antibacterial activity of methanol extract of *A. indica* was studied against *B. subtilis*, *S. aureus*, *E. coli*, *S. typhi* and *P. aeruginosa*, the results showed that maximum zone of inhibition against *S. aureus* and minimum zone of inhibition against *E. coli*. It was contrary to the results obtained in present work.

IV. CONCLUSION

Out of four different solvent extract of *Acalypha indica*, Aqueous and petroleum ether extract was found to be most effective against nosocomial infection of *Escherichia coli* and *Staphylococcus aureus* bacterial strains.

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