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## Comparative study on antibiogram of *Acalypha indica* L. *Phyllanthus niruri* L. and *Euphorbia hirta* L. against bacterial pathogens.

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**Abstract-** Three plants species belonging to the family Euphorbiaceae are evaluated for antibacterial activity outcome are *Acalypha indica* L., *Phyllanthus niruri* L., *Euphorbia hirta* L. of Dalma range of East Singhbhum, Jharkhand. The powdered leaf material of these three selected plants were extracted with methanol and solvent extract were evaporated for dryness with the help of rotary evaporator. Remaining dry residue was dissolved in methanol, ethanol, acetone, distilled water, and then leaf sample is applied for antibacterial action. Antimicrobial potential of these three plants is evaluated by bacteria *staphylococcus aureus* and *Escherichia coli*.

**Key words:** Antibacterial, Antimicrobial, Euphorbiaceae.

### INTRODUCTION

Plants are one of the most important sources of medicines. Since thousands of years, mankind is using plant source to cure many diseases. According to the report of WHO over 80% of the world populations rely on traditional system of medicines.<sup>1</sup> Plants have the ability to produce a large number of phytochemicals. These phytochemicals are bioactive compounds. Plants produce many bioactive compounds such as flavonoids, alkaloids, tannins, saponins, glycosides, phenols, resins etc. These bioactive compounds are secondary metabolites and are deposited in leaves, stem, barks, roots, fruits, flowers, and seeds. These Phytochemicals are known to possess antimicrobial<sup>2</sup>, antibacterial, antifungal<sup>3</sup>, antidiabetic<sup>4</sup> properties.

Bioactive compounds derived from plant sources have the potential to antimicrobial properties against a broad range of pathogens.

Many plants of Euphorbiaceae are used in cure of illness. *Acalypha indica* L. is an erect annual herb, widely distributed throughout the plains of India. It is useful in bronchitis, pneumonia and asthma and its leaves are laxative used in scabies and in snake bite.<sup>5</sup> *Phyllanthus niruri* L. is also an annual herb, distributed throughout India, mostly in hotter parts of India. Traditionally it is used in Jaundice, skin diseases etc.<sup>6</sup> *Euphorbia hirta* L. is also annual herb and it occurs in waste places throughout the warmer regions of India. It is useful in removing worms in children, in bowel complaints, asthma, cough and also promotes formation and flow of milk in women.<sup>7</sup>

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This work was intended to explore the antibacterial activity of bioactive compounds found in *Acalypha indica* L., *Phyllanthus niruri* L., and *Euphorbia hirta* L. of Dalma range of Jharkhand.

**MATERIALS & METHODS**

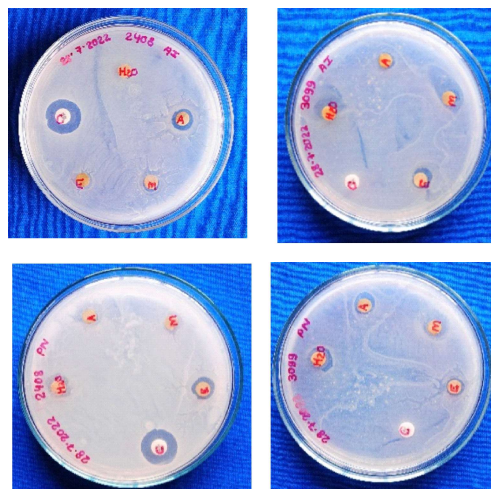
For the present investigation plant samples i.e., *Acalypha indica* L., *Phyllanthus niruri* L. and *Euphorbia hirta* L. were collected from Dalma Forest, East Singhbhum district of Jharkhand by field trips. Shade dried leaves are powdered and extracted by organic solvents like ethanol, methanol, acetone and distilled water for the evaluation of antimicrobial properties of sample plants i.e., *Acalypha indica* L., *Phyllanthus niruri* L. and *Euphorbia hirta* L. Two pathogenic bacteria viz; *Escherichia coli* and *Staphylococcus aureus* are used. The agar disc diffusion method is the best method to analyse the antimicrobial properties against numerous microorganisms. The zone of inhibition was measured in mm<sup>2</sup>. The nutrient media are prepared for bacteria. Broth media is used for bacteria. The culture media and petridish were sterilized in autoclave. After this they were placed in Laminar air flow. The media are carefully poured into the petridish and allowed to get solidified form in Laminar air flow. Then paper disks were prepared and sterilized. The leaves extract was loaded into the disks and the plates were incubated at 37°C temperature for 24 hours. After that analysis of the result in growth plate was done and zone of inhibition was determined.

**RESULT & DISCUSSION**

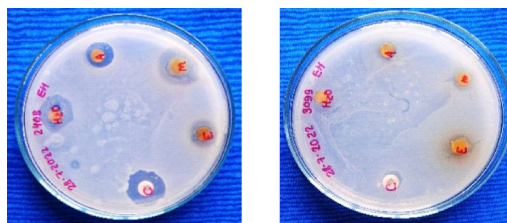
Present investigation reveals that the anti bacterial activity of *Acalypha indica* L., *Phyllanthus niruri* L. and *Euphorbia hirta* L. the highest zone of inhibition is

recorded in case of *Euphorbia hirta* L. with solvent methanol and distilled water against bacterial pathogen, *Staphylococcus aureus* then second highest zone of inhibition is recorded by *Acalypha indica* L. with solvent methanol. *Phyllanthus niruri* L. shows the highest zone of inhibition with solvent ethanol against bacterial pathogens *E. coli*.

**Disc diffusion results of *Acalypha indica* L., *Phyllanthus niruri* L. and *Euphorbia hirta* L.**



**Zone of inhibition in *Acalypha indica* L. and *Phyllanthus niruri* L.**

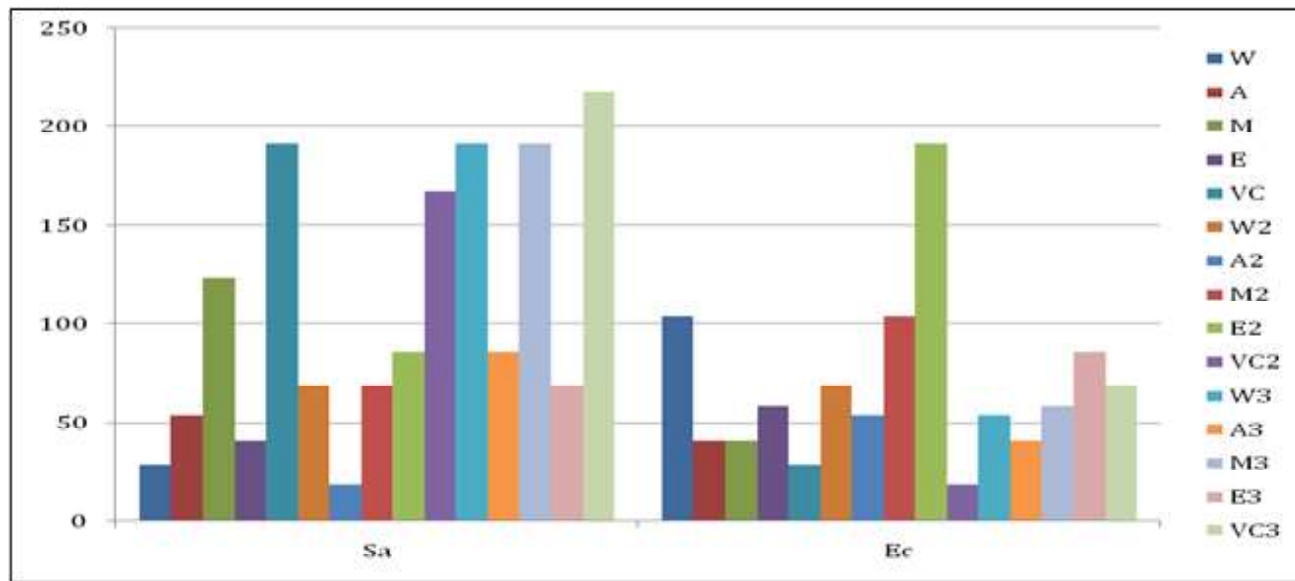


**Zone of inhibition in *Euphorbia hirta* L.**

The table showing antimicrobial activities of extracts of *Acalypha indica* L., *Phyllanthus niruri* L. and *Euphorbia hirta* L. against pathogenic bacteria

Sl.No.	Pathogens	Zone of Inhibition														
		<i>Acalypha indica</i> L.					<i>Phyllanthus niruri</i> L.					<i>Euphorbia hirta</i> L.				
		W	A	M	E	VC	W	A	M	E	VC	W	A	M	E	VC
01	Sa	29.045	54.165	123.245	40.82	191.54	69.08	18.84	69.08	85.56	167.205	191.54	85.565	191.54	69.08	217.445
02	Ec	103.62	40.82	40.82	58.47	29.04	69.08	54.165	103.62	191.54	18.84	54.165	40.82	58.474	85.565	69.08

(Sa= *Staphylococcus aureus*; Ec= *Escherichia coli*; W= Distilled water; A= Acetone; M= Methanol; E= Ethanol; VC= Vancomycin)



**Graph shows comparison of zone of inhibition of plant extracts.**

Extract of *A. indica* L.- W1(Water), A1(Aceton), M1 (Methanol), E1 (Ethanol) VC1 (Vancomycin)

Extract of *P.niruri* L. – W2 (Water), A2(Aceton), M2 (Methanol), E2 (Ethanol) VC2(Vancomycin)

Extract of *E. hirta* L.- W3(Water), A3(Aceton), M3(Methanol), E3(Ethanol), VC3 (Vancomycin).

Kainimozhi *et al.* (2012)<sup>8</sup> reported *A. indica* revealed that all extracts have antibacterial potential against pathogens *Escherichia coli*, *Pseudomonasa eruginosa*, *Staphylococcus aureus*, *Klebsiella pneumonia*. Ethanolic, Methanolic, and acetone extracts showed high Inhibition zone against all these bacteria while hexane and petroleum ether extract showed less or nil zone of inhibition.

Subramani *et al.* (2022)<sup>9</sup> investigated that *Euphorbia hirta* possess antimicrobial properties against bacteria *Escherichia coli*, *Streptococcus mutans* and *Lactobacillus acidophilus*.

## CONCLUSION

Plants are natural source of large number of drugs. These plants drugs have antibiotic properties which are extensively used in traditional health care practices. Many traditional plants used by indigenous people also contain such kind of phytochemicals. The Result of present work revealed that the leaves extract of *Acalypha indica* L., *Phyllanthus niruri* L. and *Euphorbia hirta* L. have antibacterial properties which support to some traditional uses of medicinal plants. They also use traditional foods, which also contain antimicrobial compound. That's why we have to also promote and conserve traditional medicinal plants for our betterment of health and society and also for our ecosystem.

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