In Vitro Antimicrobial Activity of Methanol Extracts from Selected Plant

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Abstract

In vitro antimicrobial activity of methanol extracts of different parts of selected plant - *Euphorbia hirta* L. were examined using agar disc diffusion method against *Escherichia coli.* Methanol solvent was used in preparation of crude extract of plant. Maximum *in vitro* inhibition was scored in leaf extract which offered 25 mm zone of inhibition against *E.coli* . A significant inhibition was also found in stem extracts of *Euphorbia hirta* against *E. coli.*

KEYWORDS: *In vitro* , Solvent , Extracts, *Euphorbia hirta* and *Escherichia coli.*

INTRODUCTION

Selected plant - *Euphorbia hirta* belongs to family Euphorbiaceae. It is a very popular herb amongst practitioners of traditional medicine in village of Jharkhand. It is widely used to treat various ailments including intestinal parasites, diarrhoea, peptic ulcers, vomiting, amoebic dysentery, asthma, bronchitis, coughs, colds, kidney stones, menstrual problems, sterility and venereal diseases. Research on antimicrobial studies have carried out on some medicinal plants including *Betula pendula* (Mukhtar et al., 2002) and *Ageratum houstonianum* (Bowers , 1976). According to World Health Organization, ethno-medicinal plants would be the best source to obtain bioactive compound which would be used in a variety of drugs (Santos et al., 1995) . Some scientists have studied antibacterial activity of crude extracts of *Euphorbia hirta* against few bacteria((El-Mahmood et al., 2009;Ibrahim et al.,2012; Shanmugapriya et al.,2012). The bio-active compounds present in *E. hirta* have potentially significant application against human pathogens (El-Mahmood et al., 2009). The present study was undertaken to explore the *in vitro* antimicrobial activities of methanol extracts of *E. hirta* against *Escherichia coli*.

MATERIALS AND METHODS

The fresh plant of *Euphorbia hirta* was collected from the campus of Nirmala College, Doranda and also from different regions of Ranchi district of Jharkhand ,India. After collection of plant ,leaves, buds and stems were separated and washed with water, followed by shade-dried, powdered and used for extraction. 15 g of each powder was taken and soaked in 150 mL of methanol into conical flasks , placed on a shaker at 37 °C temperature for 72 hr. The filtered crude extracts were concentrated. After complete solvent evaporation, extract was weighed and stored in a refrigerator at 4 °C for further use . 250 mg of solvent residue was dissolved in 5 mL of methanol were used as the test extracts for antimicrobial activity assay.

Test bacteria such as *Escherichia coli* was collected from Birsa Agriculture University, Kanke , Ranchi, Jharkhand, India. All the test bacterial species were maintained on nutrient agar media.

Antimicrobial Activity

Antimicrobial activity of methanol extracts of different aerial parts of plant were determined by disc diffusion method on nutrient agar medium . Extract were loaded on to the sterile disc (Whatman No. 1 filter paper) and dried aseptically.

The discs dipped in respective solvent were used as negative controls. The impregnated discs were aseptically placed on the solidified media containing test bacteria. After 24 h of incubation at 37 °C temperature the culture plates were examined and the diameters of the zones of inhibition were measured in mm unit.

RESULTS AND DISCUSSION

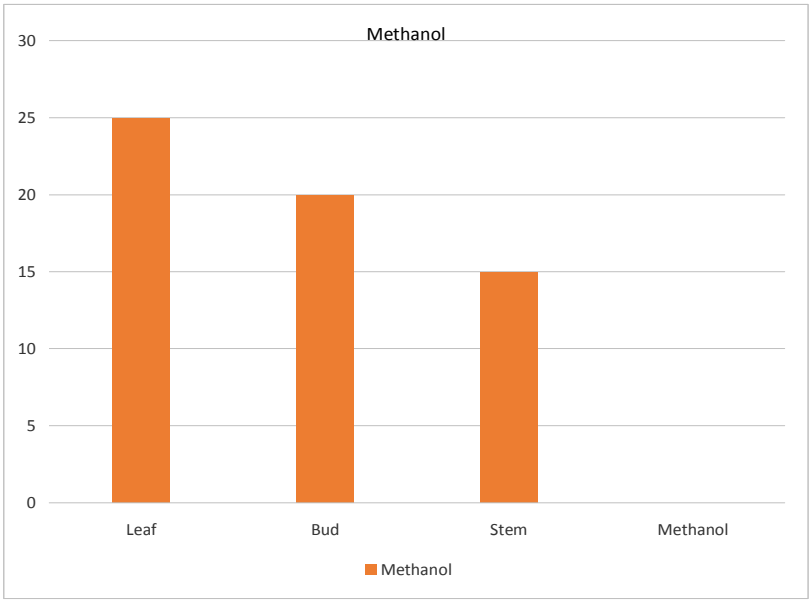
The antimicrobial activity of methanol extracts of different aerial parts such as leaves, buds and stems of *E. hirta* against test bacteria *Escherichia coli* showed varied level of inhibition (Table -1). Among treatments, maximum *in vitro* inhibition of tested bacteria *E. coli* was scored in methanol extracts of leaf of *E. hirta* which offered Zone of inhibition of 25 mm and Zone of Inhibition Area of 686.88 mm^2 . Further, bud and stem extract of *E. hirta* were effective against *E. coli* which recorded significant Zone of inhibition 20 and 15 mm respectively and Zone of Inhibition Area of 471.00 and 294.38 mm^2 respectively (Graph – 1 and Figure - 1).

The antimicrobial properties of selected plant *Euphorbia hirta* may be due to the presence of some bio-active compound such as alkaloids, tannins, saponins and flavonoids which are plant secondary metabolites.

Table 1: Study of Diameter of Zone of Inhibition (DIZ) and Zone of Inhibition Area (ZIA) of Methanol Extract of different parts of *Euphorbia hirta* L. against *E .coli* .

Different Parts	Diameter of Disc (mm)	Diameter of Inhibition including disc (mm)	DIZ (mm)	ZIA(mm^2)
Leaf	5	30	25	686.88
Bud	5	25	20	471.00
Stem	5	20	15	294.38
Methanol	5	5	0	0

DIZ = Diameter of zone of inhibition in millimeter scale.
ZIA = Zone of Inhibition Area in millimeter square.



Graph 1: Antimicrobial activity of Methanol Extract of different parts of *Euphorbia hirta* L. against *E .coli* .

Figure 1 : Antimicrobial activity of Methanol Extract of Different parts of *Euphobia hirta* L. against *Escherichia coli.*

CONCLUSIONS

Methanol Extracts of different parts of *E. hirta* were found to be effective as a source of antibacterial agents against *E.coli* . These primary extracts open the possibility of finding new clinically effective antibacterial compounds. The result of present study showed that methanol extracts of different parts of *E. hirta* have varied antimicrobial activities against the test bacteria . This suggests that the extracts of these plants are broad spectrum in their antimicrobial activities. It showed marked antibacterial activities against *E.coli* . It is used for various medical purposes .Continued further exploration of plant-derived antimicrobials is needed today. Further research is necessary to determine the identity of the antimicrobial compounds from this plant and also to determine their full spectrum of efficacy.

ACKNOWLEDGEMENTS

Parts of my research work described here was supported by **UGC**- PSJ-007/12-13 (ERO) . I wish to extend my hearty thanks to Prof. Ramesh Kumar Pandey, University Professor, University Department of Botany, Ranchi University ,Ranchi for providing required laboratory facilities.

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