International Journal of Current Advanced Research
ISSN: O: 2319-6475, ISSN: P: 2319-6505, Impact Factor: 6.614
Available Online at www.journalijcar.org
Volume 7; Issue 5(E); May 2018; Page No. 12530-12532
DOI: http://dx.doi.org/10.24327/ijcar.2018.12532.2205

Research Article

EFFECT OF METHANOL, ETHANOL AND DIMETHYL SULFOXIDE EXTRACTS OF EUPHORBIA HIRTA L. AGAINST HARMFUL PATHOGENS

Indu Kumari*

Department of Botany, Nirmala College, Doranda, Ranchi

ARTICLE INFO

Article History:

Received 6th February, 2018
Received in revised form 20th March, 2018 Accepted 8th April, 2018
Published online 28th May, 2018

Key words:

Euphorbia hirta, Extracts, inhibition, Escherichia coli and Staphylococcus aureus.

ABSTRACT

The maximum in vitro inhibition was observed in methanol extract of leaf of Euphorbia hirta with inhibition zone of 25 mm and zone of inhibition area of 686.88 mm² against Escherichia coli. The significant results were found in methanol extract of bud and dimethyl sulfoxide extract of leaf of plant. In case of Staphylococcus aureus , methanol extract of leaf and bud showed maximum in vitro inhibition which offered inhibition zone of 20 mm and zone of inhibition area of 471.00 mm². A significant inhibition was also found in other extracts of Euphorbia hirta against E. coli and S. aureus.

INTRODUCTION

Medicinal plants are a major source of drugs for the treatment of various diseases. Medicinal plants contain different type of chemicals which act as best weapons for combating ailments and as a preventive cure against diseases and infections of humans and animals. According to WHO, 80 percent of world population depend on medicinal plants (Shinwari and Khan, 1998). Use of antibiotics have been increased the resistant varieties of pathogens, which have led to the emergence of new multi-resistant bacterial strains (Aibinu *et al*., 2004). The antibacterial activity of some medicinal plants was proved by some scientists (Pretorius *et al.,* 2003, Moreillion *et al*., 2005).

Euphorbia hirta Linn.is a perennial herb. It is most common plant species. It belongs to family Euphorbiaceae. It is small, ascending, annual plant. The stem of plant is hairy and the leaves are oblong, elliptical, acute or subacute. The stem and leaves produce white or milky juice when cut. The specialty of the herb is that it bears flowers and fruits in all seasons and throughout the year and grows in damp regions. It grows heavily during rainy season. Besides various medicinal property, it posses antimicrobial, antibacterial,antioxidant, antidiarrheal, anticancer, antidepressant for blood pressure , antihypertensive, anti-platelet aggregation and anti-inflammatory, anthelmintic, antiplasmodial .Some scientists have carried out antimicrobial studies on some medicinal plants including *Betula pendula'* (Mukhtar *et al*., 2002) and *Ageratum houstonianum* (Bowers , 1976).

Corresponding author:* **Indu Kumari
Department of Botany, Nirmala College, Doranda, Ranchi

Research on antibacterial activity of *Euphorbia hirta* against few bacteria was done by some scientists. (El-Mahmood *et al*., 2009; Shanmugapriya *et al*.,2012; Ibrahim *et al*.,2012). The purpose of present research work was to study the effect of methanol, ethanol and dimethyl sulfoxide extracts of *Euphorbia hirta* L. against harmful pathogens like *Escherichia coli and Staphylococcus aureus*.

MATERIAL AND METHODS

The extracts of different aerial parts of *Euphorbia hirta* in different solvents such as methanol, ethanol and dimethyl sulfoxide were used to inhibit the growth of pathogens. Antibacterial activity of different extracts were measured by agar disc diffusion method**.** Fresh leaf, bud and stem of *Euphorbia hirta* were collected from different areas of Ranchi district of Jharkhand, India. Plant was identified taxonomically and authenticated. Different parts were separated and cleaned with water and shade-dried. The different parts of the plant were powdered, stored and used for extraction. 15 g of each powder was mixed to150 mL of solvent for 72 hr. The extract was filtered through Whatman No. 1 filter paper and stored in a refrigerator at 4 °C for further use.

Growth of Test Pathogens

Bacterial strains were obtained from Birsa Agriculture University, Kanke, Ranchi, Jharkhand, India. The test bacterial species were maintained on nutrient agar media for further use.

Antibacterial Activity

Methanol, ethanol and dimethyl sulfoxide extracts of different aerial parts of *Euphorbia hirta* were used to inhibit the growth of pathogens. Agar disc diffusion method was used in

measuring of inhibition zone of test bacteria. In this method, the test bacteria was inoculated into nutrient agar medium on the petridish. The filter paper discs of 5 mm diameter were prepared using filter paper (Whatman No.1), impregnated with the extracts were placed on the test organism seeded petridishes. Then petridishes were incubated at 37°C for 24hours. The measurement of diameter of the zone of inhibition shows the antibacterial activity.

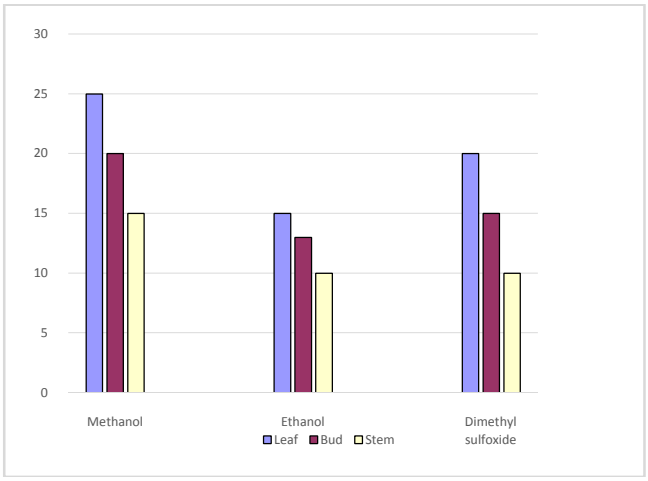
RESULTS AND DISCUSSION

Results of experiment revealed that methanol, ethanol and dimethyl sulfoxide extracts of different parts of *Euphorbia hirta* L. posses potential antibacterial activity against test pathogens such as *Escherichia coli* and *Staphylococcus aureus*. The maximum *in vitro* inhibition was observed in methanol extract of leaf of *Euphorbia hirta* with inhibition zone of 25 mm and zone of inhibition area of 686.88 mm² against *Escherichia coli.* The significant results were found in methanol extract of bud and dimethyl sulfoxide extract of leaf of plant with inhibition zone of 20 mm and zone of inhibition area of 471.00 mm². Further methanol extract of stem and ethanol extract of leaf and dimethyl sulfoxide extract of bud of *E. hirta* were effective against *E. coli* which recorded same significant zone of inhibition of 15 mm and zone of inhibition Area of 294.38 mm². Stem extract in ethanol or in dimethyl sulfoxide shows least inhibition zone against *E. coli* around 10 mm and zone of inhibition area of 157.00 mm² (Table-1 and Graph – 1) .

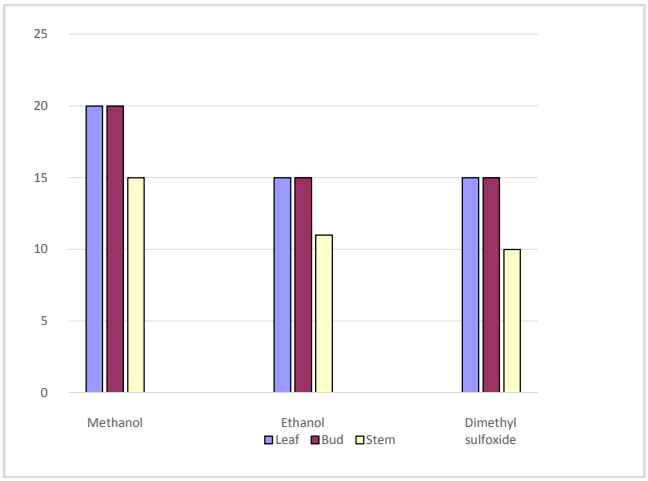
In case of *Staphylococcus aureus*, methanol extract of leaf and bud showed maximum *in vitro* inhibition which offered inhibition zone of 20 mm and zone of inhibition area of 471.00 mm². A significant inhibition was found in methanol extract of stem and ethanol extract of leaf or bud and dimethyl sulfoxide extract of leaf or bud which recorded same significant zone of inhibition of 15 mm and zone of inhibition Area of 294.38 mm². *In vitro* inhibition was also found in other extracts of *Euphorbia hirta* against *E. coli and S. aureus* (Table-1 and Graph-2).

Table 1 Study of Diameter of Zone of Inhibition (DIZ) and Zone of Inhibition Area (ZIA) of Methanol, Ethanol and Dimethyl sulfoxide extract of different parts of *Euphorbia hirta* against *Escherichia coli* and *Staphylococcus aureus*.

Solvents	Parts	Escherichia coli		Staphylococcus aureus.	
		DIZ(mm)	ZIA(mm²)	DIZ(mm)	ZIA(mm²)
Methanol	Leaf	25	686.88	20	471.00
	Bud	20	471.00	20	471.00
	Stem	15	294.38	15	294.38
Ethanol	Leaf	15	294.38	15	294.38
	Bud	13	234.72	15	294.38
	Stem	10	157.00	11	181.34
Dimethyl sulfoxide	Leaf	20	471.00	15	294.38
	Bud	15	294.38	15	294.38
	Stem	10	157.00	10	157.00



Graph 1 Antibacterial activity of Extracts of different parts of *Euphorbia hirta* using Methanol, Ethanol and Dimethyl sulfoxide solvent against *Escherichia coli* .



Graph 2 Antibacterial activity of Extracts of different parts of *Euphorbia hirta* using Methanol, Ethanol and Dimethyl sulfoxide solvent against *Staphylococcus aureus*.

CONCLUSIONS

It has been concluded that methanol, ethanol, and dimethyl sulfoxide extracts of different aerial parts of *E.hirta* posses antibacterial activity against test pathogens. The antibacterial activity of extracts could be due to presence of various phytoconstituents. Out of all the extracts from *E. hirta*, maximum *in vitro* inhibition showed by methanol extracts against *E. coli* and *S. aureus.* Other extracts of *Euphorbia hirta* were also effective against *E. coli and S. aureus*. Some of these observation would help in developing new antibacterial drugs for resistant-strains of bacteria.

Acknowledgements

I wish to extend my hearty thanks to Prof. Ramesh Kumar Pandey, University Professor, University Department of Botany, Ranchi University, Ranchi for his kind support and cooperation to carry out study. Parts of my research work described here was supported by **UGC**- PSJ-007/12-13 (ERO)

References

1. Aibinu, I, Adenipekun, E and Odugbemi, T. 2004. Emergence of Quinolone Resistance amongst *Escherichia coli* strains isolated from clinical infections in some Lagos State Hospitals in Nigeria. *Nigerian Journal of Health and Biomedical Science.* 3(2):73-78.

2. Bowers WS, 1976. Discovery of insect juvenile hormone in plants (Agretochrome I, II). Sci. 195: 542-547.
3. El-Mahmood Muhammad Abubakar, 2009. Antibacterial activity of crude extracts of *Euphorbia hirta* against some bacteria associated with enteric infections. *Journal of Medicinal Plants Research* Vol. 3(7), pp. 498-505, ISSN 1996-0875.
4. Ibrahim T.A., Adetuyi F.O. and Ajala Lola, 2012. Phytochemical screening and antibacterial activity of *Sida acuta* and *Euphorbia hirta*. *Journal of Applid Phytotechnology in Environmental Sanitation* 1(3):113-119; ISSN 2088-6586.
5. Moreillion,P., Que,Y.A., and Glauser,M.P, 2005. *Staphylococcus aureu*s (Including Staphyloccal Toxic shock). In 'Principles and Practice of Infectious diseases.' (Ed.) Mandell G.L, Bennett J.E, Dolin R. Published by *Churchill livingstone Pennyslyvania* 6th ed. 2: 2333- 2339.
6. Mukhtar MH, Ansari SH, Ali M, Wani FA, 2002. Antimicrobial activity of*Betula pendula*. Hamdard Medicus. 45: 41-43.
7. Pretorius, J.C., Magama S., and Zietsman P.C., 2003. Growth inhibition of plant pathogenic bacteria and fungi by extracts from selected South African plant species *South African Journal of Botany* 20: 188-192.
8. Shanmugapriya Perumal, Suthagar Pillai, Lee Wei Cai, Roziahanim Mahmud, Surash Ramanathan, 2012. Determination of Minimum Inhibitory Concentration of *Euphorbia hirta* (L.) Extracts by Tetrazolium Microplate Assay, *Journal of Natural Products* Volume 5, 68-76; ISSN 0974 - 5211.
9. Shinwari, M.I. and Khan, M.A. 1998. Indigenous use of medicinal trees and shrubs of Margalla Hills National Park, Islamabad. *Pak. J.Forest*.48 (1-4) : 63-90.

How to cite this article:

Indu Kumari (2018) 'Effect of methanol, ethanol and dimethyl sulfoxide extracts of euphorbia hirta l. Against harmful pathogens', *International Journal of Current Advanced Research,* 07(5), pp. 12530-12532.
DOI: http://dx.doi.org/10.24327/ijcar.2018.12532.2205

****