Effect of Ethanol Extracts of *Euphobia hirta* L. against *Staphylococcus aureus*

Indu Kumari
Assistant Professor, Department of Botany, Nirmala College, Doranda, Ranchi Jharkhand, India

Abstract

Effect of Ethanol extracts of *Euphorbia hirta* L. were examined against *Staphylococcus aureus* . Ethanol was used as solvent. Different aerial parts such as Leaves, Buds and Stems were extracted using ethanol. Test bacteria *Staphylococcus aureus* was used. *S. aureus* is a facultative anaerobic, nonmotile, non–spore-forming, and Gram-positive coccal bacterium. Maximum inhibition was recorded in leaf and bud extract of *E. hirta* using ethanol against test bacteria *S. aureus,* with zone of inhibition of 15 mm and zone of inhibition area of 294.38 mm^2 . Stem extract also shows inhibition zone of 11 mm and zone of inhibition area of 181.34 mm^2 .

KEYWORDS: Solvent , Ethanol, Extracts, *Euphorbia hirta* and *Staphylococcus aureus*.

INTRODUCTION

Bio-active compounds of medicinal plants act as best weapons for combating ailments and as a preventive cure against diseases without causing any side effect. Resistant strains of pathogens have been increasing , which have led to the emergence of new multi-resistant bacterial strains (Austin et al. 1999; Aibinu *et al*., 2004). Last few years, the active plant extracts are screened to prove antimicrobial activities from medicinal plants (Pretorius *et al.*, 2003, Moreillion et al., 2005). It is needed for a continuous search and development of new drugs (Barbour et al., 2004; Machado et al., 2003; Rojas et al., 2003). According to World Health Organization (Santos et al., 1995) medicinal plants would be the best source to obtain a variety of drugs.

Antibacterial activity of crude extracts of some medicinal plants against pathogenic bacteria were reported by some scientist (Samy et al., 2000 , Taylor., 1995; Mukhtar et al., 2002; El-Mahmood et al., 2009; Ibrahim et al.,2012; Shanmugapriya et al.,2012;).

Euphorbia hirta L. is a annual herb. It belongs to the family Euphorbiaceae. . *Euphorbia hirta* is commonly known as asthma weed or basri dudhi. *Euphorbia hirta* has been used by villagers as traditional medicine in a treatment against infectious pathogens. The herb widely found in India. *E. hirta* widely used as a decoction or infusion to treat various ailments including intestinal parasites, diarrhoea, vomiting, amoebic dysentery, asthma . The present research work was undertaken to explore the effect of ethanol extracts of *E.hirta* extract against *Staphylococcus aureus* .

MATERIALS AND METHODS

The fresh plants of *Euphorbia hirta* were collected from different lacations of Ranchi district of Jharkhand. Different aerial parts of plant such as leaves, buds and stems were separated and washed thoroughly 2 - 3 times with water, shade-dried, powdered and used for extraction. Fixed amount of each powder was soaked in definite volume of solvent into conical flasks , closed by foil paper and

placed on a shaker at 37 °C temperature for 72 hr. After evaporation of solvent , extract was weighed and stored in a refrigerator at 4 °C. 500 mg of solvent residue was dissolved in 10 mL of ethanol was used as the test extracts.

Test bacteria such as *Staphylococcus aureus* was collected from Birsa Agriculture University, Kanke , Ranchi, Jharkhand.The test bacterial species was maintained on nutrient agar media.

Antibacterial Activity

Antibacterial activity of different aerial parts of *Euphorbia hirta* using ethanol solvent were determined by disc diffusion method . In this method, the test organism was seeded into autoclaved nutrient agar medium on the plates . The filter paper discs of 5 mm diameter were prepared using Whatman No. 1 filter paper , impregnated with the extract were placed on the test organism seeded plates. Then plates were incubated at 37°C for 24hours . The experiment was carried out in triplication to get average result. Culture plates were examined and the diameters of the inhibition zones were measured in mm unit.

Results and Discussion

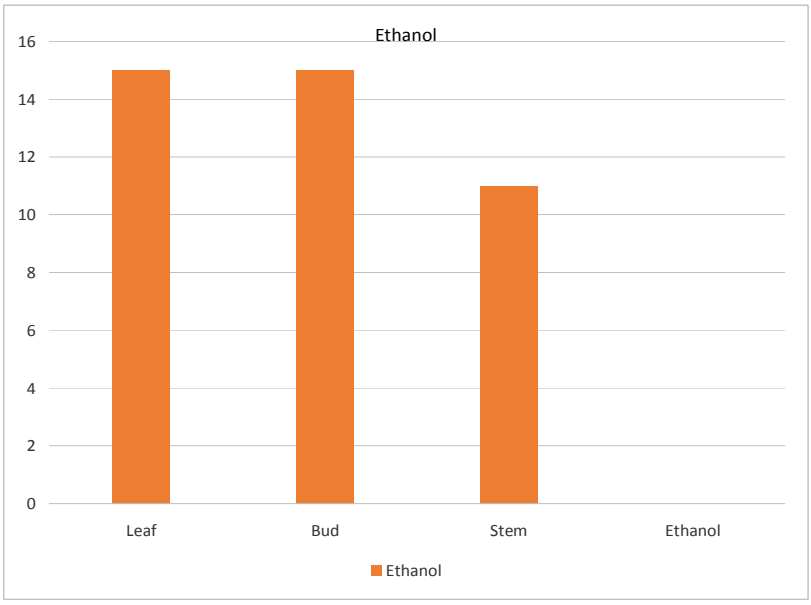
Results of experiment revealed that ethanol extracts of different parts of *Euphorbia hirta* L. posses potential antibacterial activity against test bacteria *Staphylococcus aureus* . Among treatments, ethanol extract of leaf and bud were found to be more active against test bacteria - *S. aureus* . Maximum *in vitro* inhibition of tested bacteria *S. aureus* was scored in ethanol extracts of leaf and bud of *E. hirta* which offered Zone of inhibition of 15 mm and Zone of inhibition area of 294.38 mm^2 . Stem extract in ethanol also shows significant inhibition zone of 11 mm and zone of inhibition area of 181.34 mm^2 (Table-1 and Graph – 1) .

This study suggested that ethanol extracts of different aerial parts of *E.hirta* posses antibacterial activity against *S. aureus*. The antibacterial activity of extracts could be due to presence of various phytoconstituents.

Table 1: Study of Diameter of Zone of Inhibition (DIZ) and Zone of Inhibition Area (ZIA) of Ethanol Extract of different parts of *Euphorbia hirta* L. against *Staphylococcus aureus* .

Differenr Parts	Diameter of Disc (mm)	Diameter of Inhibition including disc (mm)	DIZ (mm)	ZIA(mm^2)
Leaf	5	20	15	294.38
Bud	5	20	15	294.38
Stem	5	16	11	181.34
Ethanol	5	5	0	0

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



Graph 1: Effect of Ethanol Extracts of different parts of *Euphorbia hirta* L. against *Staphylococcus aureus* .

CONCLUSIONS

The results obtained in the present work indicated that *E. hirta* extracts using ethanol solvent were effective against *Staphylococcus aureus* . The antibacterial studies showed the significance of the ethanol extract of *Euphorbia hirta* L. Out of all the extracts from *E. hirta* , maximum significant antimicrobial activity showed by leaf and bud extract using ethanol solvent against test bacteria. The result of research work have justified the traditional indirect use of plant in curing various diseases. Some of these observation would be helped in developing drugs for therapeutic use in different diseases.

ACKNOWLEDGEMENTS

The auther is sincerely thank to Prof. Ramesh Kumar Pandey, University Professor, University Department of Botany, Ranchi University ,Ranchi for providing the necessary laboratory facilities required for carrying out the present work. Parts of 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. Austin D.J., Kristinsson K.G.and Anderson R. M. ,1999. The relationship between the volume of antimicrobial consumption in human communities and the frequency of resistance. *Proceedings of the National Academy of Sciences of the United States of America* 96(3): 1152–1156.

3. Barbour, E.K., Al Sharif, M., Sagherian, V.K., Habre, A.N., Talhouk, R.S. and Talhouk, S.N., 2004. Screening of selected indigenous plants of Lebanon for antimicrobial acitivity.*J. Ethnopharmacol*., 93(1): 1–7.

4. 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.

5 . 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.

6. Machado T B, Pinto A V, Pinto M C F R, Leal I C R, Silva M G, Amaral A C F, Kuster R M, Netto – dosSantos K R, 2003. *In-vitro* activity of Brazilian medicinal plants, naturally occurring naphthoqinones and their analogues, against methicillin–resistant *Staphylococcus aureus*. *Int. J. of Antimicrobial Agents* 21:279-284.

7. 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.

8. Mukhtar MH, Ansari SH, Ali M, Wani FA ,2002. Antimicrobial activity of *Betula pendula*. Hamdard Medicus. 45: 41-43.

9. 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.

10. Rojas R, Bustamante B, Bauer J, 2003. Antimicrobial activity of selected Peruvian medicinal plants. *J. Ethanopharm*. 88: 199-204.

11. Samy, R.P. and S. Ignacimuthu, 2000. Antibacterial activity of some folklore medicinal plants used by tribals in Western Ghats in India. J. Ethnopharmacol.,69: 63-71.

12. Santos PRV, Oliveira ACX, Tomassini TCB, 1995. Control microbiogicode productos. Fitoterapicos. *Rev. Farm. Bioquim.* 31: 35-38.

13. 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.

14. Taylor, R.S.L., N.P. Manandhar, J.B. Hudson and G.H.N. Towers, 1995. Screening of selected medicinal plants of Nepal for antimicrobial activities.J. Ethnopharmacol., 546: 153-159.