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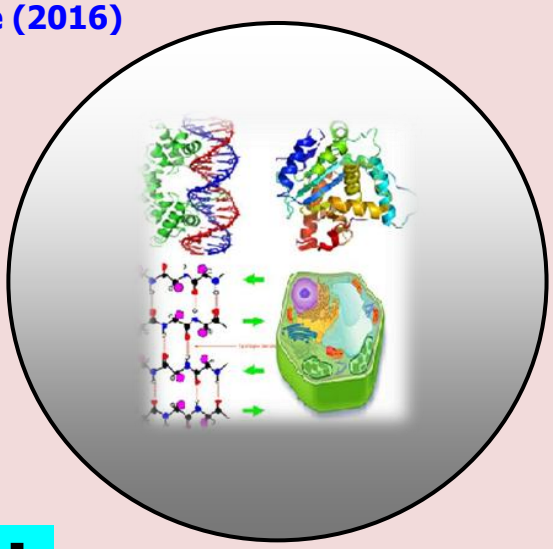
ISSN 2319-3077 Online/Electronic
ISSN 0970-4973 Print

UGC Approved Journal No. 62923
MCI Validated Journal
Index Copernicus International Value
IC Value of Journal 82.43 Poland, Europe (2016)
Journal Impact Factor: 4.275
Global Impact factor of Journal: 0.876
Scientific Journals Impact Factor: 3.285
InfoBase Impact Factor: 3.66

J. Biol. Chem. Research
Volume 35 (2) 2018 Pages No. 359-362



Journal of Biological and Chemical Research
An International Peer Reviewed / Referred Journal of Life Sciences and Chemistry

Indexed, Abstracted and Cited in various International and National Scientific Databases

Published by Society for Advancement of Sciences®

J. Biol. Chem. Research. Vol. 35, No. 2: 359-362, 2018
(An International Peer Reviewed / Refereed Journal of Life Sciences and Chemistry)
Ms 35/02/2010/2018

ISSN 2319-3077 (Online/Electronic)
ISSN 0970-4973 (Print)

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RESEARCH PAPER
Received: 25/05/2018 **Revised: 19/06/2018** **Accepted: 20/06/2018**

A Study of Antibacterial Activity of Aqueous Extracts of *Euphorbia hirta* L. against Bacteria *Escherichia coli*

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ABSTRACT

Disc agar diffusion method was used to study the antibacterial activity of aqueous extracts of different parts of Euphorbia hirta L. against bacteria Escherichia coli. Maximum zone of inhibition zone was occurred in aqueous extract of bud of Euphorbia hirta L. against Escherichia coli which offers 20 mm zone of inhibition and zone of inhibition area of 471.00 mm².A significant inhibition zone was observed in aqueous extract of leaf and stem of Euphorbia hirta L against Escherichia coli. The susceptibility of Escherichia coli varies with the types of aerial parts of same plant used.

Key words: Antibacterial activity, Aqueous, Euphorbia hirta L. and Escherichia coli.

INTRODUCTION

Euphorbia hirta L. (Family- Euphorbiaceae) is an herb frequently found in India. It is a common weed known as 'garden spurge'. *Euphorbia hirta* L. is used as analgesic, antipyretic, anti-inflammatory, antidepressant for blood pressure, antihypertensive and antioxidant. *Euphorbia hirta* L was used in treating of respiratory ailments, especially cough, coryza, bronchitis, asthma, diarrhea, peptic ulcers, heartburn, vomiting, amoebic dysentery etc.

Natural medicinal plants have been known to synthesize bio-active secondary metabolites with established potent antibacterial activities, which indeed have formed the basis of some pharmaceuticals, alternative medicines and natural therapies (Farombi, 2003; R´ıos et al., 2005; Reynolds et al., 1996., Lis- Balchin 1997).

Bacteria - *Escherichia coli* is causal organism of various human infections such as food poisoning, nosocomial infections, wound infections and urinary tract infections and has been selected for the present study. Antibacterial activity of crude extracts of some plants against some few bacteria was studied by some scientist.((El-Mahmood et al.,2009; Shanmugapriya et al.,2012 ; Ibrahim et al.,2012; Suresh et al.,2008; Sunil Kumar et al., 2010; Mukhtar et al., 2002; Bowers , 1976).

The objective of the present study was to find out the antibacterial activity of aqueous extracts of *Euphorbia hirta* L. against bacteria *Escherichia coli.*

MATERIALS AND METHODS

The different parts of *Euphorbia hirta* were collected from different locations of Ranchi district of Jharkhand, India. After collection of fresh plant, different aerial parts such as 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 solvent into conical flasks, placed on a shaker at 37 °C temperature for 72 hr. After solvent evaporation, extract was weighed and stored in a refrigerator at 4 °C for use. 500 mg of solvent residue was dissolved in 10 mL of water were used as the test extracts for antibacterial activity assay. A Bacterium Escherichia coli was collected from Birsa Agriculture University, Kanke, Ranchi, Jharkhand, India.

Antibacterial Activity

Antibacterial activities of aqueous extracts of different aerial parts of plant were determined by disc diffusion method on nutrient agar medium. All tests were performed in autoclaved agar medium. Bacteria were inoculated in nutrient agar medium on the sterile solid plates. The plates were placed in an incubator at 37°C for 18–24 hours. The discs (prepared by Whatman No. 1 filter paper) dipped in different extracts and also in respective solvent were used as negative controls. The zone of inhibition of bacterial growth around each disc is measured by using Himedia zone scale and the susceptibility is determined**.** The diameters of the zones of inhibition were measured in mm unit.

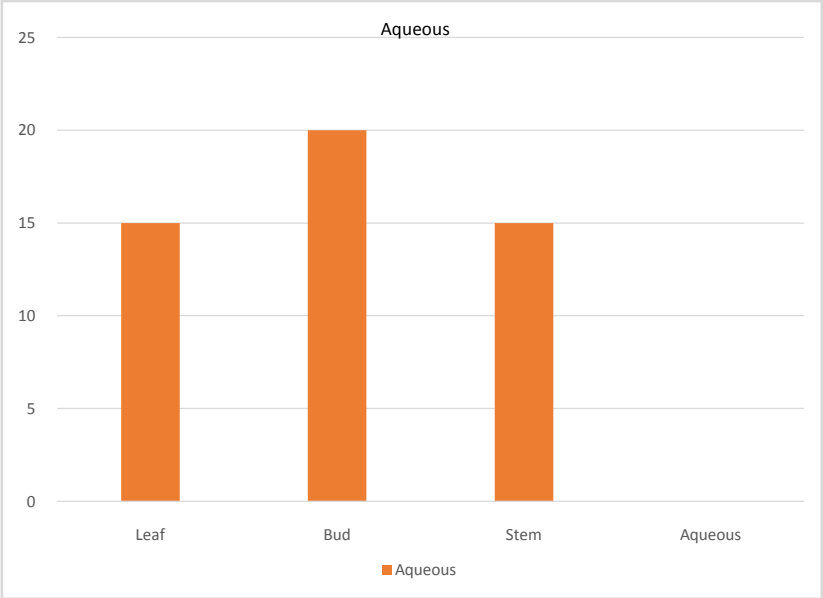
RESULTS AND DISCUSSION

The result of work showed that the different levels of inhibition zone (Table-1). Maximum inhibition zone was observed in aqueous extract of bud of *Euphorbia hirta* L. against *Escherichia coli* which offers zone of inhibition of 20 mm and zone of inhibition area of 471.00 mm².

A significant inhibition zone of bacteria *E. coli* was found in aqueous extract of leaf and stem of *Euphorbia hirta* L. which offered same inhibition zone of 15 mm and zone of inhibition area of 294.38 mm². From Figure-1 and graph – 1, it is seen that the extracts from different parts of *E. hirta* in aqueous showed antibacterial activity against *E. coli.* Maximum degree of antibacterial activity properties was found in bud extract of *E. hirta.*

Table 1. Study of Diameter of Zone of Inhibition (DIZ) and Zone of Inhibition Area (ZIA) of Aqueous 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(mm²)
Leaf	5	20	15	294.38
Bud	5	25	20	471.00
Stem	5	20	15	294.38
Aqueous	5	5	0	0



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

Figure 1. Study of effect of Aqueous extract of different parts of *Euphorbia hirta* L. against *Escherichia coli*.

CONCLUSIONS

From result, It is concluded aqueous extracts of different parts of *E. hirta* have varied antibacterial activities against the test bacteria. This suggests that the extracts of these plants are broad spectrum in their antibacterial activities. It showed marked antibacterial activities against *E. coli* which may be due to secondary metabolites of plants such as alkaloids, tannins, saponins and flavonoids. These secondary metabolites are actually the defensive mechanisms of the plants against test bacteria. Result of research work forms a primary platform for further studies to discover new antibiotic drugs based on medicinal plants.

ACKNOWLEDGEMENTS

Parts of my research work described here were supported by **UGC**- PSJ-007/12-13 (ERO). I wish to extend my hearty thanks to Prof. Ramesh Kumar Pandey, Former Dean, Former HOD, University Department of Botany, Ranchi University, Ranchi for his kind support to conduct this project.

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