RESEARCH REVIEW JOURNALS
Volume-04
Issue-03
March-2019

ISSN: 2455-3085 (Online)
RESEARCH REVIEW International Journal of Multidisciplinary
www.rrjournals.com[UGC Listed Journal]

Antimicrobial Activity of *Dicoma tomentosa* Plant in arid region of Jhunjhunu

[1]Shilpa Dhaniya and [2]Suman Kumari Parihar

[1]*Research Scholar, Department of Botany, S.P.C.Government College, Ajmer, Rajasthan (India)*
[2]*Research Guide, Department of Botany, S.P.C.Government College, Ajmer, Rajasthan (India)*

ARTICLE DETAILS

Article History
Published Online: 13 March2019

Keywords
Antimicrobial activity, Dicoma tomentosa, Agar well diffusion method, zone of inhibition, phytochemical analysis

ABSTRACT

The resistance of pathogenic bacteria and fungus strains to antibiotics is the major burning issue around the world. To minimize the strain resistance to antibiotics plant *Dicoma tomentosa* was selected. In the present study, the leaves and stem of *Dicoma tomentosa* was collected and antimicrobial activity was examined through Agar well diffusion method. The crude extracts were obtained by using methanol extraction solvent. Antimicrobial activity of leaves and stem extracts of *Dicoma tomentosa* was evaluated hostile four fungus *Penicillium funiculosum*, *Aspergillus Niger, Trichoderma ressei* and *Fusarium oxysporum* and four bacterial strains, *Staphylococcus aureus, Streptomyces grisveus, Escherichia coli* and *Bacillus subtilis.* It was determined that maximum zone of inhibition was in leaves (12mm) against *bacillus subtills* In fungus, maximum zone was observed in stem against *Trichoderma ressei (*13mm) while other fungal colonies were found to be resistant.

1. Introduction

For a long period of time, plants have been a valuable source of natural products for maintaining human health, especially in the last decade, with more intensive studies for natural therapies. Now a day, the use of phytochemical for pharmaceutical purpose has gradually increased in many countries. According to world health organization (WHO) medicinal plants would be the best source to obtain a variety of drugs. About 80% of individuals from developed countries use traditional medicine, which has compounds derived from medicinal plants. (1)The screening of plant products for antimicrobial activity has shown that the higher plants represent a potentional source of novel antibiotic prototypes (Afolayan,2003).there has been an increasing incidence of multiple resistance in human pathogenic microorganisms in recent years, largely due to indiscriminate use of commercial antimicrobial drugs commonly employed in the treatment of infectious diseases. This has forced scientist to search for new antimicrobial substances from various source like the medicinal plants (2). Plants produces a wide variety of secondary metabolites which are used either directly as precursors in the pharmaceutical industry. It is expected that plant extracts showing target sites other than those used by antibiotics will be active against drug resistant microbial pathogens. However, very less information is available on such activity of medicinal plants and out of the 4,00000 plant species on earth, only a small number has been systematically investigated for their antimicrobial activities(3).

Large number of antimicrobial agents derived from traditional medicinal plants is available for treating various diseases caused by microorganism (4). Although hundreds of plant species have been tested for antimicrobial properties, the vast majority have not been adequately evaluated (5). The aim of present study, to evaluate the potentional of antimicrobial activity of methanol extracts of *Dicoma tomentosa* leaves and stem against clinically isolated bacterial and fungal strains.

2. Material and method

Collection of plant material was authenticated by Department of Botany, University of Rajasthan. *Dicoma tomentosa* was collected from Udaipurwati in Jhunjhunu, Rajasthan (India) during September to October (2017).

Preparation of the crude extract was obtained by macerating 10 gm of dried plant powder in 95% methanol and kept on a rotary shaker for 24hr. the extract was filtered, and will be dried. The extract will be stored at 40C in airtight bottles. The dried extracts were dissolved in Dimethyl sulfoxide to make the final concentration which kept in refrigerator till used. The extracts were filtered, dried and then stored at 40C in airtight bottles.

Microorganisms used clinically laboratory bacterial isolates of Streptomyces griseus, Staphylococcus aureus, Bacillus and Escherichia coli and fungal isolates viz. Aspergillus Niger, Fusarium oxisporium, Penicillum funiculosum and Trichoma ressei were collected from the stock cultures of Microbiology Laboratory, SMS Medical College Jaipur (India).

Preparation of Extract

The crude methanol extract obtained by macerating 30 g of dried plant powder in 95% methanol

And kept on a rotary shaker for 24hr.the extract was filtered, centrifuged at 5000g for 15 min. and dried under reduced pressure than stored at 4°C in airtight bottles.

Culture and Maintenance of bacteria

The bacteria were grown in Nutrient agar medium (prepared by autoclaving 8% Nutrient agar, in distilled water at 15 psi for 25-30min) and incubating at 37°C for 48 hr.each bacterial cultures was further maintained on the same medium after every 48 hr of transferring. Fresh suspension of test organism in saline solution was prepared from a freshly grown agar slant before every microbial assay.

Determination of antibacterial Assay

In vitro antibacterial activity of the crude methanol extract was studies against gram positive and gram negative bacteria strains by the agar well diffusion method (6). The extracts were diluted in 100% Dimethylsulphoxide (DMSO) at the concentration of 5mg/ml.wells (about 6mm depth) was prepared in the seeded agar plates. the test compounds (100µl) was introduced in the well (6mm).the plates were incubated overnight at 37°C.the antimicrobial spectrum of the extract was determined for the bacterial species in terms of zone sizes around each well. The diameter of zone of inhibition produced by the commercial control antibiotics ciprofloxacin. For the each bacterial strains control were maintained were pure solvents were used instead of the extract.

The control zones were subtracted from the test zone diameter was measured with antibiotic zone reader to nearest mm.the experiment was performed three times to minimize the error and the mean values were presented.

Determination of antifungal Assay

Antifungal activity of the excremental plant was investigated by agar well diffusion method (7).the fungi were subculture on to potato dextrose agar, PDA(Merck, Germany) and respectely incubated at 37°C for 24 hr. and 25°C for 2-5 days. suspension of fungal spores were prepared in sterile water and adjust to a concentration of 106 cells/ml.The plates were dried at room temperature for 15 min wells of 6mm in diameter were punctured in the culture media using sterile glass tube.0.1ml of several dilution of fresh extracts was admistrated to fullness for each well. Plats were incubated at 37°C.After incubation of 24 hr.bioactivities was determined by measuring the diameter of inhibition zone (in mm).all experiments were made in triplicate was calculated. After incubation of 24 h bioactivities were determined by measuring the diameter of inhibition zone (in mm). All experiments were made in triplicate and means were calculated.

3. Result and discussion

Plants synthesize variety of phytochamical as part of their normal metabolic activities.chamical profile a single plant may vary over a time, as it reacts to changing conditions. In 2010 a survey of 1000 plants were done out of which, 156 clinical trials for evolution of their pharmacological activities and therapeutic applications gave encouraging results (8). This led to the new search for drugs and dietary supplements derived from plants. during the last 10 years pace of development of new antimicrobial drugs have slow down, while prevalence of resistance of growing and outlook for the use of antimicrobial drugs in future is still uncertain therefore, action must be taken to reduce this problem, such as controlling the use of antibiotics and carrying out research for better understanding of genetic mechanism of resistance. This stimulated to evaluate as source of antimicrobial agent along with their ethenomedicinal use (10). In this present study the methenolic extracts of *Dicoma tomentosa* were found to have maximum antibacterial activity against *bacillus subtilis* (12 mm).while rests of bacterial strains were found to be resistant(table 1).

Similarly against strains more zone of inhibition was determined in stem against similarly against fungal strains more zone of inhibition was determined in stem against *Tricoderma ressei* (13mm).*Ticoderma ressei* (13mm). The other three strains of they were found to be resistant against plant parts of *Dicoma tomentosa.*

Table 1: Antibacterial activity of *Dicoma tomentosa* against various clinical isolates

Serial no.	bacterial colonies	Leaves (zone in mm)	steam (zone in mm)	Standard as Ciprofloxacin
1	*Escherichia coli*	9±0.55	NA	22
2	*Staphylococcus aureus*	11±0.92	NA	22
3	*Streptomyces grisveus*	NA	12±0.38	22
4	*Bacillus subtilis*	12±0.49	NA	22

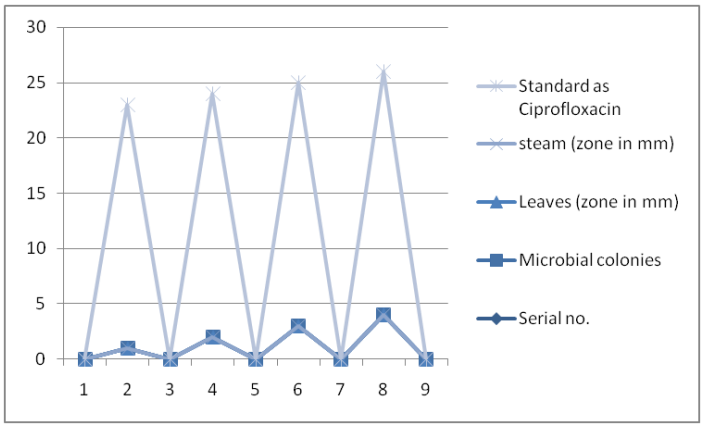
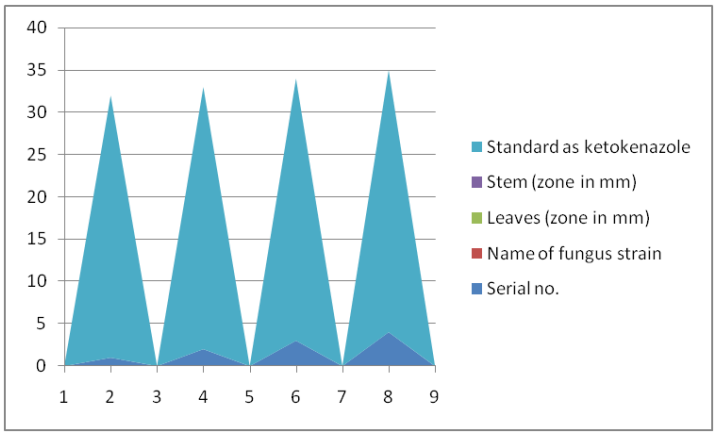


Table 2: Antifungal activity of *Dicoma tomentosa* against various clinical isolates

Serial no.	Name of fungus strain	Leaves (zone in mm)	Stem (zone in mm)	Standard as ketokenazole
1	*Trichoderma ressei*	10±0.67	13±0.82	31
2	*Aspergillus Niger*	12±0.91	NA	31
3	*Penicillium-funiculosum*	NA	10±0.82	31
4	*Fusarium oxysporium*	NA	NA	31



Acknowledgement

I grateful thanks to Dr. Ajit Kumar and Dr. Manas Mathur,

Department of Biotechnology, Seminal Applied Science Private Limited, Jaipur, Rajasthan for providing necessary materials during my analysis.

References

1. Ellof. J.N. (1998). J. Ethanopharmacol. 60: 1 - 6.
2. I.Wu.M.W., A.R. Duncan and C.O. Okunji. (1999). J. ASHA Press Alexandra V.A. pp. 457 – 462
3. Malik F, Hussain S, Mirza T, Hameed A, Ahmad S, Riaz R, Shah PA, Usmanghani K. (2011) Antimicrobial Activity of Some Important Medicinal Plant against Plant and Human Pathogens, World Journal of Agricultural Sciences, 839-843.
4. Jain SK. (1994) Antibacterial and cytotoxic activity of Kenyan medicinal plants, MemInst Oswaldo Cruz, Rio de Janeiro 103(7), 650-652. Ethno botany and research on medicinal plants in India. Ciba Found Sym 185, 153–64.
5. Balandrin MF, Klocke JA, Wurtele ES, Bollinger WH. 1985. Natural plant chemicals: Sources of Industrial and Medicinal materials, Science 228, 1154-1160.
6. Perez C, Paul M, Bazerque P. An antibiotic assay by the agar-well diffusion method. Acta. Biol. Med. Exp. 1990; 15:113-115.
7. Perez C, Paul M, Bazerque P. An antibiotic assay by the agar-well diffusion method. Acta. Biol. Med. Exp. 1990; 15:113-115.
8. Bonjar Shadidi, Aghighi S, Karimi NA. Antibacterial and anti-fungal survey in Plants Used in indigeno herbal-medicine of South East Regions of Iran. J Biol. Sci., 2005; 4:405-412.
9. (9)Cravotto MD, Boffa PhD, Genzini MD, Garella MD. Phytotherapeutics: an evaluation of the potential of 1000 plants. J Clin. Pharm. Therapeu, 2010; 35:11-48.
10. (10) Akinpelu DA, Onakaya TM. Antimicrobial activities of medicinal plants used in folklore remedies in South- Western Nigeria. African Jour. Biotechnol. 2006; 5(11):1078-1081.

