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RESEARCH ARTICLE

ANTIMICROBIAL ACTIVITIES OF ROOT EXTRACTS OF *COLEUS FORSKOHLII* BRIQ

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ABSTRACT

Coleus forskohlii Briq. Is a useful medicinal herb in India. *Coleus* is used to treat hypertension, rheumatism, bronchitis, whooping cough, indigestion, epilepsy and dyspepsia. The present study was aimed to investigate the antimicrobial activity of ethanol extract of root of *Coleus forskohlii* was evaluated by disc diffusion method against some microbial species like *Staphylococcus aureus*, *Pseudomonas aeruginosa*, *E.coli*, *Bacillus subtilis* and *Aspergillus niger*. *Staphylococcus aureus* is the most sensitive strain (12.03 mm) of those tested with ethanolic extract of root of *Coleus forskohlii*. Whereas other microorganisms were showed less antibacterial sensitivity to the tested extracts. However, this study revealed maximum growth inhibition and effectiveness was remarkably observed in the extracts of *Coleus forskohlii*.

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INTRODUCTION

Medicinal plants have become the focus of intense study recently in terms of conservation and as well as their traditional uses are supported by actual pharmacological effect Locher *et al* (1995), Jaiger *et al* (1996). Traditional medicine as an alternative form of health care. The screening of medicinal plants and its active compounds are very useful for health care system of many countries like India, China etc. Sudhersan (1998). *Coleus forskohlii* Briq. Is an important medicinal herb in India. It is used for the treatment of malarial fever, chronic asthma, hiccough, bronchitis, colic and convulsion Nadkarni (1996).

Coleus forskohlii belong to the family lamiaceae or labiatae. *Coleus* native in India and Mediterranean. It is a tender, fleshly, highly aromatic. The Lamiaceae plants are usually aromatic. This aromatic smelling medicinal plant contains many phytochemicals such as monoterpenoid, diterpene, for skolin, caryophyllene (bicyclic sesquiterpene) and flavonoids Ram *et al* (1970). Many plants of this family are used in traditional medicine because of their antimicrobial, antioxidant, antiseptic and other pharmacological activities. It is a genus of perennial plants, native to tropical Africa, Asia, Australia, the East Indies, The Malay Archipelago, and the Philippines. It is commonly known as "Indian/ country borage" and 'Pathorchur' in Hindi and Bengali Chopra *et al* (1956). It is known to possess antimicrobial, antiepileptic, leishmanial, and

antioxidant activities Khare *et al* (2011). The main objective of this study was to determine antimicrobial activity of *Coleus forskohlii* plant against some microorganism.

MATERIAL AND METHODS

Collection of plant

Coleus forskohlii plants were collected from Sarojini Naidu Girls Govt. P.G. (Autonomous) College Bhopal (M.P.) in the month of July. The plant was authenticated from Laghu Vanupaj Prasannskarn & Anusandhan Kendra Barkheda Pathani, Bhopal (M.P). Roots were washed under running tap water twice with distilled water to remove the adhesive contaminant and dust particles and dried under room temperature. Finally the samples were crushed and converted into powdered form and stored in airtight bottles for further analysis.

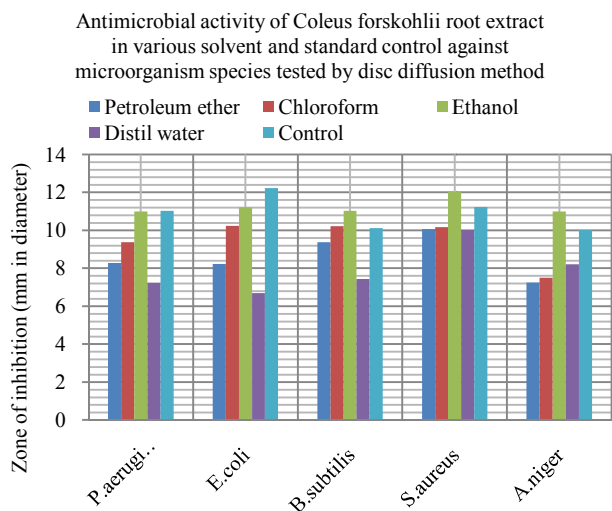
Preparation of Plant Extracts

A soxhlet apparatus was used for the extraction of the plant root material. The collected plant roots were shade dried and powdered separately. 50 gm of dried powder was packed with plastic cup and then subjected to extraction with the petroleum ether, ethanol, chloroform and distilled water. The extracts were filtered and the filtrates were concentrated under reduced pressure to obtain the extracts as solid residues Harbone *et al* (1984). The collected extracts were concentrated by

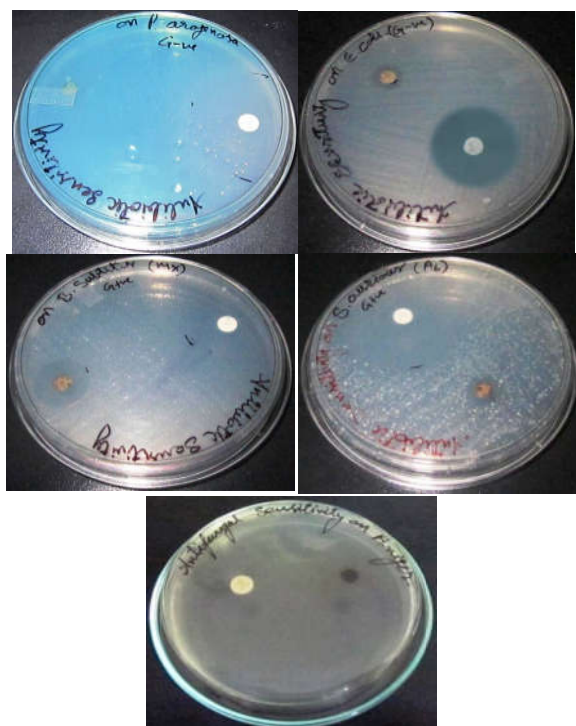
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evaporation under room temperature and used for antibacterial activity.



Graph1



Plates 2 Plates showing minimum inhibitor concentration (MIC) of Ethanolic extract of *Coleus forskohlii* root against various antimicrobial (*P.aeruginosa*, *E.coli*, *B.subtilis*, *S.aureus*, *A. niger*) strains.

Test Microorganism and Maintenance

The antibacterial activity of extracts of plants were tested against five species of microorganisms: *Bacillus subtilis*, *Escherichia coli*, *Staphylococcus aureus*, and *Pseudomonas aeruginosa* and *Aspergillus niger* obtained from Department of Microbiology, Barkatullah University, Bhopal (M.P).The microbial strains were inoculated in the Nutrient broth (NA) and Potato dextrose agar (PDA) medium cultured on the slants in the sterilized Laminar Air Flow from the pure culture. These cultured slants were incubated at 37 °C for bacterial growth for 24 hour and fungus culture was maintained on Potato dextrose broth at 28°C for 48 hours.

Antimicrobial Screening

Antimicrobial activities of the extracts were determined by the disc diffusion method.

Disc Diffusion Method

Sterile nutrient agar plates were prepared for bacterial strains and inoculated by a spread plate method under aseptic condition. The filter paper disc of 6 mm diameter (Whitman’s No. 1 filter paper) was prepared and sterilized. Petri plates containing nutrient agar (NA) and Potato dextrose agar (PDA) medium (20 ml media/plate) respectively.50 gm of each powdered sample was mixed in a conical flask with 100 ml of deionised distilled water or organic solvent, plugged, then shaken at 120 rpm for 30 minutes and kept for 24 h. The paper discs were separately impregnated with 15 µl of extract placed on the agar which had previously been inoculated with the selected test microorganism. The root compound extracts to be tested were prepared various concentrations of 25 %, 50 %, 75 % and 100 % and were added to each disc of holding capacity 10 micro litre. Three replicates were carried out for extract against each of the test organisms. Simultaneously, addition of the respective solvents instead of extracts was carried out as control, while ciprofloxacin (10 µg/ml) was used as a positive control for bacteria and fungi. After incubation, the diameters of the zones were measured in millimeters and the mean values were tabulated Aida *et al* (2001), Doughari *et al* (2006), Gupta *et al* (2013).

Table1 Antimicrobial activity of *Coleus forskohlii* root extract in various solvents (Petroleum ether, Chloroform, Ethanol, Distill water) and standard control (Cefixime) against microorganism species tested by disc diffusion.

Various solvents (100mg/ml)	Microbial – culture				
	<i>P. aeruginosa</i>	<i>E. coli.</i>	<i>B. subtilis</i>	<i>S.aureus</i>	<i>A.niger</i>
Petroleum-ether	8.27 ± 0.25	8.23 ± 0.32	9.37 ± 0.21	10.07 ± 0.24	7.25± 0.32
Chloroform	9.37 ± 0.25	10.23 ± 0.25	11.12 ± 0.25	10.17 ± 0.15	7.49 ± 0.26
Ethanol	11.00± 0.10	11.21 ± 0.25	11.03 ± 0.26	12.03 ± 0.15	11.00± 0.25
Distil water	7.23 ± 2.38	6.69 ± 0.15	7.43 ± 0.20	10.02 ± 0.10	8.2± 0.32
Control	11.02 ± 0.11	12.23 ± 0.11	10.12 ± 0.11	11.23 ± 0.11	10.02 ± 0.15

Values are mean inhibition zone (mm) ± S.D of three replicates

RESULT AND DISCUSSION

The present study was carried out on *Coleus forskohlii* root extract possess antimicrobial activity. The antimicrobial activity of different extracts (ethanol, petroleum ether, chloroform and distill water) of *Coleus forskohlii* Briq were examined against 5 microorganism (*Staphylococcus aureus*, *Pseudomonas aeruginosa*, *E.coli*, *Bacillus subtilis* and *Aspergillus niger*). The results of the antimicrobial activities of the ethanol extract indicate that root of *Coleus forskohlii* Briq with respect to some organisms were showed significant activity. Ethanol extract show maximum zone of inhibition against bacteria *Staphylococcus aureus*. It is most sensitive strain of *Coleus forskohlii*, with the strongest inhibition zone of 12.03 mm. However, the other extract also showed moderate amount of antimicrobial activity against *Pseudomonas aeruginosa*, *E.coli*, *Bacillus subtilis* and *Aspergillus niger*. The

inhibition of zone was observed for *E.coli* was 11.21mm, *Bacillus subtilis* was 11.03 mm, *Pseudomonas aeruginosa* was 10.34 mm and *Aspergillus niger* was found 9.38 mm.

Similar results were reported by using ethanolic extract is effective against not only *E. coli* but also against *S. aureus* and *P. mirabilis* equally strong, so it can be used to eliminate both Gram positive and Gram negative skin pathogens studied by Kalesware *et al* (2014) Similar result reported Ashok Kumar *et al* (2011) studied that ethanolic extract was showed maximum zone of inhibition against bacteria *Staphylococcus aureus* (22 mm), *Pseudomonas fluorescens* (20 mm), *Sericea* (11 mm), *Kelebsiella pneumonia* (20 mm) and *Bacillus pumilus* (12 mm). The maximum zone of inhibition against fungi *Aspergillus flavus* (20 mm), *Aspergillus parasiticus* (20 mm), *Trichoderma rubrum* (25 mm) and *Microsporium gypseum* (25) respectively.

Similar results were documented by Baskaran *et al* (2011). The ethanol extract was more effective against *Bacillus cereus* and *Micrococcus luteus* and *Klebsiella pneumonia* and *Staphylococcus aureus* and also effective against the test fungi such as *Aspergillus niger* and *Candida albicans*. The most effective antimicrobial activity of *Coleus forskohlii* was found maximum zone of inhibition against *Salmonella typhi* (14 mm), *Staphylococcus aureus* (15 mm), *Staphylococcus epidermidis* (15mm) and *Klebsiella pneumonia* (8 mm) respectively reported by Senthilkumar, *et al* (2010), Anbuselvan, *et al* (2013). The ethanol extracts of *Hemidesmus indicus* root extract of the crude drug was more effective in *E.coli* and *Bacillus subtilis* (Gram positive bacteria) and moderately effective at *Pseudomonas aeruginosa* and *Staphylococcus aureus* (Gram-negative bacteria). It was favored that had in-vitro antibacterial property studied by Purohit, *et al* (2014).

CONCLUSION

The present study all the crude extracts has significant antibacterial activity on most of the bacteria whereas ethanol extract had maximum inhibition activity against *Staphylococcus aureus* as compared to chloroform, petroleum ether and distill water. The ethanol solvent of root extract of *Coleus forskohlii* has great potent antimicrobial activity against some microorganism which might be due to the phytochemicals present in the plants. All these bacteria are pathogenic so *Coleus* can be used to prepare alternative medicine that can cure disease caused by these bacteria.

References

1. Aida, P., Rosa, V., Blamea, F., Tomas, A., Salvador, C. (2001). Paraguayan plants used in traditional medicine. Short communication, *J Ethnopharm*, 16:93-98.
2. Anbuselvan S. And Muralikrishnan V. (2013). Antimicrobial activity of *Coleus forskohlii* root extract against human pathogens. *International Journal of phytopharmacology*.4 (1): 42-49.
3. Ashok Kumar, Sonia Saklani, Manoj Gahlot, Ranveer Singh, Ruchee Patial and Priyanka Kashyap (2011). Antimicrobial Activity of Extracts of the Medicinal Plant *Coleus Forskohlii*. *Int. J. Drug Res. Tech.* 1 (1): 52-59.
4. Baskaran, C., Rathabaia, V., Sivamani, P. and Thiagarajan, V. (2011). Antimicrobial activity of various root extracts of *Coleus forskohlii*. *Int J Curr Sci*, 1: 78-84.
5. Chopra, R.N., Nayar, S.L., Chopra, I. C (1956). *The Glossary of Indian Medicinal Plants*, CSIR, New Delhi, 74.
6. Doughari, J.H. (2006). Antimicrobial activity of *Tamarindus indica* Linn. *Trop J Pharm Res.* 5 (2):597-60.
7. Gupta, A.K., Ahirwar, N.K., Shinde, N., Choudhary, M., Rajput, Y.S., Singh, A. (2013). Phytochemical screening and antimicrobial assessment of leaves of *Adhatodavastica*, *Azadirachtaindica* and *Datura stramonium*. *UK Journal of Pharmaceutical and Biosciences.* 1(1): 42-47.
8. Harbone, J. B. (1984). *Phytochemical Methods: A guide to modern techniques of plant analysis*. London: Chapman and Hall Ltd.
9. Jaiger, A.K., Hutching, A. and Van Stadeb, J. (1996). Screening of zulimedical plants of prostaglandin synthesis inhibitors. *Journal of ethanopharmacology*, 52:95-100.
10. Kalesware Muniandy, Zaiton Hassan, and Mohd Hafez (2014). Antimicrobial Activity of the Ethanolic Extract of *Coleus aromaticus* against Common Wound Pathogens. *Research Journal of Pharmaceutical, Biological and Chemical* 5(3): 1294.
11. Khare, R.S., Banerjee, S., Kundu, K (2011). *Coleus aromatics* Benth - A nutritive medicinal plant of potential therapeutic value. *International Journal of Pharma and Bio Sciences*, 2: 488-500.
12. Locher, C.P. (1994). Antimicrobial activity and anti complement activity of extract obtained from selected Halation medicinal plants. *Journal of ethano pharmacology*.49:23-32.
13. Nadkarni, A.K (1996). *Indian Materia Medica*, I(2) : 371.
14. Purohit Prasanna, Thakur Bais Ritu, Singh Pratibha, Suguffa Khan (2014). Assessment of antibacterial activity and phytochemical screening of *Hemidescusindicus* root extracts. *UK journal of pharmaceutical and Bioscience.* 2(6):67-72.
15. Ram, P.R and Mehrotra, B.N. (1970). *Compendium of Indian medicinal plants*, CDRI Lucknow and Publication and Information Directorate. New Delhi. 2: 79-201.
16. Senthilkumar, C. S., Suresh Kumar M. & Rajasekara Pandian M. (2010). In vitro antibacterial activity of crude leaf extracts from *Teco mastans* (l) juss. Et kunth, *Coleus forskohlii* and *Pogo stemonpatchoul* against human pathogenic bacteria. *International journal of pharm tech research*, 2(1): 438-442.
17. Sudhersan, C. (1998). Shoot bud regeneration from leaf explants of a medicinal plant *Enicostern maoxillare*. *Current science*.74: 1099-1100.

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