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Antimicrobial and Antifungal activity of *Leptogium Javanicum* Mont. and *Usnea ghattensis* Awasthi

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Abstract: *Leptogium javanicum* Mont. and *Usnea ghattensis* Awasthi collected from forests of Araku valley were tested for their antimicrobial and antifungal activity. The crude extracts of these two lichens have exhibited antimicrobial and antifungal activity on *Escherichia coli* Migula, *Staphylococcus* sp. Rosenbach, *Aspergillus niger* Van teighum and *Fusarium oxysporum* Schlecht. This data forms new information.

Keywords: Activity, bacteria, extracts, fungi, lichen.

INTRODUCTION

In recent years there has been a rising interest in the discovery of new antimicrobial compounds, due to alarming increase in the rate of infections and microbes with multidrug resistance^[1]. The investigation of new bioactive compounds is of utmost importance in the control of antibiotic resistant micro organisms^[2]. Many investigators have evaluated the bioactivity of lichen extracts and the isolated constituents against micro-organism including pathogenic microbes^[3]. Further the available data pertaining to lichen extracts in relation to antimicrobial and antifungal activity is meager. This paper presents the data on the efficacy of *Leptogium javanicum* Mont. and *Usnea ghattensis* Awasthi (Lichens) crude extracts on *Escherichia coli* Migula, *Staphylococcus* sp. Rosenbach, *Aspergillus niger* Van teighum and *Fusarium oxysporum* Schlecht.

MATERIALS AND METHODS

Two lichen species namely and *Leptogium javanicum* Mont. and *Usnea ghattensis* Awasthi (Fig. A, B) collected from Araku valley, Andhra Pradesh and their crude sterile aqueous extracts in sterile water (w/v) were tested on *Escherichia coli* Migula, *Staphylococcus* sp. Rosenbach, *Aspergillus niger* Van teighum and *Fusarium oxysporum* Schlecht. using agar disc method^[4]. Vegetative thallus of the lichens, were air dried for four days and cleaned free of any other plant materials and washed under running tap water.

They were oven-dried at 40 °C for 72 hours and grinded into powder by the use of mechanical hand grinder. The powder samples were stocked in sterilized specimen bottles until when needed. 150 g of lichen powder was extracted in 70%

ethanol for 5h. The solvent was removed under reduced pressure at using rotary flash evaporator.

The extracts were prepared in sterile water by adding lichen powder so as to get 2%, 3%, 4%, and 5% concentrations. Initially only 5% has shown marginal inhibitory activity. The two bacterial cultures used were drawn from the Department of Microbiology, Osmania University, Hyderabad while two fungi *Aspergillus niger* Van teighum (soil fungi) and *Fusarium oxysporum* Schlecht. (Fruit rot pathogen of cucumber) have been collected from the Mycology and plant pathology lab, Dept. of Botany, Osmania University, Hyderabad.

RESULTS AND DISCUSSION

Lichens represent powerful source of new bioactive molecules for various pharmaceutical purposes and more than a thousand lichen substances are reported.

The results indicate that the extracts of *Usnea ghattensis* Awasthi and *Leptogium javanicum* Mont. have shown antagonistic activity on *Escherichia coli* Migula, *Staphylococcus* sp. Rosenbach, *Aspergillus niger* Van teighum and *Fusarium oxysporum* Schlecht. at 5% concentration. The results are in conformity with the results obtained by the earlier workers who have done some work on other lichen species^[5-15].

The present data indicates the potential antimicrobial and antifungal activity of *Usnea ghattensis* Awasthi and *Leptogium javanicum* Mont. on bacteria and fungi and forms new information.

Table 1: Effect of sterile water extracts of lichens powder on bacteria and fungi

| Sl. No. | Name of the Lichen (5% Conc.) | Anti-Bacterial activity | | Anti-Fungal activity | |
|---------|----------------------------------|-------------------------|-------------------------------------|-----------------------------|------------------------------|
| | | <i>E.coli</i> Migula | <i>Staphylococcus</i> sp. Rosenbach | <i>A. niger</i> Van-teighum | <i>F. oxysporum</i> Schlecht |
| 1. | <i>Usnea ghattensis</i> Awasthi | +++ | ++ | + | ++ |
| 2. | <i>Leptogium javanicum</i> Mont. | ++ | + | ++ | ++ |

++ = More inhibition; + = Moderate inhibition; + = Less inhibition

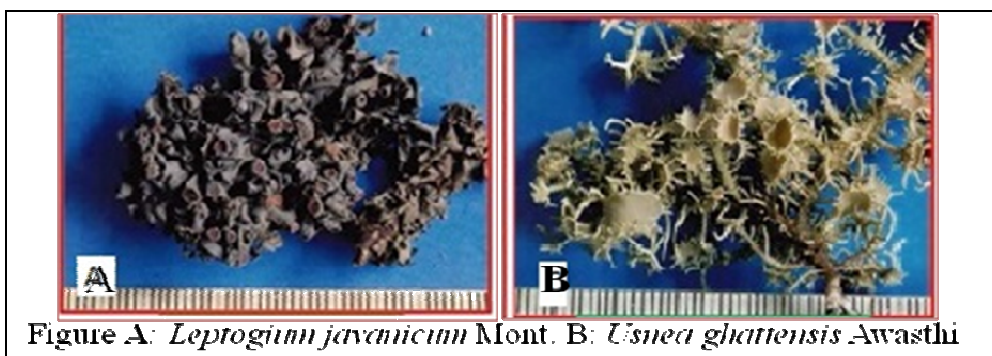


Figure A: *Leptogium javanicum* Mont. B: *Usnea ghattensis* Awasthi

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References

1. Crockett, M.S., Kageyama, D., Homen, C., Lewis J Osborn, and Sander, L. *Antimicrobial properties of four pacific lichens*. (Oregon State University Press, Coravallis; pp-32, 2003)
2. Paulo, S. *Brazilian Journal of Microbiology* 34(3), 329-331, 2003
3. Fournet, A., Ferreira, M. E., Arias, A.R. and Ortiz, S.T. 1997. In: Activity of compound isolated from Chilean lichens against experimental cutaneous leishmaniasis. Chausti A; Yaluff G;Quilhot W; Fernandez E and Hidalgo ME.eds. *Comp Biochem Physiol.* 116(1),51-54,
4. Tippaswamy, B., Naveen Kumar, K.J., Guruprasad Bodharthi, J. and Shivaprasad, S.R. *Journal of Experimental Sciences.* 61-68, 2011
5. Mahadik, D., Morey, V., Behera, C., Makhija, V. and Naik, G. *Latin American Journal of Pharmacy;* 30(2), 220-228, 2011
6. Molnar, K. and Farkas, E. Current results on biological activities of lichen secondary metabolites: a review; *65(3-4)*, 157-173, 2010.
7. Mitrovic, T., Stamenkovic, S., Cvetkovic, V., Tomic, S., Stankovic, M., Radojevic, I., Stefanovic, O., Comic, L.J., Dacic, D., Curcic, M. and Markovic, M. *Int. J. Mol. Sci.*, 12, 5428-5448, 2011
8. Anjali, D.B., Mohabe, S., Reddy, A.M. and Nayaka, S. *Current Research in Environmental & Applied Mycology* 5(3), 160-168, 2015
9. Karthikaidevi, G., Thirumaran, G., Manivannan, K., Anantharaman, P., Kathiresan, K., and Balasubaramanian, T. 2009. *Advances in Biological Research* 3 (3-4), 127-131, 2009
10. Prabhu, S. S., and Sudha S.S. *Int. J. Adv. Res. Biol.Sci.* 2(4), 177-181, 2015
11. Priya Srivastava, D. K., Upreti, T. N., Dhole and Apurva K.Srivastava., *Int.J.Curr.Microbiol. App.Sci.* 2(5), 271-279, 2013.
12. Sinha, S.K., and Mrinal, B. *International Journal of Pharma and Bio Sciences* 2 (4): 23-28, 2011
13. Srivastava, P., Logesh, A.R., Upreti, D.K., Dhole, T.N., Srivastava, A. *Mycosphere* 4(4), 734-743, 2013
14. Sharma, B.C., Kalikotay, B.C., Bimala Rai, S. *Indian Journal of Fundamental and Applied Life Sciences* 2 (1), 120-126, 2012.