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Antifungal Potential of *Philonotis revoluta* - A Moss Against Certain Phytopathogenic Fungi

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The antifungal activity of aqueous crude extract of *Philonotis revoluta(*a moss)on fungi *Fusarium moniliforme(*Sheldon*), Helminthosporium turcicum* (Pass). Leonard & Suggs. and *Curvularia lunata(*Wakker)Boedijn was determined using pour-plate method. Colony diameter and fresh weight of test organisms under the effect of different concentrations of extract was evaluated. The results suggested that all the extracts showed significant inhibitory activity but colony diameter and fresh weight was found to be maximum in lower concentrations of extract whereas it was found to be minimum in higher concentrations of *Philonotis revoluta.*

Key words : Antifungal activity, *Philonotis revoluta*, Moss, Phytopathogenic fungi, Aqueous crude extract.

The search of new antifungal agents is essential because opportunistic infections in immunocompromised individuals and development of resistance to currently used agents. Bryophytes offer a rich source of rare and structurally unique molecules and can serve as a reserve of potentially antifungal compounds for further development as pharmaceuticals. (Xie and Lou, 2008).

One of the features that helped bryophytes to survive and maintain their place in today's flora is their content of biologically active compounds. These protect the usually delicate plants not only from fungi and other microorganism but also from insects and slugs which are common danger in bryophyte habitat.

Plagiochila stevensoniana proved to inhibit dermatophytic organism like *Trichophyton menlagnophytes, Candida albicans* and *Bacillus subtilis* (Lorimeres and Perry, 1993). Moss *Homalia trichomonoides* exhibit antifungal activity against *Candida albicans* (Wang 2004). *Tulbaghia violacea* extract reduced the Sorghum loose and covered smut disease (Nteso and

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Pretorius 2006). Deora *et al.*, 2008 studied antifungal activity of *Plagiochasma sappendiculatum* against *Alternaria solani* and suggested that extract of *P. appendiculatum* was effective against *A. solani*. The present study investigated antifungal potential of aqueous crude extract of *Philonotis revoluta* against selected fungi and further addition of more bryophytes having antifungal property.

MATERIAL AND METHODS

Plant Material collection and Preparation of extracts

The plant material was collected from Mount Abu, Distt. Sirohi (Raj.) in rainy season in both vegetative and sporophytic stages in the month of September 2008.

The fresh plant material was collected and washed thoroughly with tap water till the debris and soil particles removed and then it was weighted. Plant tissue were grinded using pestle and mortar by adding equal amount of sterilized distilled water (1:1) .The extract was centrifuged and filtered through Muslin cloth then the filterate was taken as standard plant extract solution (100%). Further, the extract was serially diluted by adding sterilized water to get different concentrations.

Test Organism

To find out the antifungal potential of *P. revoluta* three test organisms such as *Fusarium moniliforme, Helminthosporium turcicum and Curvularia lunata* were used. *F. moniliforme* (MTCC No 156) and *C. lunata.* (MTCC No 2030) were brought from the Institute of Microbial Technology, (Chandigarh) in powdered form and cultured on nutrient broth in the laboratory. Pure culture of *H. turcicum* was brought from the Department of Pathology RCA, (Udaipur). The pure culture was then sub-cultured and this sub cultured was used for further experimental study.

Preparation of Medium

PDA (Potato Dextrose Agar) medium was prepared and autoclaved for *F. moniliforme* and *H. turcicum whereas* PCA (Potato Carrot Agar) medium was prepared for *C. lunata*.

Screening the extracts for antifungal activity

The plant extract was autoclaved to avoid contamination and then incorporated into nutrient media by transferring each type of plant extract into a Petri dish containing melted warm medium in (1 : 1) and gently shaken for mixing of the extract and allowed to solidify. The nutrient media plates containing plant extracts were inoculated aseptically with test organisms by transferring 3 mm diameter colony with the cork borer at four corners of medium in each Petri dish. Three replicates were maintained for each treatment. The medium without any extract served as the control.

All the inoculated Petri dishes were kept at room temperature for 72 hrs. After 72 hrs colony diameter and fresh weight were determined.

RESULTS AND DISCUSSION

Antifungal activity of aqueous crude extracts of *Philonotis revoluta* was assayed and data on the effect of plant extracts on the growth of test organism is presented in fig.1, 2 and 3. The results revealed that significant reduction in the growth of all the three test organisms was observed in respect of all the plant extracts tested. In *F.moniliforme*, *H.turcicum* and *C.lunata* colony diameter was 23.12, 25.75 and 21.87 mm whereas colony fresh weight was 1.73, 1.95 and 1.14 gm respectively in 10 per cent concentration. Higher concentrations of extract of *P. revoluta* showed more potentiality towards the colony diameter and fresh weight therefore less colony diameter and fresh weight were reported at 100 per cent concentration (Fig. 1, 2 & 3).

On the basis of results obtained it was evaluated that higher concentrations inhibited the growth of all test fungi but among all three test organisms studied *C. lunata* exhibited most sensitivity against aqueous crude extract of *Philonotis revoluta* followed by *F. moniliforme* and *H. turcicum* respectively.

The result of this work corresponded to the findings of Deora and Bhati 2007 who find out that extract of certain bryophytes such as *Plagiochasma articulatum, Anthoceros longii, Fissidens bryoides* showed antibiotic property against *Agrobacterium tumifacians.*

Mekuria (1998) reported that alcoholic extracts of a moss was active against *Candida albicans.* Benerjee and Sen (1979) found similar observations that mosses are effective against selected microorganisms.

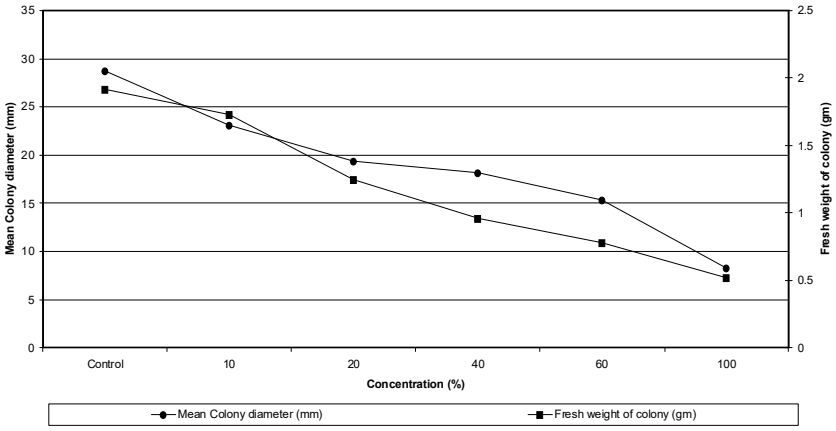

Fig. 1. Effect of aqueous crude extract of *Philoutois revoluta* an colony diameter and colony fresh weight of *Fusarium moniliforme*

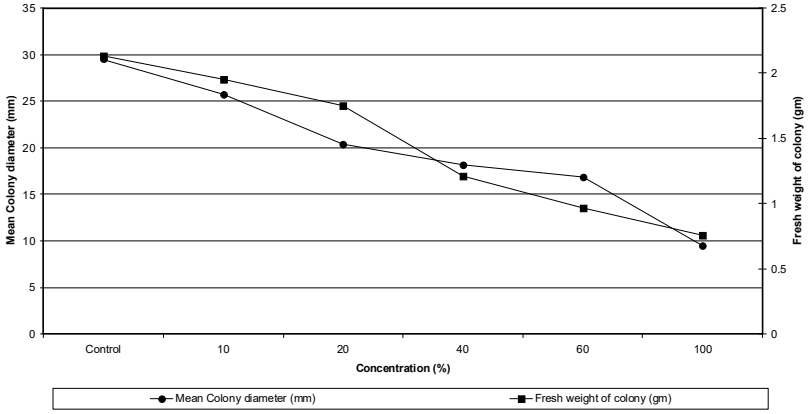

Fig. 2. Effect of aqueous crude extract of *Philoutois revoluta* an colony diameter and colony fresh weight of *Helminthosporium turcicum*

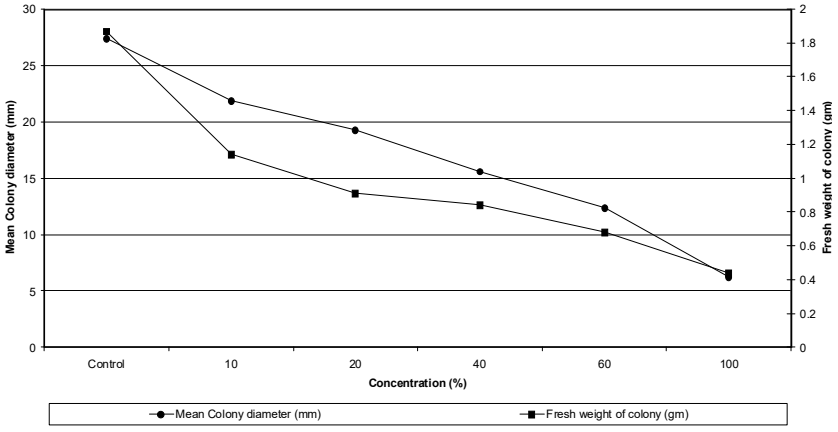

Fig. 3. Effect of aqueous crude extract of *Philoutois revoluta* an colony diameter and colony fresh weight of *Curvularia lumata*

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