Studies on antidermatophytic effect of Allamanda cathertica

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Introduction

Dermatophytoses (ringworm diseases) are infections of the skin by organisms termed dermatophytes. Treatment of dermatophytoses is expensive and needs long time to cure. So the poor people of rural areas cannot continue the treatment and are more sufferers. Bangladesh has a good source of medicinal plants and most of these grow wild in wastelands, jungles and roadsides without any cultivation. Literature survey revealed that different plant extracts and their isolated compounds have been found to be effective against various species of fungus which are responsible for ringworm diseases (Acharya and Chatterjee, 1975; Kader et al., 1989; Onawunmi, 1989; Singh et al., 1988). These findings used as a guide in our continuing search for new natural antifungal agents from plant source.

Allamanda cathertica Linn. locally called malotilata planted as an ornamental plant in Bangladesh. It is an evergreen glabrous shrub. The plant is reputed to have various folk medicinal uses claimed by local kaviraj. Some authors reported that extract of leaves exhibited strong antidermatophytic effects (Tiwary et al., 2002). The leaf also possesses cathertic properties and the stem barks act as a hydrogogue in ascites (Anonymous, 1985). Allamanda leaf extract was found to be effective against plant pathogens (Masuduzzaman et al., 2008). Extract of roots are hypotensive, antileukemic. and used as a remedy for snake bite (Ghani, 1998).

The present investigation was objected to carry out antidermatophytic activity of A. cathertica along with evaluation of the role of socio-economic condition on dermatophytoses patients.

Materials and Methods

Preparation of extracts: A. cathertica was collected from Rajshahi locality during the month of March to April 2003 and taxonomically identified by Prof. A.T.M. Naderuzzaman, Department of Botany, Rajshahi University. Adhering dirt’s of the plant was removed. The whole plant was cut into small pieces and dried at room temperature. The dried parts were grinded to...
form powder. The dry powder (250 g) was extracted using dichloromethane and methanol as solvent. The extracts were concentrated to dryness by rotary evaporator at 30°C under reduced pressure. The amounts yielded using the solvent dichloromethane and methanol were 27.39 and 18.00 g respectively. Antifungal screening was carried out taking these extracts of *A. cathertica*.

**Antidermatophyte activity test:** All the extracts were examined for their antifungal potency by disc diffusion method (Bauer *et al.*, 1966). Two dermatophytes namely *Trichophyton rubrum* and *Microsporum gypseum* were used for this investigation. The dermatophytes were isolated from fungal specimens collected from selected ringworm patients attending the Skin and V.D. outpatient department of Rajshahi Medical College Hospital, Rajshahi. The fungal pathogens were further purified by repeated subculture under strictly aseptic condition using laminar airflow machine. The medium (Potato dextrose agar) was poured into sterile petridishes and the inoculum was adjusted to contain 10⁵ to 10⁷ fungi per ml. The extracts were dissolved in solvents (dichloromethane and methanol) to obtain a concentration of 50 µg/µL. The discs (6 mm in diameter) were prepared by sterile filter paper and dried in an oven to remove moisture. The solutions were applied on the dried filter paper discs by micropipette to obtain discs containing 50 and 200 µg of extracts in each disc. Fluconazole discs (50 µg/disc) were used as standard. The discs were then placed on the petridishes seeded with the medium containing inoculum and allowed to diffusion at 4°C for 24 hours. The petridishes were then incubated at 30°C for 48-72 hours and the zones of inhibitions observed were measured (Table I).

### Results

In the antifungal activity test, dichloromethane extract of whole plant of *A. cathertica* (50 µg/disc) showed the zones of inhibition against *T. rubrum* (11 mm) and *M. gypseum* (10 mm). Whereas at concentration of 200 µg/disc the same extract exhibited highly pronounced effect displaying their zones of inhibitions against *T. rubrum* (52 mm) and *M. gypseum* (35 mm) respectively (Table I). The standard disc of fluconazole (50 µg/disc) showed the zones of inhibition against *T. rubrum* (14 mm) and *M. gypseum* (10 mm). On the other hand, methanol extract of the plant was not active against the tested pathogens.

### Discussion

The present study demonstrates the antidermatophytic effect of whole plant extract of *A. cathertica*. Dichloromethane extract showed highly potent activity against the tested pathogens such as *T. rubrum* and *M. gypseum* at the concentration of 200 µg/disc. Whereas at concentration of 50 µg/disc the same extract showed moderate activity. But methanol extract was not active against the tested fungi. This may be due to the absence of antifungal principles in methanol extract.

Irobi and Daramola (1993) investigated in Nigeria with the leaf extracts of *Mitracarpus vilosus* for *in vitro* antifungal activities. Ethanolic extracts produced definite antifungal activities against *T. rubrum*, *M. gypseum*, *Candida albicans*, *Aspergillus niger* and *Fusarium soni*. The aqueous extracts and glycerol vehicle control did not inhibit any of the fungi tested. Our result is consistent with this investigation. Tiwari et al. (2002) isolated plumieride as an active principle from leaf extract of *A. cathertica* and showed strong fungitoxicity against *Epidermophyton floccosum* and *M. gypseum*. This findings correlate with the results of the present study.

In conclusion, *A. cathertica* may play a highly beneficial role in dermatophytoses patients.

### Acknowledgements

We are highly grateful to Department of Microbiology, Rajshahi Medical College; Department of Botany, Rajshahi University, Rajshahi for isolation and identification of dermatophytes.

### References


### Table I: *in vitro* antidermatophytic activities of dichloromethane and methanol extracts of *Allamanda cathertica*

<table>
<thead>
<tr>
<th>Tested fungi</th>
<th>Diameter of zone of inhibition (in mm)</th>
<th>Dichloromethane extract</th>
<th>Methanol extract</th>
<th>Fluconazole</th>
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<tbody>
<tr>
<td></td>
<td></td>
<td>50 µg/disc</td>
<td>200 µg/disc</td>
<td>50 µg/disc</td>
</tr>
<tr>
<td><em>Trichophyton rubrum</em></td>
<td></td>
<td>11</td>
<td>52</td>
<td>No inhibition</td>
</tr>
<tr>
<td><em>Microsporum gypseum</em></td>
<td></td>
<td>10</td>
<td>35</td>
<td>No inhibition</td>
</tr>
</tbody>
</table>


Singh S, Singh SK, Tripathi SC. Fungitoxic properties of essential oil of *Eucalyptus rostrata*. Indian Perfumer. 1988; 32: 190-93.