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Anti-fungal activity of various extracts of *Rhinacanthus nasutus* (l).kurtz

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ABSTRACT

To examine the anti-fungal activities of various extracts of the plant. *Rhinacanthus nasutus* (l).kurtz. Method: The anti-fungal activity was studied by tube dilution method using Sabouraud's Dextrose Agar (SDA) medium and the results compared with standard Clotrimazole (125 µg/ml). All the extracts inhibited the growth of various fungi tested in all concentrations, (MIC:125 µg/ml), except for ethyl acetate extract the MIC was 250 µg/ml. The results of all extracts were comparable with that of the standard clotrimazole (125µg/ml). Conclusion: The plant appears to be a ideal source for the active phyto-constituent responsible for anti-infective property and also for development of new phyto-medicine against various resistant organisms.

KEYWORDS

Rhinacanthus nasutus (L).kurtz;
Anti-fungal activity;
Clotrimazole.

1. INTRODUCTION

Rhinacanthus nasutus (Nagamalli) from South-East Asia belonging to the Family Acanthaceae. The plant has been used to treat Herpes infections, skin eruptions, and fungal diseases. Root leaves and seeds of the plant are found useful against ringworm infections. Root when boiled in milk used as aphordiasic and antidote to snake bite. The ethanolic extract of fresh flowers of *Rhinacanthus nasutus* was found to contain rutin[1]. Rhincanthone, an anti-fungal quinone was also isolated[2]. The plant is also reported for anti-viral property[3]. Eight new esters like dimethyl dihydro pyrano naptho quinone esters have been reported earlier[4]. Anti-fungal and anti-bacterial activities were reported against various organisms[5]. Interestingly, the plant is also found to possess anti-proliferative activity[6], cytotoxicity and antiplatelet effect[7]. There was no said scientific validation of this plant against the anti-fungal property of various extracts. Hence in the present study, an attempt was made to prepare various extracts ranging from polar to non-polar solvents and to investigate the same for its anti-fungal property.

2. MATERIALS

The plant was collected fresh during the month of September 2005 from PARC (Plant Anatomy Research Center) chennai , Tamil Nadu, India. Its identity confirmed by PARC (Plant Anatomy Research Center) chennai , Tamil Nadu, India by comparing it with the voucher specimen deposited there. The leaves of the plant *Rhinacanthus nasutus* were used for the present study. The following microorganisms were procured from standard laboratory maintained in the Institute of Microbiology, Madras Medical College, Chennai - 600 003 and used for the study.

Fungi

Aspergillus niger, Penicillium chrysogenum, Mi-

Full Paper

TABLE 1 : Anti-fungal activity of various extracts of *Rhinacanthus nasutus (L).kurtz*

Fungi	MIC in µg/ml					
	Clotrimazole	Hexane extract	Chloroform extract	Ethyl acetate extract	Ethanol extract	Aqueous extract
Candida albicans	125	> 50<125	> 50<125	>125<250	> 50<125	> 50<125
Candida tropicalis	125	> 50<125	> 50<125	>125<250	> 50<125	> 50<125
Aspergillus niger	125	> 50<125	> 50<125	>125<250	> 50<125	> 50<125
Penicillium chrysogenum	125	> 50<125	> 50<125	>125<250	> 50<125	> 50<125
Microsporum gypseum	125	> 50<125	> 50<125	>125<250	> 50<125	> 50<125
Epidermophyton floccosum	125	> 50<125	> 50<125	>125<250	> 50<125	> 50<125

Clotrimazole (125µg/ml) from Hi-media Laboratory Ltd, Mumbai - 400 086, India, Values are an average of triplicate

crosporum gypseum, Candida albicans, Candida tropicalis and Epidermophyton floccosum. Clotrimazole were obtained from Hi-media Laboratory Ltd, Mumbai-400 086, India.

3. METHOD

3.1 Preparation of plant extract

Freshly collected leaves were dried in shade, then coarsely powdered and 250g of powder was extracted in an aspirated bottle with various solvents like n-hexane, chloroform, ethyl acetate, ethanol and water by cold maceration for 3-7 days. The various extracts after maceration were filtered through whattman filter paper no.41 and evaporated on a water bath and finally dried in vacuum. The residue was diluted with DMF (Di-methyl formamide) to get a final concentration of 1000 µg/ml and used for the study.

3.2. Anti-fungal activity[8-10]

For anti-fungal activity a stock solution of extract was serially diluted suitably with Dimethyl formamide (DMF) to get the final concentration of 1000µg/ml and used for the study. A volume of 0.5 ml of micro-organism suspensions containing approximately 4×10^6 cells were used to inoculate the surface of the solidified media (slants) prepared by using Sabourauds Dextrose Agar (SDA) medium and allowed to set and then incubated at 37?C for 1-4 weeks. The results were read by noting the presence or absence of growth of the organisms and compared with standard Clotrimazole (125µg/ml).

4. RESULTS

All the extracts inhibited the growth of various fungi tested in all concentrations, (MIC:125 µg/ml), except for ethyl acetate extract the MIC was 250 µg/ml. The results of all extracts were comparable with that of the standard clotrimazole (125 µg/ml).

4. DISCUSSION

All extracts tested for anti-fungal activity against the fungi (*Aspergillus niger, Penicillium chrysogenum, Microsporum gypseum, Candida albicans, Candida tropicalis and Epidermophyton floccosum)* were found to be effective and the effect was comparable with that of standard Clotrimazole. All extracts in lower concentration 50 µg/ml did not show any significant anti-fungal property. But all extracts at concentration 125 µg/ml expressed susceptibility except ethyl acetate extract. The ethyl acetate extract showed activity at higher concentration of 250 µg/ml. All other extracts had MIC of >50µg/ml<125µg/ml. These findings support the beneficial role of various extracts against the tested pathogenic fungi. Further investigation on the phytochemical constituent of the extracts may reveal a lead template with potent anti-fungal property.

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