Comparative antifungal activity of two different germplasm of Mucuna

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ABSTRACT

Two different germplasm of Mucuna collected from agro geographical regions was evaluated for its antifungal activities. Antifungal activity of the seed extracts was studied against Aspergillus niger, Aspergillus flavus, aspergillus carneus and candida albignas. Results showed that methanol and ethanol extracts showed more potent antifungal activity than other solvent extracts. The results were expressed as mean ± SD. The results obtained in the study shows that velvet bean black seed extract has more antifungal activity against fungal species.

Keywords: Antifungal activity, fungal species, velvet bean, solvent extract

INTRODUCTION

Mucuna pruriens (Fabaceae), velvet bean, is found in Asia, America, Mexico and Eastern Nigeria. It has been used as green manure cover crop (GMCC); improving the soil quality and in food the seeds are used as soup thickeners. In Ayurveda, the decoction of the seeds is known to be used for remeding tuberculosis, diabetes and cancer. Mucuna pruriens is also used to prepare various formulations, which are used as medicines or alleviating certain diseases [1]. The phytochemical research based on ethno-pharmacological information is generally considered as an effective approach in the discovery of new anti-infective agents from higher plants [2]. Chemical constituents may be therapeutically active or inactive. The chemical constituents may be used for the various purposes besides antimicrobial agents. Antibiotics are also known to disturb the natural intestinal micro flora [3], thus, depriving the benefits of these microbes to human body. Medicinal plants exhibit antibacterial activity [4], since they contain innumerable biologically active chemical constituents. The extract also exhibits anti-inflammatory activity, as it is known to inhibit carrageenin-induced edema [5]. Seeds of this wild legume are widely used for treating male sexual dysfunction in Unani Medicine [6]. Over the past two decades, intensive efforts have been made to discover clinically useful antibacterial/antifungal drugs [7, 8, 9]. Mucuna pruriens possess a wide range of pharmacologic activities such as antimicrobial activity [10], anti-protozoal activity [11], anti-inflammatory activity [12], neuroprotective activity [13], anti diabetic activity [14], antioxidant activity [15]. The present study is aimed to evaluate the antifungal activity of different extracts of two different accessions of Mucuna.

MATERIALS AND METHODS

Collection of Seeds
The Mucuna seed germplasm (white-coloured and black-colored seed coat), were collected from Tamil Nadu, Western Ghats, South India. After drying thoroughly in sunlight for 2-3 days, the parts were thrashed to remove
mature seeds; the seeds after thorough cleaning were stored in plastic containers at room temperature (25°C) until further use.

**Preparation of Seed samples**

Dry mature seeds of different accessions (10 g each) were powdered in a Wiley Mill to 60-mesh size with suitable precaution to avoid contamination of samples. The powders were stored in plastic containers at room temperature (25°C) until further use.

**Solvent Extraction**

Solvent systems used for the extractions were acetone, ethanol, chloroform, petroleum ether, hexane, methanol and water. Soxhlet and flask extraction procedures were adapted for extraction. 10g of each powered samples were packed in muslin cloth and used for extraction by soxhlet apparatus at a temperature below the boiling temperature of each solvent. A portion of the powdered plant samples was soaked in the conical flask containing solvent, wrapped with aluminum foil and placed in shaker for 48 hours at 120-130 rpm. After 48 hours, the extracts were filtered using Whatman filter paper No: 1. the solvent was evaporated and the residue was dissolved in sterile dimethyl sulfoxide (DMSO-9:1) in 50 mg/ml concentration. The extract was filtered using 0.22 micro filters (Type GV- Millipore) and stored at 4°C for further antifungal activity study.

**Screening for Antifungal activity**

**Microbial cultures and growth conditions**

The seed extracts were assayed for antifungal activity against the fungal strain *Aspergillus niger*, *Aspergillus carneus*, *Aspergillus flavus* and *Candida albicans*, were obtained from the Department of Biotechnology, SRM University, Chennai, India. This fungus was grown on PDA plate at 28°C and maintained with periodic sub-culturing at 4°C.

**Antifungal activity:**

The extract was prepared using suitable solvent system and the antifungal activity was studied employing the standard cup-plate method [16, 17, 18]. The antifungal activity was compared with standard fluconazole.

**RESULTS AND DISCUSSION**

Antifungal activity of *Mucuna pruriens* seed extracts against *Aspergillus niger*, *Aspergillus carneus*, *Aspergillus flavus* and *Candida albicans* were represented (Table-1&2). Fluconazole was used for comparing with the seed extracts. In comparison with other solvents used in the present study, methanol and ethanol extracts of seeds were showed significant antifungal activity against all the studied pathogens. On overall, the seed extracts are very active against all the tested pathogens. The results also show that the aqueous extracts of seeds significantly varied in their antifungal potential. These differences may be attributed to differences in nature and/or concentration of chemical inhibitors in the different plant species and in their relative solubility in water [19, 20].In the case of solutions with a low activity, however, a large concentration or volume is needed. The inhibition zones produced by velvet bean seed extract were less than those produced by standard positive control drug. Because of the limited capacity of discs, holes or cylinders are preferably used [21]. It has been suggested that the antifungal activity is mainly due to the presence of essential oil, flavonoids and triterperoids & other natural polyphenolic compounds of free hydroxyl groups [22].

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<th>Name of species</th>
<th>Zone of Inhibition(mm)</th>
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<td>A. Carneus</td>
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<td>C. Albicans</td>
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Table 2: Antifungal activity of various extracts of velvet bean white coloured seeds and Fluconazole (Standard)

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CONCLUSION

Two different germplasm of *Mucuna* was collected and evaluated for its antifungal activities. Between two germplasm, black coloured germplasm was registered for higher levels of antifungal activity than white coloured germplasm. Ethanol and methanolic solvents extracts of seed seemed to be brought better antifungal activity studied in the present report. Antifungal activity of seed extract is highly comparable with standards. Further in vivo studies and investigations on the isolation and identification of active components in these seeds may lead to chemical entities with potential for clinical use in the prevention and treatment of cataract.

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REFERENCES