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ANTIFUNGAL POTENTIAL OF *WITHANIA SOMNIFERA* AGAINST SOME PLANT PATHOGENIC FUNGI

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Antifungal activity was performed on plant pathogenic fungi with the methanolic, hexane, aqueous and diethyl ether extract of leaves of *Withania somnifera,* with disc diffusion assay. The maximum zone of inhibition was found against *Aspergillus niger, Fusarium moniliformis* and *F. oxysporium* in hexane extract. Aqueous extract had showed maximum activity against *A. paraciticus.*

Keywords : Antifungal; *Aspergillus* sps.; Disc diffusion; *Fusarium* sps.; *Withania somnifera.*

Plants have been an important source of precursors and products used in a variety of industries, including those of pharmaceuticals, food, cosmetics and agrochemicals. Medicinal plants are the most important source of life saving drugs for the majority of the world population[1]. Approximately 3000 plant species are known for their medicinal properties in India[2-3].

The indiscriminate use of chemical pesticides has given rise to serious environmental pollution, genetic resistance of pests, toxic residues in stored products and hazards from handling etc. Therefore, there is a need to develop botanical pesticides which are effective, biodegradable, broad-spectrum of activity and do not leave any harmful effect on environment.

The present study was aimed to evaluate *Withania somnifera* L. (Dunal) against the potential human pathogens *Asperigillus niger, A. paraciticus* and agricultural pathogens *Fusarium oxysporium* and *F. moniliformis. Withania somnifera* L. (Dunal) belongs to family Solanaceae and is classically known for its rejuvenate benefits. It has recently been referred to as Indian ginseng for its reputed restorative benefits. The wild plant is generally an erect branching shrub, grows approximately up to a height of one meter.

The plant is used for the treatment of tuberculosis, rheumatism, inflammatory conditions, and a potential antitumor agent[2-4]. The plant contains tropane alkaloids such as tropine hygrine anferine and a number of steroidal lactones known as Withanolides. The various withanolides, withaferin A and its 5-hydroxy-6-chloro derivatives have been reported to exhibit marked cytostatic activity against cell derived from human carcinoma, experimental mouse tumours and Hela 229 cells *in vitro*[5]. Recently *W. somnifera* L. was also used to inhibit the development of tolerance and dependence on chronic use of various phytotropic drugs[6].

The tribal, especially *Bheel* and *Garasodia,* give root powder orally to the male patients of asthma and bronchitis[7]. Methanolic extract of the plant was found to reduce leucopenia induced by radiation[8]. A number of medicinal plants are being used to cure various diseases caused by microbes. Hence, the present study was undertaken to investigate the antifungal activity against selected pathogenic fungi (*Aspergillus. sps, Fusarium sps)* using ethanolic extract of *Withania somnifera.*

Plant Material and Chemical Extraction: The dried leaves of *Withania somnifera* were procured from the garden, University of Rajasthan, Jaipur, Rajasthan. Leaves were air dried and extracted with methanol, di-ethylether, hexane, distilled water using a Soxhlet apparatus. The extracts were filtered and concentrated in vacuum rotavapour.

Test organisms: Four test organisms, *Aspergillus niger, A. paraciticus, Fusarium oxysporium, F. moniliformis,* were obtained from Plant Pathology Laboratory, University of Rajasthan, Jaipur, Rajasthan and maintained on Potato Dextrose Agar (PDA).

Bioassay: Disc diffusion bioassay was employed for testing antifungal activity of plant extract[9]. The readymade PDA medium (Hi-media, 39g) was suspended in distilled water and autoclaved at pressure of 15 lbs for 20 min. Seven days old cultures of test organisms (0.5 ml) were seeded onto plate and uniformly spread with spreader. Paper discs measuring 6mm diameter, that absorbs about 0.1ml of the test sample and a known quantity of standard reference antibiotics were used. The inoculated plates were kept at 5°C for 45-55 min and then incubated at 35-37°C for 18 hrs. The inhibition zone was measured and compared

Table 1. Antifungal activity of *Withania somnifera* (leaves) extract on different fungi.

S. No.	Extract	Zone of Inhibition (in mm)			
		F. oxysporium	*F. moniliformis*	*A. paraciticus*	*A. niger*
1	Methanol	11	10	11	12
2	Haxane	14	13	14	16
3	Aqueous	13	11	15	12
4	Di ethyl ether	07	10	09	10

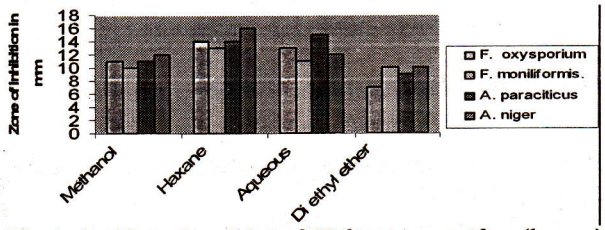

Fig.1. Antifungal activity of *Withania somnifera* (leaves) extract on different fungi.

with those of the standard reference antibiotics. Three to four replicates were maintained for each treatment.

Effect of different solvent extracts of *Withania somnifera* leaves were tested against four different fungi (Table 1). All the test solutions inhibited the fungal species with varying degree of sensitivity. The antifungal activity was found very less in diethyl ether extract. The diameter of inhibition zones ranged from 7 to 16mm among different fungal species. The maximum zone of inhibition was found against *Aspergillus niger, Fusarium moniliformis* and *F. oxysporium* in hexane extract. Aqueous extract had showed maximum activity against *A. paraciticus*.

A similar study of screening the natural plant extracts against different fungal and bacterial pathogens was well recorded in literature[10,11]. Since plants have co-evolved with pathogens, it is reasonable to expect a variety of such compounds with specific as well as general antifungal activity[12]. The present study has shown that the leaf extract of *Withania somnifera* possesses remarkable fungal toxic activity against many human and agricultural pathogens. Thus, there is a possibility of developing this plant as a source of antifungal agent and further investigations are necessary to identify the bioactive principles.

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