Babeet Singh Tanwer. *et al*. / *International Journal of Biopharmaceutics*. 2010; 1(2): 72-74.

ISSN 0976 - 1047

International Journal of Biopharmaceutics

IJB

Journal homepage: www.ijbonline.com

ANTIFUNGAL POTENTIAL OF ASHWAGANDHA AGAINST SOME PATHOGENIC FUNGI

Satya Pal Singh[1], *Babeet Singh Tanwer[2] and Moinuddin Khan[1]

[1] Singhania University, Pacheri Bari, Jhunjhunu, Rajasthan.
[2]Department of Botany, University of Rajasthan, Jaipur. Rajasthan.

ABSTRACT

Withania somnifera also known as Ashwagandha was evaluated for its antifungal activity against some pathogenic fungi. Extracts in different organic solvents were used for disc diffusion assay. Hexane and ethyl acetate extracts have showed maximum inhibition zone against *A. niger* (15mm and 12.2mm respectively). Methanol extract showed maximum activity against *F. oxysporium* (13.0mm) and *A. flavus* (15mm) while aqueous extract showed maximum activity against *F. moniliformis* (9.6mmm).

Key words Antifungal, *Withania somnifera*, *Aspergillus* sps., *Fusarium* sps., Disc diffusion.

INTRODUCTION

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 (Chopra *et al.*, 1958, Suffness and Douros, 1982). Most of the active principles of ayurvedic and unani medicines are found in *W. somnifera and* around hundred different preparations are already commercially available (Tripathi *et al*., 1996). Many pharmacological studies have been conducted to investigate the properties of ashwagandha in an attempt to authenticate its use as a multi-purpose medicinal agent. For example, anti-inflammatory properties have been investigated to validate its use in inflammatory arthritis (Anbalagan and Sadique, 1981) and animal stress studies have been performed to investigate its use as an antistress agent (Dadkar *et al.*, 1987; Archana and Namasivayan, 1999; Dhuley, 1998: Singh *et al.*, 1982). Several studies have examined the antitumor and radiosensitizing effect of *Withania somnifera* (Singh *et al.*, 1986; Devi *et al.*, 1992; Devi, 1996).

The plant contains tropane alkaloids such as tropine, hygrine, anferine and a number of steroidal lactones known as Withanolides. Recently *W. somnifera* L. was also used to inhibit the development of tolerance and dependence on chronic use of various phytotropic drugs (Gupta and Rana, 2007).

The tribal especially *Bheel* and *Garasodia* give root powder orally to the male patients of asthma and bronchitis (Singh and Paney 1998). Methanolic extract of the plant was found to reduce leucopenia induced by radiation (Kuttan, 1996).

However, the last few years have seen a major increase in their use in the developed world. Several screening studies have been carried out in different parts of the world. There are several reports on the antimicrobial activity of different herbal extracts in different regions of the world (Singh and Paney 1998;

***Corresponding author**

Babeet Singh Tanwer
E-mail: babeet_2p6@yahoo.co.in

Kuttan, 1996). 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 various extracts of *Withania somnifera.*

Plant Material and Chemical Extraction:

The dried leaves of *Withania somnifera* were procured from the garden, Singhania University, Pacheri Bari, Jhunjhunu, 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 vacou.

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

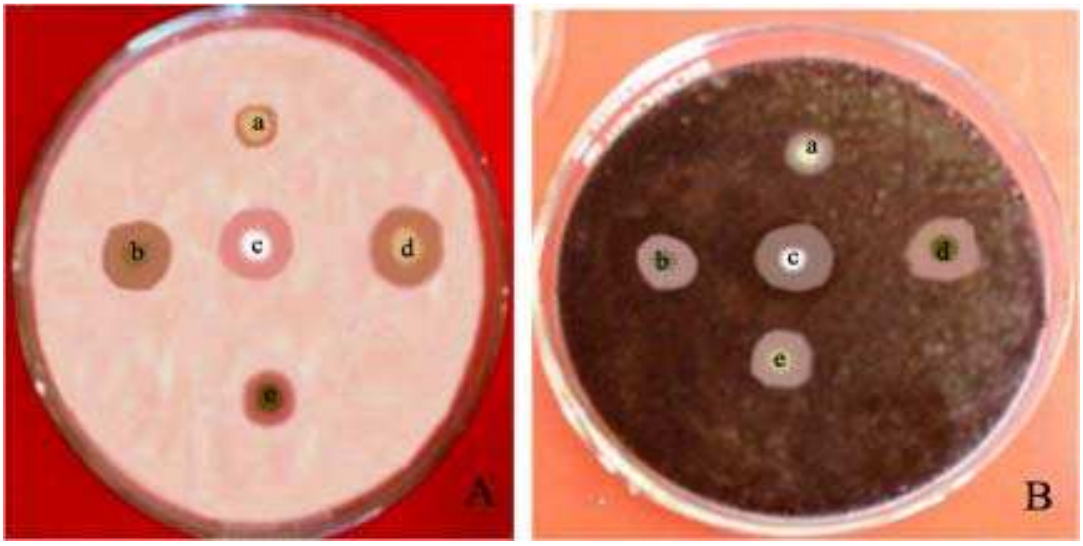
Bioassay: Disc diffusion bioassay was employed for testing antifungal activity of plant extracts (Linday, 1962). The readymade PDA medium (Hi-media, 39g) was suspended in distilled water and autoclaved at pressure of 15lbs for 20min. Seven days old cultures of test organisms (0.5 ml) were seeded onto 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 antibiotic (Fluconazole) were used. The inoculated plates were kept at 5°C for 45-55min and then incubated at 25-27°C for 48hrs. The inhibition zone was measured and compared with those of the standard reference antibiotics. Three to four replicates were maintained for each treatment.

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. flavus***	***A. niger***
1	**Haxane**	11.3	10.2	12.4	15.0
2	**Ethyl acetate**	9.6	9.0	10.0	12.2
3	**Methanol**	13.0	11.4	15.0	12
4	**Aqueous**	7	9.6	7.9	8.3
5	**Fluconazole***	12.0	11.5	12.8	14.7

* Standard drug for fungi30mg/ml

Figure1. Effect of different extracts of *Withania somnifera* (leaves) extract on (A) *Fusarium oxysporium* and (B) *Aspergillus niger* (a= Aqueous extract, b = Ethyl acetate extract, C= Standard Fluconazole, d= Methanol extract and e = Haxane extract)



RESULTS AND DISCUSSION

Effect of different solvent extracts of *Withania somnifera* leaves were tested against four fungi (Table 1).

All the tested extracts inhibited the fungal species with varying degree of sensitivity. The antifungal activity was very less found in aqueous extract. The diameter of inhibition zones ranged from 7 to 15mm among different fungal species. Hexane and ethyl acetate extracts have showed maximum inhibition zone against *A. niger* (15mm and 12.2mm respectively). Methanol extract showed maximum activity against *F. oxysporium* (13.0mm) and *A. flavus* (15mm) while aqueous extract showed maximum activity against *F. moniliformis* (9.6mmm).

A similar study of screening the natural plant extracts against different fungal and bacterial pathogens was well recorded in literature (Ahmad *et al.,* 2000; Fabry *et al*., 1998; De Boer *et al.,* 2005; Nair *et al*., 2005; Chung *et al.,* 2004). 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 (Darokar *et al.,* 1998). The present study has shown that the extracts of *Withania somnifera* possess remarkable antifungal activity against many pathogenic fungi. This activity may be due to presence of alkaloids and steroidal lactones (Withanolides) in *Withania* Thus, there is a possibility of developing this plant a source of antifungal agent and further investigations are necessary to identify the bioactive principles.

REFERENCES

Ahmad I, Mehmood Z, Mohammad P, Ahmed S. Antimicrobial potency and synergistic activity of five traditionally used Indian medicinal plants. *Journal of Medicinal Aromatic Plant Sciences*. 2000; 22 (4A): 173-176.

Anbalagan K. and Sadique J. Influence of an Indian medicine (Ashwagandha) on acutephase reactants in inflammation. *Indian J Exp Biol.* 1981; 19: 245-249.

Archana R. and Namasivayan A. Antistressor effect of *Withania somnifera*. *J Ethnopharmacol*. 1999; 64:91-93.

Chopra RN, Chopra IC, Honda KL and Kapur LD. IN: Indigenous Drugs of India, Vol. 12, U.M. Dhu and Sons Pvt. Ltd. Calcutta, 1958: 436.

Chung PY, Chung LY, Ngeow YF *et al*. Antimicrobial activities of malaysian plant species. Pharm Boil. 2004; 42: 292-300.

Dadkar VN, Ranadive NU, Dhar HL. Evaluation of antistress (adaptogen) activity of *Withania somnifera* (Ashwagandha). *Ind J Clin Biochem*. 1987, 2:101-108.

Darokar MP, Mathur A, Dwivedi S, Bhalla R, Kanuja SPS, Sushi Kumar. Detection of antibacterial in the floral petals of some higher plants. *Current Science*. 1998; 75 (3): 187-189.

De Boer HJ, Kool A, Broberg A et al. Antifungal and antibacterial activity of some herbal remedies from tanzania. *J Ethnopharmacol.* 2005; 96: 461-469.

Devi PU, Sharada AC, Solomon FE, Kamath MS. *In vivo* growth inhibitory effect of *Withania somnifera* (Ashwagandha) on a transplantable mouse tumor, Sarcoma 180. *Indian J Exp Biol.* 1992; 30:169-172.

Devi PU. *Withania somnifera* dunal (ashwagandha): potential plant source of a promising drug for cancer chemotherapy and radiosensitization. *Indian J Exp Biol*. 1996; 34:927-932.

Dhuley JN. Effect of ashwagandha on lipid peroxidation in stress-induced animals. *J Ethnopharmacol.* 1998; 60:173-178.

Fabry W, Okemo PO, Ausorg R. Antibacterial activity of East African Medicinal Plants. *J Ethnopharmocol*. 1998; 60 (1): 19-24.

Gupta GL. and Rana AC. *Withania Somnifera* a commonly use in Ayurvedic Medicine plant. *Phycog Mag.* 2007; 2(1): 129.

Kuttan G. Use of *Withania somnifera* dunal as an adjuvant during radiation therapy. *Ind. J. Exp. Bio*. 1996; 34(9): 854-856.

Linday EM. Practical Introduction to Microbiology, (E & FN Spon Ltd), 1962: 77.

Nair R, Kalariya T, Chanda S. Antibacterial activity of some selected indian medicinal flora. *Turk J Biol*. 2005; 29: 41-47.

Singh N, Nath R, Lata A, et al. *Withania somnifera* (ashwagandha), a rejuvenating herbal drug which enhances survival during stress (an adaptogen). *Int J Crude Drug Res*. 1982; 20:29-35.

Singh N, Singh SP, Nath R, et al. Prevention of urethane-induced lung adenomas by *Withania somnifera* (L.) Dunal in albino mice. *Int J Crude Drug Res.* 1986; 24:90-100.

Singh VP. and Paney RP. Ethnobotany of Rajasthan, In India. Scientific Publishers, Jodhpur, India, 1998: 212.

Suffness M, and Dourous J. Current Status of the NaCl Plant and animal product. *Program. J. Nat. Prod*. 1982; 45: 1-14.

Tripathi AK, Shukla YN. and Kumar S. Ashwagandha *Withania somnifera* Dunal (Solanaceae): A status report. *J. med. Arom. Plant Sci*. 1996; 18**:** 46-62.