SCREENING OF IN VITRO ANTIFUNGAL ACTIVITY OF PLANT EXTRACT OF *DATURA STRAMONIUM, SOLANUM NIGRUM* AND *WITHANIA SOMNIFERA*

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Abstract: Number of plants has been found to possess antifungal properties, which are able to control certain fungal diseases of crops. Present paper deals with the effect of *Datura stramonium* Linn. *Solanum nigrum* Linn. and *Withania somnifera* (L.) Dunal. Extract in *in-vitro* by poisoned food technique to know their inhibitory effect on the growth of *Alternaria alternata* (Fr.) Keissler. Extracts of *Withania somnifera* leaves were found significantly superior in inhibiting the mycelial growth 33.98%, 52.82% and 74.28% of *A. alternata* at 5 percent, 10 percent and 15 percent respectively, followed by *D. stramonium*. The extracts of *S. nigrum* were least effective in growth inhibition as compared to other plant extracts at all the three concentrations tried.

Keywords: Antifungal activity, *Alternaria alternata*, plant extract and *in-vitro* inhibition

INTRODUCTION

A fungus are an important group of microorganisms responsible for various diseases of plants and causes a considerable loss (90%) in agricultural yield. Various chemical fungicides have been used to control the plant diseases. But due to indiscriminate use of synthetic fungicide, various important pathogens have developed resistance to many of the currently available fungicides (Gungawane, 1990). Besides this, fungicides also polluting water and soil. Sometimes fungicide adversely affects the non targeted organisms. Efforts are being done to finding new antifungal compounds as an alternative to chemical fungicides from plants, since they produce a wide variety of secondary metabolites, which perform a defensive role in plants and protects the plants from their invaders. Plant extracts and essential oils have been investigated throughout the world for their antifungal activity against wide range of fungi. (Ezzat, 2001; Gupta *et al.,* 2008). Therefore the plant extract of three members of family Solanaceae were evaluated for their antifungal activity against *Alternaria alternata*.

MATERIAL AND METHOD

50 gm leaves of each plant were cut into small pieces and grind with the help of grinder by adding 50 ml of sterilized distilled water. These phyto-extracts were filtered through double layered muslin cloth in 150 ml conical flask and plugged with non absorbent cotton. These filtered extract were autoclaved at 121.1 lb/inch^2 for 20 minutes. Autoclaved extract were individually added into previously sterilized PDA, 5 percent (*i.e.*, 1 ml extract+19 ml PDA), 10 percent (*i.e.*, 2 ml extract+ 18 ml of PDA) and 15 percent(*i.e.*, 3ml extract+ 17 ml PDA) and mixed thoroughly at the time of pouring in the previously sterilized petriplates. Petriplates were then inoculated aseptically after solidification by placing 5 mm disc at the center, cut aseptically with cork borer from 10 days old culture of test pathogen *i.e., Alternaria alternata*, separately. Pure culture of fungi was obtained from microbiology laboratory of Botany Department of Meerut College, Meerut. Petriplates without phyto-extract were served as control. Pathogens were recorded and percent growth inhibition was also worked out by using the following formula:-

Percent growth inhibition = $\frac{C-T}{C} \times 100$

Where,

C = Growth of pathogen in control after incubation

T = Growth of pathogen in treatment after incubation.

RESULT AND DISCUSSION

The extracts of *Datura stramonium*, *Solanum nigrum* and *Withania somnifera* with three concentrations *viz.,* 5 percent, 10 percent, 15 percent were evaluated in *in-vitro* for their efficacy against *Alternaria alternata* at all the three concentrations tried (Table 1). The extract of *Withania somnifera* leaves were inhibitory to the mycelial growth of *Alternaria alternata* even at 5 percent concentration tried as compared to the control. It proved significantly superior in checking the fungal growth 33.98 %, 52.82%, 74.28% over the rest plant extracts at 5 percent, 10 percent and 15 percent concentrations respectively. Extracts of *Datura stramonium* was second best in checking the fungal growth. Extract of *Solanum nigrum* exhibited least activity against *Alternaria alternata*.

Table 1. Effect of various plant extracts on the growth of *Alternaria alternata* in in-vitro at various concentrations.

Name of plant Extracts used	Various concentrations		
	5% Conc.	10% Conc.	15%Conc.
	Growth Inhibition (%)	Growth Inhibition (%)	Growth Inhibition (%)
Datura stramonium Linn.	28.56	48.46	72.85
Solanum nigrum Linn.	20.24	32.82	62.42
Withania somnifera (L.) Dunal	33.98	52.82	74.28

Indian economy is based on agriculture. Farmers cultivated many crops and vegetables. These crops are commonly attacked by many fungal pathogens besides the insects and bacteria. To control these pathogens farmers have to spray many synthetic fungicides. These fungicides created the problems of air, soil and water pollution and serious health hazards due to the toxicity of their residues. The plant extracts can be used as biofungicides without any adverse effect on the environment. Thus the present study helps to avoid the hazardous effects of synthetic fungicides.

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REFERENCES

Agrios, G. N. (2005). Plant pathology. Academic press, NewYork.

Anwar, M.N., Singh, P., Begum, J., and Chowdhury, J.U. (1994). Antifungal activity of some selected plant extracts on phytopathogenic fungi. *Bangladesh J. Bot.***2**:23-26.

Ezzat, S.M. (2001). In vitro inhibition of *Candida albicans* growth by plant extracts and essentials oils. *World J. Microbiol. Biotechnol*. **17**: 757-759.

Gangwane, I.V. (1990). Fungicide resistance against pathogens in India. *Indian phytopthol*. **40**:551-553.

Gupta, C., Garg, A.P. and Uniyal, R.C. (2008). Antimicrobial activity of some herbal oils against common food borne pathogens. *Afri. J. Microbiol. Res.* **2**: 254-261.