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EVALUATION OF AQUEOUS EXTRACTS OF NEEM SEED AND SEED PARTS AGAINST FOUR SPECIES OF STORED GRAIN FUNGI

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ABSTRACT

Aqueous extracts of neem (Azadirachta indicia A. Juss) seed, seed kernel, seed coat and deoiled seed cake were evaluated for and fungicidal effects at three different concentrations against *Aspergillus flavus, A. parasiticus, Fusarium moniliforme,* and *Rhizoctonia solani.* Benlate (fungicide) was used for comparison. All the extracts have shown fungicidal actitvity of varying degree against test species. Neem seed extract at 0.1 % concentration was as effective as benlate against *R.solani* and neem cake extract was found most effective against *F. moniliforme.* The responses were does dependent and statistically significant compared to the untreated check.

Key-words: Neem derivatives, antifungal properties, pathogenic fungi.

INTRODUCTION

Plant and their materials have been used to cure human and animal diseases. To find safe and cheap control of plant disease, plant materials are now considered to exploit. Bhowmick (1982), studies antifungal activity of neem leaf extract against *Curvularia lunata.* Raina (1976) and Atal and Kapur (1982) isolated *nimbi-din* from neem that inhibited the growth of fungi *Tinea rub-rum*. Atal and Kapur (1982) also used neem oil against fungi *Microsporum gypsum, Aspergillus fumigatus, Penicillium litacinum, Fusarium nivale, Micronectriella nivalis.* He also demonstrated antifungal activity of nimbidin, nimbin, nimidol and neem oil against ring worm fungus, *Trichophyton interdigitale, Coccidiodes immitis* and other species of *Trichophyton.* Khan *et al*. (1973) used neem cake against *Rhizoctonia solani, F. oxysporum, Alternaria tenuis, Helminthosporium nodulus* and *Curvularia tuberculata*. Singh etal. (1980), Singh *et al*. (1984), Gracia and Garcia (1988), Jeyarajan *et al*. (1988) and Thangamani and Krishna Mohan (1988) used neem seed derivatives and other botanical products against fungal diseases. Bambode and Shultan (1973), used neem cake against many pathogenic fungi, *C. lunata, A. tenuis H. sativum, H. speciferum* and *R. solani.*

MATERIALS AND METHODS

Twenty gram each of neem seed, seed Kernel, seed coat and seed cake were crushed into small pieces and were separately soaked for 24 hrs in 250 ml beakers containing 100 ml distilled water. The tested materials (neem derivatives) were crushed into small pieces before soaking. This diffusate was passed through musline cloth. Extract (diffusate) was added to autoclaved (P D A) medium at the rate of 0.1, 0.05, and 0.025% concentration and 10 ml each of treated or untreated medium were poured into Petri plates (70 mm diameter). Fungal cultures (*A. flavus, A. parasisticus, F. moniliforme, R. solan)i* were placed in centre of each agar plate either treated or untreated. The inoculated Petri plates were incubated at room temperature for seven days. Radial growth of the fungi was measured in cm at 24 hrs interval. Fungicide benlate was used as standard and untreated medium was used as control. Each treatment was replicated three times. Comparison of difference in fungal growth in each species was made statistically using Duncan's multiple range test ($p<0.05$).

RESULTS AND DISCUSSION

The effect of neem derivatives on growth of *A. flavus, A. parasisticus, F. moniliforme* and *R. solani* are given in (Table 1). All the four neem derivatives were tested by agar diffusion plate method caused significant reduction in the growth of tested fungi. The rate of growth reduction was directly proportional to the concentration of tested material in the medium.

Whole neem seed and neem cake extract were found to be the best in checking the growth of fungi but were not as effective as benlate (Table 1). Whole neem seed extract and neem cakes at the rate of 0.1% concentration were found most effective against *R. solani* and *F. moniliforme* respectively. Benlate at 0.1% concentration was effective against all four fungal species. Khan *et al*. (1973) used water soluble fractions of neem oil cake against several

fungi, *R. solani, F. oxysporum, A. tenuis* and *C. tuberculata.* He also noted that all the tested fungi showed growth inhibition to varying degree. Vir (1985) reported 2.5 to 5.0% concentration of neem oil was less effective for growth inhibition of fungi, *F. moniliforme, A. nigar, Drechslera rostrata, M. phaseoline.* However, at 10% concentration the oil gave 100% growth inhibition of all the tested fungi. Singh *et al*. 1980 showed the fungicidal effect of neem oil on the growth of *F.oxysporum, R. solani*, *Sclerolium rolfsi and Sclerolina sclerotiorm*. The effect of seed coat extract and neem cake extract were the most effective at 0.1% concentration in checking the growth of *A. flavus* respectively. Atal and Kapur (1982) used neem oil against the fungi *M. gypsum, A. funmigatus, Penicillium litacinum* and *F. nival*. Bhatangar and Cormick (1988) observed the effect of neem leaf extract on *A. parasiticus* growth. They noted that the extract did not inhibit fungal growth. Sinniah *et al* and (1973) studied the toxicity of neem oil on *Aspergillus* sp. Khan *et al* (1973), Kanaiyan and Prasad (1986) and Naidu and John (1984) investigated the fungicidal effect of neem cake on *R. solani* and observed that neem cake extract is more effective than other neem derivatives in checking the growth. Our result also confirm the finding that neem cake extract is more effective than other neem derivatives in checking the growth of test fungi. The variation in the fungal growth may be due to different concentration of compound or active ingredient in neem derivative.

Table 1. Effect of different concentration of neem derivatives on growth of fungi on PDA after seven days at room temperature.

		Average Diameter Of Fungal Colonies (cm)			
Neem Seed Derivatives	**Concentration**	***Aspergilus flavus***	***Aspergillus parasiticus***	***Fusarium moniliforme***	***Rhizoctonia solani***
Whole Neem Extract	0.1	3.10 cd	2.37 fgh	2.40 e	1.83 fg
	0.05	3.23 cd	2.70 de	2.47 e	2.90 d
	0.025	3.50 c	3.17 bc	3.10 cd	3.60
Neem seed Kernel Extract	0.1	2.53 ef	2.96 cd	2.33 ef	2.83 de
	0.05	2.83 de	3.13 bc	6.67 de	2.73 de
	0.025	3.27 cd	3.37 ab	3.60 bc	3.00 cd
Neem seed Coat extract	0.1	2.17 f	2.63 def	2.70 de	3.20 bcd
	0.05	3.27 cd	2.90 cd	3.60 bc	3.43 bc
	0.025	3.97 b	3.20 be	4.00 ab	4.13 a
Neem Cake Extract	0.1	2.30 f	2.10 hi	1.83 fg	2.33 ef
	0.05	2.57 ef	2.53 efg	2.33 ef	2.90 d
	0.025	3.30 c	3.10 bc	3.50 bc	3.53 d
Banlate (fungicide)	0.1	1.73 g	1.90 i	1.77 g	1.77 g
	0.05	1.70 g	2.10 hi	1.87 fg	2.00 fg
	0.025	2.37 f	2.30 gh	2.43 e	2.17 fg
Control		4.40 a	3.63 a	2.23 a	4.43 a

Average of 3 replications; Means follows by the same letter are not significant at 5% level by duncan's multiple Range test.

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