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RESEARCH ARTICLE

Studies on seed-borne fungi, Bio deterioration of seeds and control

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ABSTRACT

Fourty one fungal species were found associated with seeds of some cereals. Maximum fungi were reported in Jowar, Maze, Bajra,wheat and paddy seeds.
Aspergillus flavus and *Curvularia pallescens* were found to be more pathogenic and cause more deterioration due to production of amylase. Amylase can convert starch in to glucose and glucose is easily absorbed by fungi and seeds become more viable and showing high percentage of germination inhibition. Maximum loss in protein and starch was recorded at 35 C and 45 C due to C.*pallescens* and *A. flavus* respectively. Bavistin and dithane Z-78 were found more effective than other fungicides.

Key Words: Fungal diversity, Cereals, Bio deterioration, control.

INTRODUCTION

The seed-borne fungi of cereals were earlier studied by Sharma and Basuchaudhary (1975), Randhawa and Aulakh(1980), Prasad and Narayan (1981), Girssham and reddy (1985); Khairnar and Mukadam (1989). Utilization and changes in seed contents by associated mycoflora result into different types of abnormalities, discolouration's, losses in weight and viability (Vidhysekeran and Govindswami, 1968, Panchal , 1984, Goodman and Christensen , 1952, Lalithakumari et al., 1971, Swahney and Aulakh, 1980, Randhawa and Aulakh, 1980, Khairnar, 1987). Present investigation reports studies on Diversity on seed molds and bio deterioration in seeds by seed-borne fungi of some cereals and their control by seed dressing fungicides.

MATERIALS AND METHODS

Freshly harvested mature and apparently healthy seeds of Jowar , Bajra, Wheat, Maize and Paddy were surface sterilized with 0.1% $HgCl_2$ solution and washed twice with sterile distilled water, further soaked in

sterile distilled water for 4 hrs. Excess water was decanted. The seeds were distributed in to presterilized conical flasks (10 g/flasks) and were inoculated separately with 2 ml spore suspension of two test fungi: *Aspergillus flavus* and *Curvularia pallescens*. The fung grown in Waksman's synthetic acid agar slants for one week incubation period, were used for spore suspension. The flasks were incubated at 10, 25, 35, and 45°C temperature for 3-15 days and harvested for recording physical and chemical changes in the seeds due to fungi. The seeds thoroughly washed under running tap water in order to remove mycelial growth from their surface. Subsequently, the seed were dried at 60°C for 48 hrs. and crushed into fine powder for the estimation of starch, protein, fat, dry weight and ash. In order to understand the rate of utilization of seed content from the dead seeds, the test fungi were also grown in autoclaved seeds. Seeds were incubated in the flask but without inoculating the spore suspensions of any test fungi served as control.

Estimation of ash 2, g. of seed powder was placed in previously weighed crucible and it was subjected to heating on a hot plate for about 30 minutes, till the sample was sufficiently turned black. Then it was placed in muffle furnace, preheated to 600°C for two hours with automatic control. Crucibles were transferred directly to desicator, cooled and weighed immediately. Weight of ash was obtained and reported as % ash.

Estimation of starch was dione by Anthrone reagent method and protein by microkjaldahl method (A.O.A.C, 1966.)

Estimation of Fat was made by extraction method. Effect of fungicides on deterioration of seed contents were studied by inoculating *Aspergillus flavus* and *Curvularia pallescens* to the seeds treated with promising fungicides at 50 ppm concentration. Deterioration of untreated seeds served as control.

RESULT AND DISCUSSION

It is evident from Table 1 that at 10° C *A. flavus* and *C.pallescens* were unable to bring out any quantitative imbalance in the seed contents. But maximum loss in protein, starch and dry weight was recorded at 35 °C and 45 °C due to *C. pallescens* and *A. flavus,* respectively.

Data in Table 2 revealed that treatment of fungicides was found to be anti-seed deterioration for both fungi. Similarly combined treatment of Bavistin with Dithane Z-78 was more effective than the individual effect of Bavistin, Captan, Blitox-50 W and Dithane Z-78.

Table 1: Effect of incubation temperature (10-45 C) on chemical changes (%) in seeds due to *A.flavus* and ***C.pallescens.***

Parameter	Cont.	*A.flavus*				*C.pallescens*			
		10	25	35	45	10	25	35	45
Dry Wt.	21.40	20.60	5.20	3.40	2.00	20.70	14.00	11.80	11.00
Ash	0.60	0.65	0.90	0.85	0.80	0.60	0.68	0.60	0.60
Protein	11.40	11.80	13.70	9.20	5.80	11.00	9.10	9.00	9.10
Fat	0.55	0.58	1.00	1.10	0.70	0.55	0.60	0.69	0.70
Starch	36.20	30.40	26.47	18.20	18.00	33.70	20.20	15.70	15.70

Table 2 : Effect of fungicidal treatment on chemical changes (%) in seeds by *A.flavus* (A.f.) and *C.pallescens*(C.p)

Fungicides	Dry Wt.		Ash		Protein		Fat		Starch	
	A.f.	C.p.	A.f.	C.p.	A.f.	C.p.	A.f.	C.p.	A.f.	C.p.
Bavistin	18.00	19.2	0.72	0.65	12.0	9.10	0.59	0.67	30.0	31.5
Blitox 50 W	17.2	17.4	0.96	0.45	14.4	10.20	0.60	0.48	29.2	28.9
Captan	16.7	17.0	0.90	0.60	13.3	10.12	0.70	0.45	28.1	28.1
Dithane Z-78	15.9	17.5	6.67	0.30	12.1	10.20	0.65	0.46	27.4	29.1
Bavistin +Dithane Z-78	16.4	16.0	6.2	0.30	11.3	10.10	0.60	0.49	30.5	31.2
Control	11.4	13.2	0.80	0.60	15.3	8.10	0.98	0.45	26.2	24.5

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