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Influence of different Volatile Substance on the Seed Mycoflora of Pearl Millet (*Pennisetum typhoides*). S. Girisham & S.M. Réddy

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Influence of different volatile substance on seed mycoflora of pearl millet (Pennisetum typhoides) was investigated. In general volatile substances were toxic to the seed-borne fungi which, however, varied with the compound. Iso-amylalcohol and aniline were effective in checking the mould infestation at the same time retaining the seed viability. Vapours of different carboxylic acids were toxic to both seed-borne fungi and seed.

Moulds cause heavy damage to food grains especially to cereals during storage. The extent of damage mainly depends on the type of seeds and environment of storage place. Several suggestions have been made from time to time to protect the seeds from moulds and insects (Narasimhan & Rangaswami, 1968; Norman, 1968; Charya *et al.*, 1980 and *Mallick & Nandi*, 1982). Volatiles, active at physiological temperature, move past and active at very low concentration, are recommended in the protection of food grains. They have the added advantage of lack of residual effect. In this paper, the effect of different volatile compounds on the seed mycoflora and seed germination of pearl millet is reported. was toxic as the number of fungi recovered and per cent occurrence of fungi decreased. Ethyl alcohol and benzyl alcohol were ineffective against A. flavus. However, Penicillium spp. and Paecilomyces varioti were sensitive and were eliminated completely from the seed mycoflora. Iso-propanol supported the growth of A. flavus, A. niger, Rhizopus stolonifer and Fusarium spp. Though A. flavus, A. niger and spices of Fusarium were not affected by ethyl alcohol, other fungi were eliminated. Though formaldehyde was effective in eliminating most of the fungi, A. flavus occurred with significant percentage of incidence. R. stolonifer occurred only with 3% of incidence. Interestingly, furfurol which eliminated most of the fungi, stimulated the growth of Chaetomium globosum.

MATERIALS & METHODS Seeds,

100g, one year old sample were kept in sterilized petri dishesr and exposed to 1ml of different volatile substances in glass vials (3ml capacity) for 7 days. The exposed seeds were analysed for mycoflora. Blotter technique (*ISTA*, 1966) was employed to detect seedborne fungi. The seeds placed on a moist blotter paper were examined for fungi. Percentage of incidence of each fungus was calculated.

RESULTS & DISCUSSION Table 1

reveals that the vapours of different volatile compounds had profound influence on the seed mycoflora which, however, varied with the substance. Methanol The incidence of A. flavus and R. stolonifer. But, formamide did not effect much the seed mycoflora of pearl millet. Morphine completely eliminated the seed mycoflora, while piperdine supported the growth of C. lunata and C. pallescens. Dimethyl amine also eliminated all the fungi from the spermosphere of pearl millet except C. lunata, C. pallescens and D. spicifera. O-anisidine stimulated the growth of A. flavus.

The three carboxylic acids were toxic and eliminated the fungi from the surface of pearl millet seeds. Both ethyl acetate and methyl acetate did not check the proliferation of A. niger, A. flavus, Fusarium spp. and R.

VOLATILE SUBSTANCES, SEED MYCOFLORA

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Table 1 Effect of different volatile compounds on the seed mycoflora of pearl millet

Name of	the 🕫			E ~		S	-	ġ		10
fungus	Aspergillu flavus	A. niger	A.Ustus	tomiu bosur	vulari unata	llescon	chslera	rium s	izopus Ionifer	Sced germi nation (%)
Volatile compounds				Chae glo	Cur	C.pa	Dre	Fusa	Rh sto	
ALCOHOLS						· · · · · · ·				
Alcohol	46	11	-	-	-	-	-	6	24	51
Benzyl alcohol	41	15	-	-	- 9	-	-	18	20	63
1-Butanol	34	14	1	20	2	-	-	8	16	50
2-Butanol	31	11	3	-	9	-	_	7	21	50
lso propanol	34	23	-	-	-	-	-	21	17	64 .
Iso amyl alochol	26	14	_	10	-	-	-	-	10	68
Methanol		-	~	1	6	-	2	-	5	22
2-Methyl-1										
propane	35	5	-	7	6	-	-	9	15	65
ALDEHYDES										
Chloroform	50	3		-	7	e	2	8	20	55
Cinnamic aldehyde	•	7		34	2	-	-	19	20	50
Dichloromethane	35	5	-	15	2	5	1	24	18	45
Formaldehyde	22	-	-	-	-	-	-	-	3	
Furfurol	4	-	-	84	· · ·	-	-	8	7	26
n-butyl bromide	17	5	4	24	5	-	3	28	25	53
AMIDES	- q÷									
Ethyl amide	_	-	<u>.</u>	_	4	5	_	5		
Formamide	36	6	_	11	6	5	4	1	15	40
AMINES										
Aniline	16	4	-	5	3	•	-	6	7	57
O-anisidine	85	15	8	-	2		-	5	20	19
Dimethyl amine	_			-	4	5	5	-	-	-
Piperdine	-	-	_	-	7	5	-	-	_	
Morphine	0_		-	p -	-	-	-	-	_	- : •
CARBOXYLIC										
Actic acid	1				6		224	1.0		•
Formic acid	-	_		÷	U				_	
Propionic acid			-	-	-	-	-	-	-	-
Eerepe										
ESTERS Ethul costata	A 1	10	1		1			12	17	==
Mothul acetate	41 56	17 15	10	-	1	-		13	1/	20
wieinyl acetate	DO .	40	10	10	-	-		15	21	30

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MISCELLANEOUS										
Acetic anhydride	45	6	-	-	-	-	-	7	20	43
Benzene	44	21	-	-	-	-	-	4	15	63
Cyclohexane	40	16	-	3	6	-	-	9	25	58
Hexane	49	6	-	-	3	-	-	-	21	57
Kerosene	55	26	8	25	2	-	-	-	10	11
Petrolium ether	30	17	3	12	4	-	-	5	23	59
Petrol	46	25	7	17	-	-	-	5	9	34
4-Picoline	-	-	_	18	5	8	-	13	17	-
Toluene		-	-	-	-	-	-			-
Xylene	38	10	1	1	-	(.	-	5	26	62

stolonifer The ketones were almost equal in their antifungal activity against A. flavus, A. niger, Fusarium spp. and R. stolonifer. Cyclohexane, acetone, acetic anhydride and benzene were ineffective. 4-Picoline eliminated A. flavus from the seed mycoflora but dimethyl sulphoxide stimulated the growth of C. globosum. Vapours of ethyl ether eliminated R. stolonifer. Toluene was toxic and eliminated all the fungi from the spermosphere. Petroleum ether eliminated species of Curvularia. Hexane also reduced the number of fungi.

ethylene-dibromide, methyl bromide and ethylene oxide. Similarly Charya & Reddy (1980) recommended the use of acetone, iso-amyl alcohol and aniline in the protection of seeds both meant for consumpation and sowing purpose.

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Dimethylamine, piperidine, morphine, acetic acid, formic acid and propionic acid, ethyl amine, 4-picoline and toluene were toxic and caused loss of seed viability. Similarly kerosene, dimethyl sulphoxide, O-anisidene, methonal and ethyl ether caused inhibition of seed germinatôn. But benzyl alcohol, isopropanol, 2-methyl 1-propane, acetone, benzene and xylene were almost non-toxic. The vapours of methanol did not supress the growth of Alternaria alternata. Acremonium terricola was not sensitive to the vapours of benzyl alcohol, ethyl amine, hexane, petroleum ether and petrol. Vapours of n-butyl bromide and petrol did eliminate the fungi except Paecilomycis lilacinus, Aspergillus ochraceus and Penicillium citrinum, respectively. No correlation existed between the toxicity of volatile substances to seed germination and seed mycoflora. We conclude that isoamyl alcohol can be employed in checking the mould infestation of pearl millet as it had no toxic effect on

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