Effect of Toxic Substance Extracted from Aspergillus niger Inoculated Seeds on Dolichos lablab

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The extract of seeds of *Dolichos lablab* FD 5 inoculated with *Aspergillus niger* markedly influenced the growth of radicle and plumule. The mean length of 7 day old radicle and plumule and the total, sugar and amino acids in cotyledonary leaves were less than the control. Activities of peroxidase phenol oxidase and IAA oxidase were stimulated in the treated radicle and plumule.

Key Words - Dolichos Aspergillus Extract Toxic effect Seedlings.

Seeds harbour fungi that reduce their quality (Harman & Nash, 1972). They impair seed germination and cause the production of abnormal seedlings. This study reports on the toxicity of Aspergillus niger Van Tieghem on lablab bean seeds (Dolichos lablab L). The seedlings were analysed for the presence of total sugars and amino acids in the cotyledons and radicle and peroxidase, phenol oxidase and IAA oxidase in the radicle and plumule.

MATERIALS & METHODS . Seeds weighing 5g were surface sterilized with 0.1% HgCl₂ for 1 min and washed thoroughly in sterile distilled water. The seeds were inoculated with the fungus spores on rolling over its culture grown on potato dextrose agar medium at $28 \pm 1^{\circ}$ C for 10 days, and stored over saturated solution of $(NH_4)_2$ SO₄ (80% RH) in sealed desiccator at $30 \pm 1^{\circ}$ C for 10 days maintaining a control of uninoculated seed lot. The seeds were extracted in 25 mL 80% acetone for 8 h. After vacuum evaporation of the solvent, the residue was dissolved in 25 mL sterile double glass distilled water (Harman, 1972).

Seeds possessing 98% germinability were surface sterilized and kept for 5 days at 30 \pm 1°C. Seedlings (5 seeds/tube) were placed in glass tube in a medium supplimented with the extract at the rate of 1 mL extract to 99 mL medium (Harman & Nash, 1972) and incubated for 7 days. Mean length of 100 radicles and plumules was measured. Total sugar and amino acids were estimated in cotyledonary leaves and radicle while peroxidase, phenol oxidase and IAA oxidase were estimated (Mahadevan & Sridhar, 1982) in the radicle and plumule.

RESULTS & DISCUSSION The mean length of radicle(19.9 mm) and plumule (8.5 mm) of 7day-old seedlings of inoculated seeds was significantly (p>0.05) less than the uninoculated control (37.8 mm of radicle and 18.6 mm of plumule). Both total sugar (86 mg against 158 mg/ 100 g fresh weight of the control) and amino nitrogen (33 mg against 73 mg/100 g fresh weight of the control) in the treated cotyledonary leaves were low. They were also less in the radicle (25 mg total sugar against 42 mg/100 g fresh weight of the control and 12 mg total amino acid against 32 mg/100 g fresh weight of the control). In contrast peroxidase, phenol oxidase and IAA oxidase were stimulated in the radicle and plumule due to the treatment (Table 1).

The results indicate that acetone extracted the toxic principles that restrict the growth of radicle and plumule, might act through oxidation of IAA by augmented activity of oxidases (Krupasagar & Sequeira, 1969) on the one hand

Table : 1	The act	tivities	of	oxida	ses in	n the	radicle	and
plumule of	7-day-	old lab	lab	bean	seedl	ings	treated	with
	extract	of A.	nige	er ino	culate	ed se	ed	

Oxidases	R	adicle	Plumule		
Oxidases	Treated	Control	Treated	Control	
IAA oxidase (µg IAA destroyed/ min/g fresh weigh	t) 0.187	0.068	0.209	0.089	
Peroxidase (O.D., 40 sec) 40	_	_	_	_	
80	0.05	0.50	0.05	1.00	
120	0.10	1.00	0.10	1.50	
160	0.20	2.00	0.2	3.00	
Phenol oxidase (O.D./60 sec) 60	-	_	-	1	
120	0.10	-	0.05		
180	0.20	0.05	0,10	0.05	

and obstructing the hydrolysis of polysaccharides to soluble sugars, and proteins to amino acids on the other hand. These resulted in their deficiency in the cotyledons and consequently reflected on the growing seedlings (Sempio, 1959). The rapid oxidation of IAA and the deficiency of sugars and amino acids may lead the formation of abnormal seedlings as in pea due to Aspergillus ruber (Harman, 1972).

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