

## LOCATION OF FUNGI IN SUNFLOWER SEED

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### Abstract

Using ISTA technique, component plating of sunflower seed showed that pericarp was infected by greater number of fungi followed by seed coat, cotyledon and axis (radicle + plumule). *Rhizoctonia solani* Kühn, *Fusarium solani* (Mart.) Sacc., and *Macrophomina phaseolina* (Tassi) Goid., were also isolated from axis of the seed. Reduced number of fungal species in surface sterilized seed indicates that most of the fungi were located on pericarp. Blotter method showed greater infection of fungi on seed parts followed by agar plate method.

### Introduction

Sunflower (*Helianthus annuus* L.), an important oil seed crop, is cultivated over 9592 hectares in Pakistan (Anon, 1985). Of the various disease causing organisms, *Alternaria alternata* (Fr.) Keissler and *Aspergillus flavus* Link., decreased the oil and iodine content of seed (Prasad, 1983). Infection of *Macrophomina phaseolina* (Tassi) Goid., reduced germination and vigour of sunflower seeds besides producing pre- and post emergence seedling blight and charcoal rot diseases (Sadashivaiah, 1988). *Plasmopara halstedii* (Farl.) Berl. & de Toni, which occurs in the seed coat reduced germination rate and produced abnormal seedlings (Zad, 1980). A knowledge of the exact location of pathogen in seed or the depth of seed infection by particular pathogen can be helpful in the control of seed borne infection. Studies were, therefore, carried out to isolate fungi from different components of sunflower seeds, the results of which are presented in this paper.

### Materials and Methods

Four samples of sunflower seeds collected from different parts of Pakistan viz., Sind (2) Punjab (1) Baluchistan (1) were used to study the location of seedborne fungi. Using the method given by Mathur *et al.*, (1975), single seed soaked for 4 h in sterilized distilled water in test tubes were dissected aseptically into pericarp (outer most hard covering), seed coat (inner membranous covering) and embryo (Willis, 1960). The embryo was further dissected into cotyledons and axis (radicle and plumule). ISTA technique (Anon, 1976) was used to detect fungal infection in different parts of seed. Using blotter method, dissected parts of 100 untreated seeds and seeds after treatment with 1% Calcium hypochlorite were placed on three layers of steri-



Table 1. Contd.

<i>solani</i>	Sind	-	-	-	-	-	-	-	-	-	-	-	-	-			
	Sind (Ho-1)	4	4	-	-	4	4	-	-	4	4	-	-	8	4	-	-
	Sind	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Trichoderma</i> sp.	Baluchistan	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Rawalpindi	-	-	8	-	-	-	4	-	-	-	4	-	-	-	4	-
	Sind (Ho-1)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Sind	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

A = Surface sterilized seed parts.

B = Non-sterilized seed parts.

lized moistened blotter. For Agar plate method, the treated and untreated seed components were plated on potato dextrose agar (PDA). Different component parts of a seed were plated on one Petri dish. The dishes were incubated at 24°C for 7 days and fungi growing on different parts were identified after reference to Barnett (1972), Booth, (1971), Ellis (1971) and Nelson *et al.*, (1983).

## Results and Discussion

Results obtained by component plating of 4 samples of sunflower seed (Table 1) showed that most of the fungi were located on the pericarp followed by seed coat, cotyledons and axis. Of the 4 samples tested variety, HO-1 of Sind showed the highest colonization of pathogenic fungi viz; *Rhizoctonia solani* Kühn, *Macrophomina phaseolina* (Tassi) Goid., *Fusarium-moniliforme* Sheldon. *F. solani* (Mart) Sacc., whereas other samples from (Punjab, Sind, Baluchistan) were infected by storage fungi especially *Aspergillus flavus* Link and *A. niger* van Tieghem. Surface sterilization of seed parts with 1% Ca(OCl)<sub>2</sub> reduced the incidence of *Aspergillus* spp. Limnard (1961) also reported that microbial contamination is eliminated by chlorine disinfection. Infection of *M. phaseolina* was recorded in all parts of seeds viz., pericarp (4%), seed coat (4%), cotyledons (4%) and axis (4%). These results are contrary to the reports of Sadashivaiah (1988) who found *M. phaseolina* infection only in the pericarp and seed coat. Infection of *R. solani* was recorded in all parts of seed viz., pericarp (4%), seed coat (4%) cotyledons (4%) and axis (8%). *F. moniliforme* was detected in inner tissues such as seed coat (4%) but not in axis. Mathur *et al.*, (1975) and Sultana *et al.*, (1988) found that infection of *F. moniliforme* was more conveniently detected in the endosperm than seed coat and embryo of sorghum seed. In the present study *F. solani* was isolated from pericarp, (4%) seed coat (4%) and cotyledons (4%) but not from the axis. *Trichoderma* sp., was recorded from pericarp (8%), seed coat (4%), cotyledons (4%) and axis (4%). Infection of *Alternaria tenuissima* was observed from pericarp (28%), seed coat (32%), cotyledons (12%) but not from axis.

**References:**

- Anonymous. 1976. International rules of seed testing. *Proc. Int. Seed Test. Assoc.*, 4:3-49.
- Anonymous. 1985. *Agriculture statistics of Pakistan*. Govt. of Pakistan, Min. Food & Agri. & Co-operatives. Food and Agriculture Division (Planning unit), Islamabad, pp 727.
- Barnett, H.L. 1960. *Illustrated genera of Imperfect fungi*. Burgess Pub. Co. Minn. pp. 241.
- Booth, C. 1971. *The genus Fusarium*. CMI, Kew, Surrey, England, pp. 237.
- Ellis, M.B. 1971. *Dematiaceous Hyphomycetes*. CMI, Kew, Surrey, England, pp. 608.
- Limnard, T. 1968. Ecological aspects of seed health testing. *Proc. Inst. Seed Test. Assoc.*, 33: 343-513.
- Mathur, S.K., S.B. Mathur and P. Neergaard 1975. Detection of Seed borne fungi in Sorghum and location of *Fusarium moniliforme* in seed. *Seed Sci. & Technol.*, 13: 683-690.
- Nelson, P.E, T.A. Toussoun and W.F.O. Marasas. 1983. *Fusarium species. An Illustrated Manual of Identification*. The State Univ. Press. pp. 203.
- Prasad, T. and B.K. Singh. 1983. Effect of relative humidity on oil properties of fungal infested sunflower seeds. *Biological Bulletin India*, 5: 85-88.
- Sadashivaiah, A.S., K.G. Ranganathaiah and D.N. Gowda. 1986. Seed health testing of *Helianthus annuus* with special reference to *Macrophomina phaseolina*. *Ind. Phytopathology*, 39: 445-447.
- Sultana, N., S.A.J. Khan and A.K. Khanzada. 1988. Detection and location of seed borne fungi in sorghum seed. *Pak. J. Bot.*, 20: 239-244.
- Willis, J.C. 1960. *A dictionary of the flowering plants and ferns*. (8th edition). Cambridge University Press, London. pp. 1245.
- Zad, J. 1978. Transmission of sunflower downy mildew by seed. *Iranian J. Plant Pathology*, 14: 1-2.

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