

Evaluation of Some Fungicides against Seed Born Mycoflora of Eggplant and Their Comparative Efficacy Regarding Seed Germination

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ABSTRACT

The efficiency of three fungicides as seed treatment was carried out to determine their effect on the germination percentage and recovery of fungi after seed treatment. Four fungicides with three concentrations were used against the mycelial growth of the tested fungi. Results revealed that Benlate gave maximum germination in *Fusarium solani* treated pots, whereas Captan performance better against the *Alternaria alternata*. All four fungicides i.e., Topsin M, Benlate, Dithane M-45 and Captan proved effective in inhibiting the fungal colony growth.

Key Word: Eggplant; Fungicides; Seed treatment; Mycelial growth; Germination

INTRODUCTION

The importance of vegetables in human diet needs no emphasis. Out of the vegetables, eggplant or aubergine (*Solanum melongena* L.) is an important one, which is not only grown for edible purposes but also as ornamental plants. Among important commercial varieties cultivated in Pakistan are Neelum, Quaisar, Pusa, Purple long, Purple round and White egg. The average yield of our country is 12.6 tons per hectare, which is very low as compared to other Asian countries (Anonymous, 2004). Along with many other factors, seed born mycoflora contributes as a major yield reducing agent. More than 50 pathogens are reported to be seed born in nature in different vegetable seeds (Richardson, 1990). Presence of seed born pathogens in low number is an important factor in the determination of seed quality and viability to ensure healthy and vigour of the future crop.

Seed treatment becomes more economical and effective when it is carried out with respect to nature of pathogen and level of infection percentage (Neergaard, 1974). The objective of the present study was to evaluate the efficiency of different seed dressing fungicides to bring down the seed borne inoculum to minimum infestation level and also to see its impact on the germination of seeds.

MATERIAL AND METHODS

Testing of seed dressing fungicides. For evaluating the rate of seed dressing fungicides, three different fungicides viz. Captan, Topsin M and Benlate were used at the rate of 2 g kg⁻¹ of seed. The healthy seed were artificially infested with isolates of most pathogenic fungi *Fusarium solani* and *Alternaria alternata*, and then treated with fungicides in petriplates (25 seeds plate⁻¹) having three layers of moistened blotting papers. Some seeds infested with fungal isolates were not treated with fungicides and used as check.

This experiment conducted in CRD and all the petriplates were incubated at 28 ± 2°C. The germination and recovery percentage data was recorded after twelve days and analyze statistically according to (Steel *et al.*, 1996).

Evaluation of fungicides by poisoned food technique. For the purpose of *in vitro* evaluation of fungicides namely Captan, Topsin M, Benlate and Dithane M-45 were used by poisoned food technique (Ilyas *et al.*, 1982). After autoclaving the media was amended with 10, 20 and 40 ppm of fungicides concentrations. This amended and non-amended (check) media was poured in each petriplates. For fungal inoculation agar plugs having fungal isolates with four mm diameter taken from 10 days old culture of *F. solani* and *A. alternata* were placed in the centre of each petriplate. These plates were incubated at 22 ± 1°C until non-amended plate filled with mycelial growth. The recorded data was analyzed statistically for sensitivity of *F. solani* and *A. alternata* to different fungicides at different concentrations.

RESULTS AND DISCUSSION

The maximum recovery of test fungi was obtained from control pots, where seeds were infested with fungal isolates but not treated with seed dressing fungicides. The data revealed that the maximum seed germination was recorded in those pots, which were treated with Benlate (91%) followed by Topsin M (47%) and Captan (42%) in case of *F. solani* treated pots (Table Ia & b). On the other hand, Captan (81%) gave the best performance against *A. alternata* as compared with other fungicides and control treatments (Table IIa & b). These data clearly showed that Benlate and Captan were most effective in controlling the seed diseases caused by *F. solani* and *A. alternata* respectively. These fungicides not only promoted the seed germination but also reduced the percentage recovery of seed born inoculums.

Table I. Effect of three seed dressing fungicides on seed germination and the recovery of *Fusarium solani*.**(a) For Germination (%)**

S. No	Treatments	No. of germinated seeds out of 25 (means*)	Germination (percentage)
1	Benlate	22.75	91
2	Topsin-M	11.75	47
3	Captan	10.50	42
4	Control	9.75	39

* = Means were calculated from four replications

(b) For recovery

S. No	Treatments	Recovery of <i>F. solani</i> from 25 seeds (Means)	Percentage decrease over control
1	Benlate	10.50	49.39
2	Topsin-M	18.75	86.20
3	Captan	19.25	88.50
4	Control	21.75	-

Table II. Effect of three seed dressing fungicides on seed germination and the recovery of *Alternaria alternata*.**(a) For germination (Percentage)**

S. No	Treatments	Number of germinated seeds out of 25	Germination percentage
1	Benlate	14.25	57
2	Topsin-M	17.50	70
3	Captan	20.25	81
4	Control	8.25	33

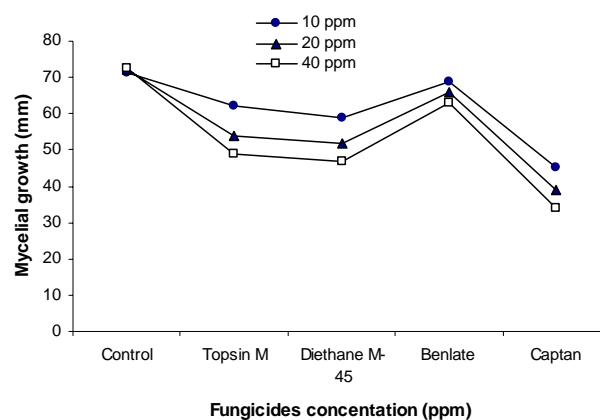
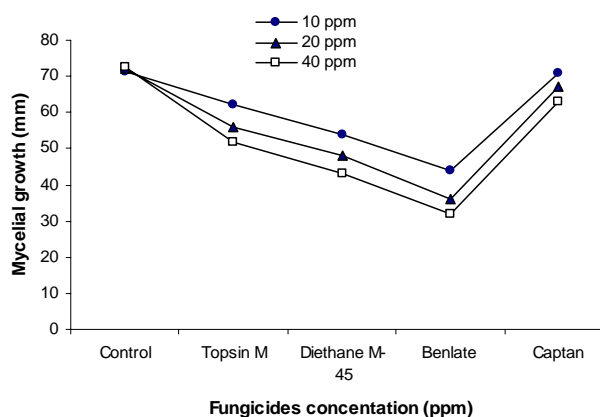
(b) For recovery

S. No	Treatments	Recovery of <i>F. solani</i> from 25 seeds	% age decrease over control
1	Benlate	18.50	81.31
2	Topsin-M	14.00	61.53
3	Captan	11.50	50.54
4	Control	22.75	-

In the next part of experiment four fungicides with 10, 20 and 40 ppm concentrations were used against *F. solani* and *A. alternata* colony growth. Among these treatments, Benlate and Captan were the most effective against *F. solani* and *A. alternata*, respectively as compared to other treatments (Fig. 1 & 2). These results agree with Mali and Joi (1985), who seven fungicides and found that these fungicides inhibits the colony growth and sporulation of *A. alternata*, *Colletotrichum capsici*, *Curvularia lunata*, *Drechslera rostrata* and *Macrophomina phaseolina*. According to Khare (1985), *F. solani* is more sensitive towards Benlate as compared to Captan and it also increases the germination of seeds. Similar results also obtained by Vimala *et al.* (1993), where they treated the eggplant seeds with three fungicides and two fungal antagonists *Trichoderma hamatum* and *T. harzianum*. All these treatments increase seed germination (92%) as compared to control (76.5%).

REFERENCES

Anonymous, 2004. *Directorate of Crop Reporting Services*, Government of Punjab Lahore (Pakistan)

Fig. 1. Effect of different fungicides at three concentrations against mycelial growth of *Alternaria alternata***Fig. 2. Effect of different fungicides at three concentrations against mycelial growth of *Fusarium solani***

- Ilyas, M.B., M.A.R. Bhatti and M.A. Randhawa, 1982. *Biology, Host Parasite Relationship and Control of Charcoal Rot Fungus (Macrophomina phaseolina)*. Technol. Bull. No. 1, Society for the Advanced of Agriculture and Science Pakistan, University of Agriculture, Faisalabad
- Khare, K.B., 1985. Fungi associated with maize and beans grown as a mixture by small scale farmers in Kenya and their control. *Turrialba Nigeria*, 35: 101-3
- Mali, J.B. and B.M. Joi, 1985. Control of seed mycoflora of chilli (*Caosicum annum*) with fungicides. *Department of Pl. Pathol. Agric. Microbiol. Matatma Phula Agric. University India*, 1: 8-10
- Neergaard, P., 1974. *Report on the 4th Regional Workshop on Seed Pathology for Developing Countries*. September 16 - 29, 1973. DGISP for developing countries, Copenhagen, 24
- Richardson, M.J., 1990. *An Annotated List of Seed Borne Diseases*, 4th edition. ISTA Zurich, Switzerland
- Steel, R.G.D., J.H. Torrie and D. Dickey, 1996. *Principles and Procedures of Statistics: A Biometrical Approach*, 3rd edition. Mc Graw-Hill, New York, U.S.A
- Vimala, R., K. Sivaprakasam and Seetharaman, 1993. Effect of seed treatment fungicides and antagonistic organism on seed mycoflora and seedling vigour in brinjal. *Madras Agric. J.*, 80: 595-7

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