J. Mycopathol. Res. **44**(2) : 249-252 (2006)

Evaluation of some fungicides and an antibiotic against *Trichothecium roseum* infecting pomegranate

RESHMA SINGH AND MONICA BASU
Department of Botany, University of Allahabad, Allahabad

The infection of *Trichothecium roseum* on pomegranate was recorded for the first time from India. A detailed study for the evaluation of some fungicides and an antibiotic was undertaken. Seven fungicides (Captan, Dithane M-45, Dithane Z-78, Difolatan 80 W, Blitox, Bavistin and Anustin) and one antibiotic (Streptocycline) were tested against the fungus. *In vitro* studies showed complete inhibition of the growth of fungus at the concentration of 250 ppm by the fungicides Dithane M-45, Difolatan 80W, Bavistin and Anustin. Blitox controlled the growth of the fungus but did not completely inhibit it. Rest of the fungicides Captan and Dithane Z-78 did not check the growth of the fungus even at higher concentration (1000 ppm). The antibiotic streptocycline was also ineffective against the fungus. Disease development on fruit under artificial inoculation condition, however, showed that Bavistin was the best followed by Dithane M-45.

Key words : Pomegranate, *Trichothecium roseum*, fungicides, antibiotic

INTRODUCTION

Pomegranate is an important fruit crop of India. The fruits are highly nourishing and have medicinal value too. Under proper conditions fruits have long storage life. The fruits improve in storage, become juicier and more flavorful. A number of fungi are known to destroy the fruits during storage. Excessive rain during ripening season may induce soft rot. *Alternaria solani* causes soft rot. Fruit may be sometimes disfigured by *Sphaceloma punicae* Bitanc & Jenkins. *Aspergillus foetidus* and *Phomopsis* sp. have also been reported to cause rot disease of pomegranate.

Present investigation has been undertaken to study the spoilage of fruits by *Trichothecium roseum* Link. The fungus produces black spots on the surface of fruits. Inside, the edible part of fruit turns blackish brown. A number of fungicides and an antibiotic have been tested as a chemical control measure for the fungal pathogen.

MATERIALS AND METHODS

To test the efficacy of eight chemicals viz., Captan, Dithane M 45, Dithane Z 78, Difolatan 80W, Blitox, Bavistin, Anustin and Streptocycline, Poisoned food technique of Nene and Thapliyal (1979) was followed.

For *in vitro* treatment, four different concentrations i.e. 1000 ppm, 500 ppm, 250 ppm and 100 ppm of the chemicals were prepared. Two ml of each concentration was added to the petridish along with the basal medium, before solidification. The basal medium used was Asthana Hawker's 'modified' medium. The inoculated dishes were incubated for 7 days at room temperature i.e. 25±2°C.

For testing the efficiency of chemicals *in vivo*, the chemicals able to check the growth of fungus *in vitro* were selected. These were prepared in the desired concentrations. For *in vivo* studies both pre and post inoculation treatments were given to the fruits. For pre inoculation treatments, they were first dipped in the known concentration of chemicals for 5 min. and were allowed to dry for 3-4 h, thereafter inoculated with the fungus and kept in sterilized polythene bags and kept at 25±2°C.

In post inoculation treatments, fruits were first inoculated with the pathogen and after a lapse of 24 h they were dipped in different concentrations of

fungicides or antibiotic for 5 mins. In the control series, in place of chemicals, the fruits were dipped in distilled water. The treated fruits were incubated for 8 days at room temperature, thereafter the percentage of fruits protected was determined with the help of following formula suggested by Lal *et al.* (1981).

$$\% \text{ Control} = \frac{\% \text{ decay in control} - \% \text{ decay in treatment}}{\% \text{ decay in control}} \times 100$$

$$\text{where per cent decay} = \frac{(W - w)}{W} \times 100$$

Where, W = weight of the fruits before incubation, w = weight of the fruits after removal of the infected tissues.

RESULTS AND DISCUSSION

From the Table 1 it was evident that the fungicides Dithane M-45, Difolatan 80W, Bavistin and Anustin were very effective against the fungal pathogen in *in vitro* condition. These fungicides completely checked the growth of the fungus even at very low concentration i.e. 250 ppm. Blitox was less effective against the fungus. Fungicides Captan, Dithane Z78 and antibiotic streptocycline were not able to check the growth of fungus even in the highest concentration (Fig. 1).

Table 1 : Effect of different fungicides/antibiotics on the growth of *Trichothecium roseum*.

Fungicides/Antibiotic	Conc. in ppm			
	1000	750	500	250
Captan	+	+	+	+
Dithane M45	-	-	-	-
Dithane Z 78	+	+	+	+
Difolatan 80W	-	-	-	-
Blitox	±	±	±	±
Bavistin	-	-	-	-
Anustin	-	-	-	-
Streptocycline	+	+	+	+

'+' growth, '-' no growth, '±' Restricted growth

The data in Table 2 indicated the percentage of fruits saved from loss when fungicides were used in comparison to a condition in which fruits were allowed to rot through infection. Bavistin gave best results. At 100 ppm it showed 62.8 per cent control in pre inoculation treatment and 40.3 per cent control in post inoculation treatment.

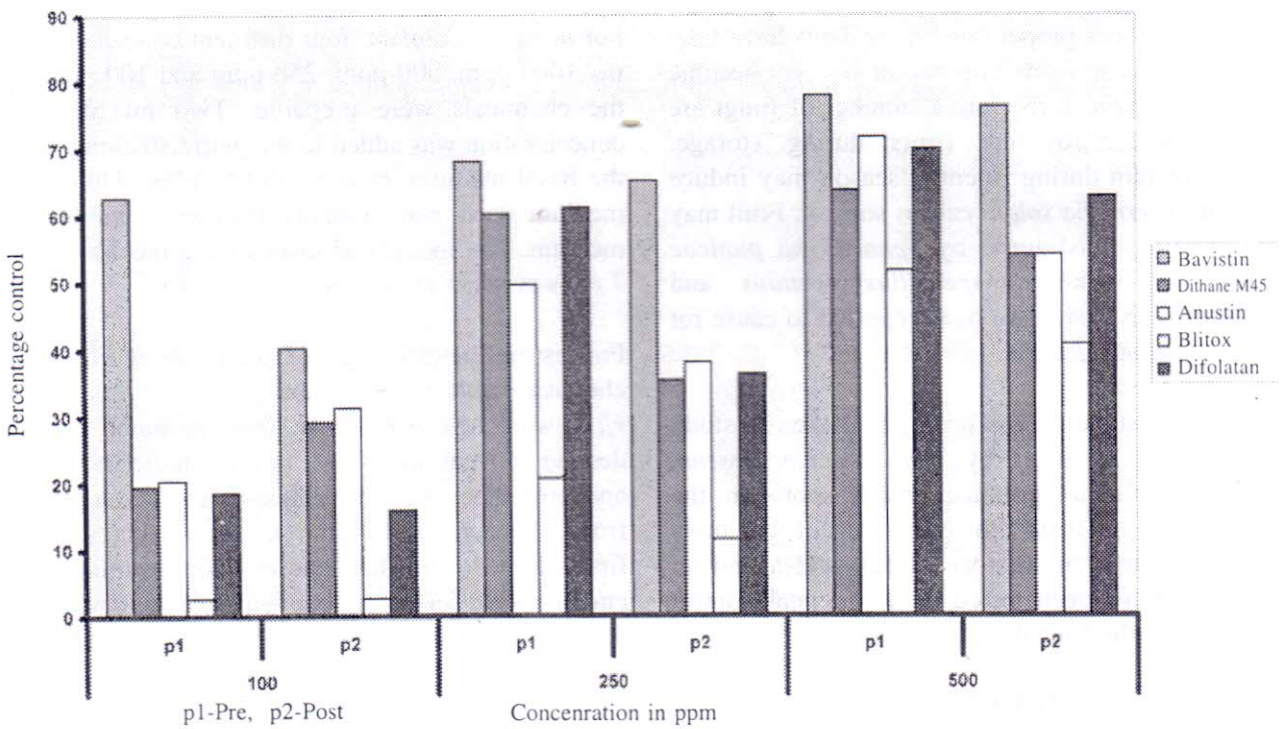

Fig. 1 : Efficiency of different fungicides (expressed as per cent control)

Table 2 : Efficacy of different fungicides in checking the disease (expressed as per cent control)

Fungicides	Conc. in ppm					
	100		250		500	
	Pre[a]	Post[b]	Pre	Post	Pre	Post
Bavistin	62.8	40.3	68.1	65.1	77.9	76.3
Difolatan 80W	19.5	29.2	60.2	35.4	63.7	54.0
Anustin	20.4	31.3	49.6	38.1	71.7	54.0
Blitox	2.7	2.7	20.7	11.5	51.7	40.7
Dithane M45	18.6	15.9	61.1	36.3	69.9	62.8

Pre inoculation treatment : CD at 5% for fungicides = 31.60; conc. = 28.43

Post inoculation treatment : CD at 5% for fungicides = 19.23; conc. = 17.30

[a]pre = pre inoculation treatment
[b]post = post inoculation treatment

Difolatan 80W showed 60.2 per cent control in 250 ppm concentration in pre inoculation treatments.

Anustin was very effective at the conc. of 500 ppm in pre inoculation treatments.

Blitox which was not found to be very effective *in vitro* treatments gave poor results in *in vivo* also.

Dithane M45 showed 61.1 per cent control in pre inoculation treatments at 250 ppm concentration.

Bavistin can be recommended to control the loss of fruit from the disease.

Earlier chemical control was done to protect the fruits from different post harvest diseases. As the infection of *Trichothecium roseum* on the fruits of pomegranate is a new record from India (Figs. 2-4), no control measures for the disease was tried to

Fig. 2 : Diseased fruit of pomegranate showing symptoms caused by *Trichothecium roseum*.
Fig. 3 : *T. roseum*: Colonies on P.D.A.
Fig. 4 : *T. roseum*: Bicelled Conidia.

check the loss. Avoidance of cracking and injury of fruits and chemical treatments followed by storage at low temperature i.e. 32° to 41°F increased the storage and shelf life of the fruits.

ACKNOWLEDGEMENT

The authors are thankful to the Head of the Botany Department, University of Allahabad for providing research facilities. Senior author grateful to C.S.I.R. for awarding Senior Research Fellowship.

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(Accepted for publication May 30 2006)