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Evaluation of the Efficacy of Different Fungicide for the Management of *Alternaria* Leaf Spot Disease of Chilli

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Abstract

Alternaria leaf spot of chilli caused by *Alternaria alternata* is an important disease affecting chilly production areas in India. The disease is primarily controlled through the use of fungicidal seed treatments. In this study, different fungicides viz. Captol, Captan, Ziram, Captofol, Thiram, Indofill Z 78 and Indofill Z 45 were assessed for their ability to reduce the growth of *Alternaria alternata* under laboratory conditions. Maximum inhibition (100%) was achieved by Captol and captan followed by captofol (89.5 %) while 0.1 % dose given. This paper reports the efficacy of fungicides that can be used under field conditions to control *alternaria* leaf spot in tropical regions and demonstrates the use of a method of application that could significantly improve the efficacy of disease control.

Keywords: fungicides efficacy; captol; captofol; *Alternaria alternata*.

Introduction

Chilli (*Capsicum annum* L.) is most widely used and universal spice of India belongs to the "Solanaceae" family. The nutritive value of chilli is excellent, chillies are rich in vitamins, especially in vitamin A and C. [1]. India has immense potential to grow and export different types of chillies required to various markets around the world. India has produced around 1014.60 million tones of chilli with area of 654 million ha. and productivity 1551 kg/ha during 2005-06 (Source: Directorate of Arecanut and Spices Development). The most important chilli growing states in India are Andhra Pradesh (49 %), Karnataka (15 %) Maharashtra (6 %) and Tamilnadu (3 %) which constitute nearly 75 per cent of the total area under chilli.

Alternaria leaf spot is widespread and highly destructive disease that infects chili plants, and yield loss caused by these diseases has been recorded up to 100 percent under congenial environment conditions [2].

Leaf spot disease caused by *Alternaria alternata* (fr) Keissler is becoming a limiting factor and posing a major problem in chilli production [3]. The pathogen has been reported to cause seed, seedling, leaf, fruit diseases as well. Post harvest decay of fruit and seed has also been reported due to this pathogen. The current study evaluates the efficacy of different fungicides against leaf spot diseases.

Material and methods

Collection of samples: Soil sample was collected from different locations of a local chilli field infested with *Alternaria alternata*. Collection of soil sample were made for the root zone at 4-20 cm depth [4].

Isolation of pathogen: soil sample were diluted serially upto 10^{-5} strength. One ml of this suspension were poured on sterilized PDA Plates. Now plates are incubated at 25° C for 5 days. Observation were recorded after the development of colonies [5].

Efficacy of different fungicides- Relative efficacy of different fungicides was tested against the leaf spot pathogen under laboratory condition. Name of fungicides and given doses are as given in table.

Table 1
List of fungicides and dose given

S.No.	Name of fungicide	Doses	
1.	Captol	0.1	0.2
2.	Captan	0.1	0.2
3.	Ziram	0.1	0.2
4.	Captofol	0.1	0.2
5.	Thiram	0.1	0.2
6.	Indofill Z 78	0.1	0.2
7.	Indofill Z 45	0.1	0.2

For this purpose, poisoned food technique devised by Schmitz was followed. The requisite amount of fungicide was incorporated into 2 percent of unsolidified media and shaken well to make it homogeneous. Then the medium was poured in 90 mm sterilized petridishes with three replication of each treatment and allowed to solidify. These dishes were then inoculated with 5 mm disc of inoculums from 10 days old culture and these discs were placed in such a way so that the fungus may come in direct contact with the medium.[6]. The medium without fungicide, inoculated similarly served as control, the petridishes then incubated at 25° C for 10 days. The efficiency of the fungicides was assessed by measuring the radial growth of the fungal colony in mm. growth inhibition percentage of colony was calculated by formula given below

$$I = \frac{C-T}{C} \times 100$$

Results

Effect of different fungicides on the growth of pathogen is presented in table 2 and 3. Results presented in table shows that all the fungicides have significant effect on the growth of pathogen. Out of 7 fungicides tested, 4 (captan, captol, ziram and captafol when given dose was 0.1 %) proved to be effective and inhibit the growth 100, 100, 87.5 and 89.5 respectively. On other side when double dose was given maximum inhibition recorded was 100 % (captan and captol) 96.45 % (ziram) and 91.52 % (captofol).

Results indicate that captan, captol, captofol and ziram have good fungicidal activity against the pathogen while other fungicides have low significance.

The chilli plant harbors the infections of *Alternaria alternata* though diseased debris of the previous crop. In each case, it is necessary to protect the plant timely application of fungicides for spread of diseases.

Table 2

Effect of different fungicide (0.1 %) on the growth of pathogen

S.No.	Fungicide	Dose	Average diameter in mm	% Inhibition
1.	Captol	0.1	0.00	100
2.	Captan	0.1	0.00	100
3.	Ziram	0.1	10.00	87.5
4.	Captofol	0.1	8.4	89.5
5.	Thiram	0.1	13.6	83
6.	Indofill Z 78	0.1	18.0	77.5
7.	Indofill Z 45	0.1	19.5	75.6

Table 3

Effect of different fungicide (0.2 %) on the growth of pathogen

S.No.	Fungicide	Dose	Average diameter in mm	% Inhibition
1.	Captol	0.2	0.00	100
2.	Captan	0.2	0.00	100
3.	Ziram	0.2	0.00	100
4.	Captofol	0.2	3.0	96.45
5.	Thiram	0.2	7.2	91.52
6.	Indofill Z 78	0.2	7.0	91.76
7.	Indofill Z 45	0.2	8.2	90.35

Discussion

Chilly is a fruit of the plant that come from the genus *Capsicum* belonging to the family solonaceae which also include other crops like tomato potato etc.[7]. Out of seven fungicide tested against the pathogen in vitro, captan, captol completely inhibited the growth of pathogen while single and double dose was given. [8]. But fungicides ziram and captafol inhibited the 100 % and 96.445 % of growth with double dose. These findings are much similar to the findings of Singh and Milne (1974), Monge (1990), Vishvakarma and Panday, Singh and Roy 2003 for *Alternaria*.

The current study conclude that fungicides like captan, captol, ziram and captofol were found to be effective against *Alternaria* leaf spot diseases.

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References:

1. Mamgain A., Roychowdhury R. and Tah J 2013. *Alternaria* pathogenicity and its strategic controls, *Research Journal of Biology Volume 1: 01-09*
2. Abd-el-Kareem F. 2007. Potassium or sodium bicarbonate in combination with Nerol for controlling early blight disease of potato plants under laboratory, greenhouse and field conditions. *Egyptian J. Phytopath.*, 35(1): 73-86.
3. Akamatsu H, Itoh Y, Kodama M, Otani H and Kohmoto K. 1997. AAL-toxin-deficient mutants of *Alternaria alternate* tomato pathotype by restriction enzyme-mediated integration. *Phytopathol.*, 87: 967-972.
4. Babu S, Seetharaman K, Nandakumar R and Johanson I. 2000. Efficacy of fungal antagonists against leaf blight of tomato caused by *Alternaria solani* (Ell. and Mart.) Jones and Grout. *J. Biol. Cont.*, 14(2): 79-81.
5. Ballance GM, Lamari L and Bernier CC. 1989. Purification and characterization of a host-selective necrosis toxin from *Pyrenophora tritici-repentis*. *Physiol. Mol. Plant Pathol.*, 35: 203-213.

6. Berto P, Commenil P, Belingheri L and Dehorter B. 1999. Occurrence of a lipase in spores of *Alternaria brassicicola* with a crucial role in the infection of cauliflower leaves. FEMS Microbiol. Lett., 180: 183-189.
7. Ching HW, Yu WT, Jen SH and Hsiung KW. 2007. Effect of oriental medicinal plant extracts on spore germination of *Alternaria brassicicola* and nature of inhibitory substances from speed weed. Plant Dis., 91(12): 1621-1624.
8. Cho Y, Davis JW, Kim KH, Wang J, Sun QH, Cramer RA and Lawrence CB. 2006. A high throughput targeted gene disruption method for *Alternaria brassicicola* functional genomics using linear minimal element (LME) constructs. Mol. Plant-Microbe Interac., 19: 7-15.