

# Sensitivity of Chilli plants to Tricyclazole 18% + Mancozeb 62% WP against Anthra- cnose disease

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## Sensitivity of Chilli plants to Tricyclazole 18% + Mancozeb 62% WP against Anthracnose disease

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Anthracnose of Chilli, caused by *Colletotrichum capsici*, is a major constraint in sustainable production of chillies. Application of fungicides is the most effective method of controlling the disease. In the present study, the superiority of a ready-mix fungicide, Tricyclazole 18% + Mancozeb 62% WP was found in controlling the disease as compared to untreated control as well as their solo components. Tricyclazole 18% + Mancozeb 62% WP at 1500 g/ha. was adjudged the superior of the two solo components with the corresponding PDI values of 5.4 and 8.67, respectively in the two seasons under study. This broad spectrum systemic fungicide have been extremely effective in enhancing the production of green chillies and may be recommended for the control of anthracnose of chilli.

**Key words:** *Capsicum annum*, anthracnose, Tricyclazole 18%, Mancozeb 62%

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### INTRODUCTION

Chilli (*Capsicum annum* L.) is one of the most commonly cultivated vegetables worldwide (Tong and Bosland, 1999) with India being the largest producer in the global map. The production of chillies is around 1.22 Mt in India from an approximated cultivated area of 0.6 million ha (Anon, 2015). Chilli is attributed with its unique culinary role in delivering flavor and colour to the food. The fruit is consumed as raw salad or cooked for flavor and also used in dried and powdered form apart from being processed to a variety of sauces and used as seasonings. Chillies are low in sodium, free of cholesterol and rich in vitamins A and C (Osuna *et al.* 1998). Export of chillies from India has been showing an increasing trend since last few years with major export destinations being Sri Lanka, USA, Canada, UK, Saudi Arabia, Singapore, Malaysia, and Germany. Both, biotic and abiotic factors limit the production of chillies and among the former, diseases caused by fungi, bacteria and viruses are the major threats for its commercial cultivation. Anthracnose/fruit rot of chilli caused by *Colletotrichum capsici* (Syd) is the major economic constraint in chillies and the loss was esti-

mated more than 50% (Ramachandran *et al.* 2007). The disease is characterized by the presence of dark, sunken lesions with a slightly raised rim on the foliage, stems, or fruits. Later, the lesions form concentric markings and dark black fungal fructifications (acervuli) are seen on the spots. The fungus can also attack the fruit stalk and spread along the stem, causing dieback symptoms (Smith and Black, 1990). Management of the disease is not significant by cultural, biological or by breeding methods, as they are either non-sustainable or time consuming (Alexander and Waldenmaier, 2002). Judicious application of fungicides is the most rational method to control the disease and several conventional fungicides have been recommended against the pathogen (Lewis and Miller, 2003). Fungicides like azoxystrobin, trifloxystrobin and pyraclostrobin have been recently tried against the disease, but only preliminary reports are available on the efficacy of these fungicides against the severe form of the disease (Lewis and Miller, 2003). Triazoles are broad spectrum fungicides with high efficacy at lower doses against different diseases on diverse crops (Schultz and Scheinpflug, 1988). Both tricyclazole and mancozeb are known to control fruit rot of chillies (Kumbhar and More, 2013) and hence a trial was envisaged to evaluate the bioefficacy of a

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combination product Tricyclazole 18% + Mancozeb 62% WP in the control of fruit rot of chilli.

## MATERIALS AND METHODS

Field experiments were conducted at the research farm of the ICAR-Indian Institute of Vegetable Research, located at Varanasi (latitude: 25.28° N, longitude: 82.99° E, elevation: 82 m MSL), India during two seasons (2010-11 and 2011-12). Thirty days old seedlings of chilli (variety Pusa Jwala) were transplanted in plots of 20 m<sup>2</sup> (5 m x 4 m) and standard package of practices were followed to raise the crop. The treatments comprised of Tricyclazole 18%+Mancozeb 62% WP @ 1000, 1250 and 1500g/ ha, Tricyclazole 75WP @ 300g/ ha , Mancozeb 75WP @ 1250g/Ha, copper hydroxide 77WP@ 1250g/ha and an untreated control, laid down in randomized block design (RBD) with three replications. Fungicide application was commenced with the visibility of initial symptoms (45 days after transplanting) and repeated after 15 days using a knap sack sprayer. Ten plants from each replication except the border rows were selected for disease observations taken at the beginning of each spray and 15 days after the second spray using the standard 0-9 scale of (Mayee and Datar, 1986), (0= no infection; 1= 1-10 %, 3= 11-25 %, 5= 26-50 %; 7= 51-75 %; 9= >75 % infection). The per cent disease incidence (PDI) was calculated based on the last observation using the formula of Wheeler (1969), where PDI = (Sum of numerical values) / (Number of fruits observed x maximum disease rating) x 100.

After maturity, the fruits were harvested and fruit yield was calculated in quintals per hectare. All data obtained were subsequently analyzed statistically

using the IRRISTAT programme developed by International Rice Research Institute, Philippines (Gomez, 1994). The maximum and minimum temperature during the growing period of two seasons ranged from 21.7 to 23.4°C and 14.5 to 16.3°C, respectively. The average relative humidity ranged from 81.5 to 84.5 % while the total rainfall during the same period ranged from 21.2 to 27.2 mm.

## RESULTS AND DISCUSSION

During both the seasons, the test fungicide at 1250 and 1500 g/ ha gave the best control of the disease as compared to the untreated control. Tricyclazole 18% + Mancozeb 62% WP at 1500 g/ ha. was adjudged the superior of the two (solo components) with the corresponding PDI values of 5.4 and 8.67, respectively in the two seasons under study (Table 1). The untreated control had a PDI value of 20.23 and 23.63 in 2010-11 and 2011-12, respectively. Both the doses (1250, 1500 g/ha.) of the test fungicide exhibited a higher mean PDC value i.e. 64.24 and 67.89 as compared to its solo components i.e., tricyclazole 75WP (33.06) and mancozeb 75WP (49.43). All the treatments of Tricyclazole 18% + Mancozeb 62% WP was better than the check fungicide copper hydroxide 77WP which manifested a percent disease control (PDC) of 28.86. The yield of fruit was also the highest in the treatment of test fungicides as compared to control in both the seasons.

The above results clearly bring to fore the superiority of Tricyclazole 18% + Mancozeb 62% WP in the paradigm of chilli anthracnose control. Tricyclazole at 0.1% is reported to be effective in managing the fruit rot diseases caused by *Colletotrichum* spp. in vegetables (Nargund et

**Table 1:** Bioefficacy Tricyclazole 18 %+ Mancozeb 62 % WP against Fruit rot diseases of Chilli

Treatments	Dose (g/ha)	Intensity of fruit rot (PDI) at different harvesting				Yield of green chilli (q/ha)		
		2010-11	2011-12	Mean	PDC	2010-11	2011-12	Mean
Tricyclazole 18%+Mancozeb 62% WP	1000	10.91	14.58	12.75	41.86	116.20	104.12	110.16
Tricyclazole 18%+Mancozeb 62% WP	1250	6.29	9.39	7.84	64.24	132.16	121.00	126.58
Tricyclazole 18%+Mancozeb 62% WP	1500	5.40	8.67	7.04	67.89	138.00	128.50	133.25
Mancozeb 75 % WP	1250	7.65	14.37	11.01	49.43	128.10	108.62	118.36
Tricyclazole 75% WP	300	12.29	17.07	14.68	33.06	126.00	103.32	114.66
Copper hydroxide 77% WP	1250	13.83	17.36	15.60	28.86	120.12	100.64	110.38
Untreated Control	--	20.23	23.63	21.93	0.00	92.04	79.14	85.59
CD (P = 0.05)	--	3.78	3.21	--	--	11.62	10.41	

al. 2013) but its solo use might lead to resistance by the pathogen. Use of ready-mix combination fungicides avoids the development of resistance of fungi to systemic fungicides because these systemic fungicides interfere with a specific functional site in the physiology of fungus which the pathogen easily overcomes by either a single mutation or by selection of resistant individuals in a population. As non-systemic protectant fungicides affect multiple functions in fungus physiology, the fungus will have to make too many changes in the genetic level to develop resistance which will take a longer duration of time. So, the combination of Tricyclazole 18% + Mancozeb 62% WP have been extremely effective in controlling fruit rot disease in chilli (Santoshreddy and Nargund, 2015) which is tandem with the present study. Tricyclazole 18% + Mancozeb 62% WP has been effective in controlling other groups of pathogen (Manu *et al.* 2012) as well and hence this broad spectrum systemic fungicide may be recommended for the control of anthracnose of chilli.

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