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Evaluation of Dithane Z-78 against Taphrina Maculans Butler Causing Leaf Spot of Turmeric.

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Abstract:

In the present study,an attempt has been made to study the antifungal efficacy evaluation of Dithane Z-78 against the pathogen *Taphrina maculans* Butler causing leaf spot of turmeric by food poisoned technique.The linear growth of fungal mycelium was measured daily and the results were expressed in terms of Percent control efficacy(PCE) up to 8 days of incubation for *Taphrina maculans Butler*.Different concentrations of Dithane Z-78 show variable effect on the linear growth of *Taphrina maculans Butler*.It was found that the mimimum inhibitory concentration (MIC) was found at 500ug/ml and PCE was 92.00 on 8thday of incubation.

Keywords:*Taphrina maculans*,Dithane Z-78

Introduction:

Turmeric (*Curcuma longa* L.) is an important Commercial spice crop belonging to family Zingiberaceae. It is a rhizomatous plant and distributed throughout tropical and subtropical regions of the world. It is used in diversified forms as a condiment, flavoring and coloring agent and as a principal ingredient in Indian culinary as curry powder.

It is commonly grown in the states of Andhra Pradesh, Tamilnadu, Karnataka, Kerala, Bihar, Orissa and Maharashtra. The different varieties of turmeric cultivated in India are Tekurpeta,Erode, Rajapuri, Salem, Lokhandi, Chintamani, Allepy, Armour, Duggirala and Waigaon (Indiresh et al., 1990). There is variation in morphology , rhizome and quality in different varieties of turmeric (Philip, 1978).

Apart from its uses as a spice, it is used in traditional medicine in Asian countries such as India, Pakistan and Bangladesh. It is having anticancer, anti-inflammatory, antiviral, anticancer, antioxidant and anti- diabetic properties (Hamid et al., 2014). The turmeric rhizome contains Curcumin,Tumeron, Zingeberene and Oleoresin. The yellow orange colour of turmeric is due to presence of Curcumin which is a part of oleoresin and it is having antioxidant properties.Such a economically valuable crop gets affected by *Taphrina maculans* fungi causing leaf blotch of turmeric reducing its quality and productivity. Therefore an attempt has been made to control the disease by using Dithane Z-78

Review of Literature

Butler (1918) observed that the spread of *Taphrina maculans* was get reduced when Boardeaux mixture (0.6%) was sprayed on turmeric plant.

Thirumalachar *et al*., (1969) suggested that the leaf blotch of Turmeric can be controlled by applying considerable amount of Bordeaux mixture (0.6%) and Aurefungin (2.5g/l).

Nirwan *et al., (*1974) found that the Taphrina leaf spot was controlled with spraying Zineb (0.2%) and was superior among other tested products including copper compounds and antibiotics.

Srivastava and Gupta (1977) revealed that the leaf spot of Turmeric caused by *Taphrina maculans* was controlled effectively by Dithane Z-78 (0.2%).

Saha *et al*., (1995) reported that Taphrina leaf spot caused by *Taphrina maculans* Butler was controlled by the application of balanced dose of NPK along with two spray of blitox or Dithane M-45 reduced disease incidence significantly.

Singh *et al*., (2000) make a study on evaluation of fungicides for the management of *Taphrina* leaf blotch of turmeric. Among 6 fungicides tested, Ridomil (500 PPM) was superior to reduce disease severity and to increase fresh rhizome yield followed by Thiophanate methyl (0.1%), Carbendazim (0.1%), Blitox (0.3%).

Shalako *et al*., (2004) tested 3 different fungicides viz., Mancozeb, Carbendazim and Bordeaux mixture against Taphrina leaf blotch disease of Turmeric and observed that integration of Mancozeb (0.25%) and Carbendazim (0.1%) was found to be the best combination resulting in maximum disease control as well as highest rhizome yield followed by three sprays of Bordeaux mixture (1%).

Materials and methods

Dithane Z-78 was used for the chemical control of *Taphrina maculans* Butler as follows,

Food Poisoning Technique is used for the testing of sensitivity of Dithane Z-78 as described by Onkar *et al*., (1993). The technique involves, the active ingredient various concentrations of Dithane Z-78 ranging from 100 to 600ug/ml was prepared. Further, the double strength Czapek-dox agar media was prepared and sterilized. A mixture of 10 ml of Dithane Z-78 solution of different concentration and equal amount of Czapek-dox agar media was prepared. After that, the solution was poured in a sterile petriplate and allowed it to solidify.

After solidification of Czapek-dox agar, a 5 mm disc of *Taphrina maculans* was inculcated in the centre of the plate. The plates containing Czapek-dox agar without any fungicide taken as a control. Then these plates were then kept for incubation at a room temperature for a week or till the control plates were fully covered with mycelial growth of the pathogen as studied by Jagtap (2013).

All treatments along with the control i.e. by adding 10 ml of sterilized distilled water in 10 ml of media, with such treated plates were prepared in triplicates.

The observations were made in the form of linear growth of fungal pathogen in millimeter (mm).The linear growth was measured when the growth in control plate is filled completely. The minimum inhibitory concentration (MIC) was measured in the form of Percent Control Efficacy (PCE). The PCE was calculated by using following formula,

$$PCE = 100\ (1 - X/Y)$$

Where, X= Diameter of colony treated with fungicide.

Y= Maximum growth of the fungus on control.

With each fungicidal treatment, minimum inhibitory concentration was determined. The statistical analysis of the obtained experimental data was arrived out by using the methods given by Panse and Sukhatme (1996) and Mungikar (1997).

Observation Table:

Table No. 1: Effect of Dithane Z-78 on Percent Control Efficacy (PCE) of Taphrina maculans Butler

Conc. (ug/ml)	*Percent Control Efficacy (PCE)*							
	Incubation period (Days)							
	1	*2*	*3*	*4*	*5*	*6*	*7*	*8*
100	*79.00*	*70.00*	*57.80*	*39.60*	*26.60*	*16.00*	*10.00*	*8.00*
200	*80.80*	*73.00*	*64.60*	*57.40*	*43.40*	*33.00*	*18.00*	*14.20*
300	*90.00*	*87.80*	*78.00*	*72.00*	*65.00*	*60.00*	*55.40*	*47.60*
400	*100.00*	*100.00*	*100.00*	*89.00*	*83.00*	*72.20*	*69.00*	*65.80*
500	*100.00*	*100.00*	*100.00*	*100.00*	*100.00*	*100.00*	*100.00*	*92.00*
600	*100.00*	*100.00*	*100.00*	*100.00*	*100.00*	*100.00*	*100.00*	*100.00*
S.E.±	*3.817*	*5.545*	*7.656*	*9.781*	*12.187*	*14.027*	*15.753*	*15.656*
C.D.at P=0.01	*22.199*	*32.187*	*44.147*	*56.165*	*69.440*	*80.017*	*90.210*	*89.540*
C.D.at P=0.05	*11.113*	*20.441*	*28.123*	*35.776*	*44.244*	*51.029*	*57.447*	*57.127*

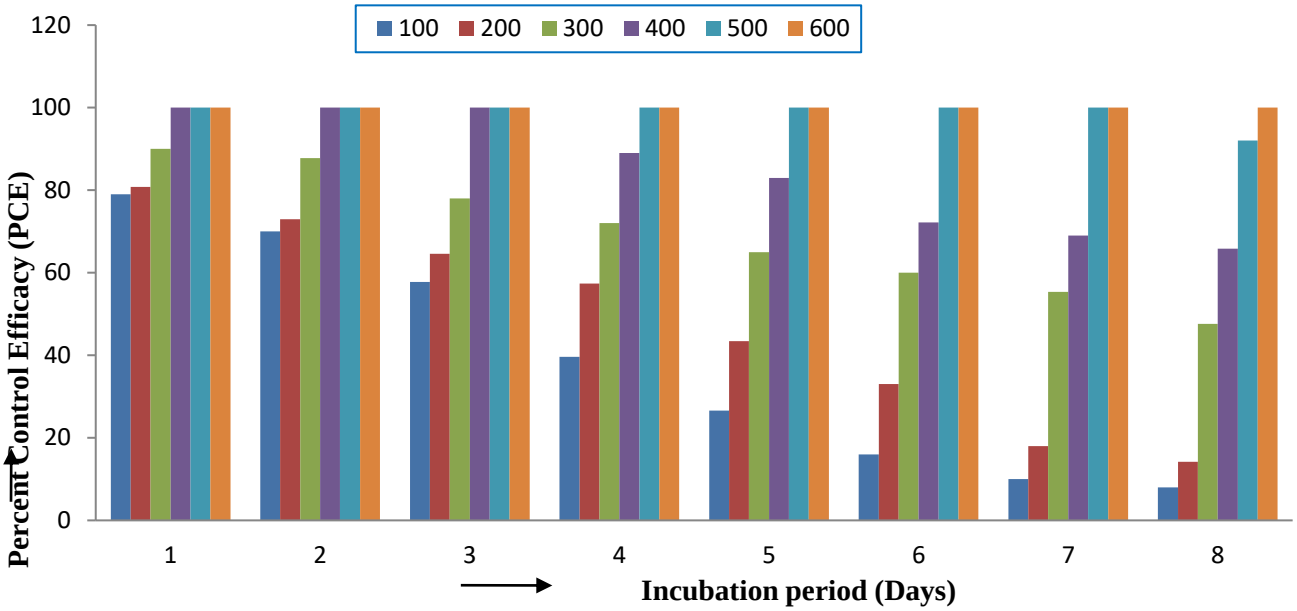

Fig. 1: Effect of Dithane Z-78 on Percent Control Efficacy (PCE) of *Taphrina maculans* Butler

Results and Discussion:

Dithane Z-78 was used against *Taphrina maculans* and observed the Percent control efficacy as noted in table 1 and fig.1. The different concentrations used were from 100 to 600 ug/ml. The observations were recorded for 8 days. The different concentration shows variations in PCE at various incubation periods.

The minimum inhibitory concentration (MIC) was found at 500 ug/ml and PCE was 92.00 on 8thday of incubation period. It was seen that as PCE was increased with increase in concentration. It was noted that as the linear growth PCE also increases. At 100 ug/ml the PCE of *Taphrina maculans* on 8th day was found 8.00, at 200 ug/ml it was 79.00 and 14.20 on 1st to 8th day. At 600 ug/ml the PCE on 1stday was 100 and on 8th day it was also found to be 100.

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