

EFFECT OF FUNGICIDES ON THE LEAF ROT OF PAN CAUSED BY *Phytophthora parasitica* var. *piperina*

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ABSTRACT

Pan (*Piper betle*) is a cash crop of India. Farmers face heavy loss due to leaf rot of pan caused by *Phytophthora parasitica* var. *piperina*. Three fungicides i.e. Thiram, Bavistin, Fytalon were selected for study against test pathogen. Of these Fytalon was most effective against *Phytophthora* because it is only fungicides which control the disease completely both in vivo and in vitro conditions at 500 ppm.

KEYWORDS : Fungicides, Pan, *Phytophthora*, Fytalon

The practice of using chemicals to manage plant diseases was developed out of necessity. In the past, crop losses leading to famines occurred frequently but it is only during the last few decades that it has been possible to prevent losses with the help of chemicals. Fungicides have played a significant role in agricultural economy of our country, particularly in ensuring the health of plants and yield of commercial crops, thus averting the potential drain of losses due to fungal diseases. The discovery of oxathiins, pyrimidine and benzimidazoles opened up practical possibilities for the control of plant diseases.

In the present day agriculture, use of chemicals for management of plant diseases has become not only important but forms as essential component of various input for increasing productivity from limited resources because more production is needed to fulfill the demands for increasing population. India being geographically tropical country with warm and humid climate provides ideal condition for development and spread of diseases which were considered minor in the past, but some have now become major resulting in heavy losses. The chemicals were used against fungi for the first time when the germ theory was established in the middle of the nineteenth century by Pasteur in animals and later in 1975 by de Bary in plants (Systemic fungicides; Vyas ,1984). Fungicides remain an important method to control losses due to fungal disease. Chemical method of plant diseases control are the most common method of betelvine diseases control in the field. Many workers have recommended copper fungicide including Fytalon, Bordeaux mixture and sulphur phosphate, organic and inorganic substances including phenolic compound for the control of betelvine

diseases (Dastur ,1935; Chaurasia, 1976)

To ascertain the effect of fungicides for the management of *Phytophthora parasitica* var. *piperina* three fungicides viz. Thiram (Thiram tech 75%), Bavistin (Carbendazim 50%) and Fytalon (Copper oxychloride 88%) were selected and used.

MATERIALS AND METHODS

In vitro Effect of Fungicides on the Mycelial Growth of *P. parasitica* var. *piperina*

To test the antifungal activity of three fungicides, Thiram, Bavistin and Fytalon were selected against the mycelial growth of *P. parasitica*. Stock solution (1000ppm) of different fungicides were added in oat meal agar medium in such a way to obtain final concentration of 50ppm, 100ppm, 200ppm, 300ppm, 400ppm, and 500ppm. Plate were inoculated with mycelial disc of test pathogen (*Phytophthora*) and incubated at 27±1°C. Data were recorded after every 24 hours up to period of 144 hours. On the basis of regular observation, mycelial growth and percent inhibition were recorded.

Effect of Fungicides on the Leaf Rot Development

For in vivo study, the healthy leaves of pan were treated with same concentration as used under in vitro condition. The healthy leaves were dipped for an hour and inoculated with circular mycelial disc of *Phytophthora*. Before inoculation, leaves were injured with sterilized needle. For control, leaves were dipped in sterilized distilled water. Each experiment was designed in triplicates. Data were recorded after every 24 hours up to period of 144 hours.

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RESULTS

Data pertaining to the effect of Thiram, Bavistin, Fytalon on the mycelial growth of test pathogen are presented in table 1. All the fungicides were found effective against *Phytophthora* but the effectiveness was varying with fungicides and their concentration. At 500 ppm under in *vitro* condition Thiram and Fytalon exhibited 100% inhibition on the mycelial growth, while Bavistin at same concentration showed only 88.9% inhibition of mycelial growth. Out of these Fytalon was also effective on lower concentration 72.2% and 88% at 300ppm and 400ppm respectively. Under in *vivo* condition, at 500ppm Bavistin and Fytalon showed 100% inhibition on leaf rot of pan but Thiram exhibited only 86.9% inhibition at same concentration. Of these, Fytalon was again exhibited effectiveness on lower concentration 54.5%, 68.6% and 81% at 200ppm, 300ppm and 400ppm respectively (Table, 2).

DISCUSSION

Chaurasia (2001) reported fungicidal activity of Thiram, against some soil borne pathogen such as *Phytophthora*, *Rhizoctonia* and *Fusarium*. The results obtained from presents study revealed that Thiram is causing complete inhibition of test pathogen almost 90%

and 100% under in *vitro* and in *vivo* condition respectively. These results are in accordance with the earlier findings (Shrivastava and Tripathi,; 1998, Shivanna et al., 1992, Chaurasia 2001). Dubey et al. (1995) reported that Bavistin (carbendazim) was effective against leaf spot and rust diseases of groundnut. Chandel and Katoch (2001) reported the fungitoxic effect of Fytalon (Copper Oxychloride) against *Fusarium oxysporum*. Shivpuri and Gupta (2001) showed the inhibitory action of Fytalon against *Sclerotinia sclerotiorum*. Naqvi (1994) reported the control of *Phytophthora* disease of Nagpur mandarin in central India using copper oxychloride (Fytalon). Similarly results of the present study revealed that Fytalon inhibit the growth as well as reduce the sporulation of pathogen under in *vivo* and in *vitro* conditions.

CONCLUSION

Considering the above facts, it may be concluded here that Fytalon is the best fungicide which may be used against test pathogen because it is the only fungicide which not only control the disease but also kills the pathogen completely both under in *vivo* and in *vitro* conditions. Whereas Thiram was effects under in *vitro* conditions and Bavistin under in *vivo*.

Table 1 : Effect of Some Fungicide on the Percent Inhibition of *P. parasitica* Under in *vitro* Condition

Fungicides	Control	Percent Inhibition of Mycelium					
		Concentration (ppm)					
		50	100	200	300	400	500
Thiram	00	13.4	27.8	35.5	55.5	77.8	100
Bavistin	00	11.2	22.3	27.7	42.2	64.8	88.9
Fytalon	00	11.2	22.3	27.7	72.2	88.1	100
CD (P=0.05) ND		1.37	3.58	2.62	16.24	2.05	1.82

Table 2 : The Effect of Some Fungicides on the Reduction of Leaf Rot of Pan

Fungicides	Control	Reduction of leaf rot%					
		Concentration (ppm)					
		50	100	200	300	400	500
Thiram	00	13.1	23.9	34.7	67.4	78.3	86.9
Bavistin	00	09.1	20.0	54.5	63.6	85.4	100
Fytalon	00	18.2	36.4	54.5	68.6	81.8	100

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