

EFFECT OF FUNGICIDES ON GERMINATION OF CONIDIA OF *ALTERNARIA SOLANI* (ELL & MART) JONES AND GROUT

BY

S. K. RAJ

Department of Plant Pathology, Faculty of Agriculture,
Bidhan Chandra Krishi Viswa Vidyalyaya, Kalyani, West Bengal, India

Nine fungicides including five systemic and four non-systemic contact (benlate, bavistin, vitavax, panoptine, demosan are systemic and alisan, sanspor, macuprax are non-systemic contact) fungicides were tested on the germination of conidia of *Alternaria solani* at the different concentration (500 ppm, 250 ppm, 125 ppm and 62.5 ppm) in each case. In the present invitro-study all the systemic fungicides showed maximum inhibition of spore germination than non-systemic contact fungicides.

INTRODUCTION

Large number of fungicides are being formulated and marketed by different commercial fungicide manufacturing companies time to time as systemic and non-systemic contact fungicides. Various fungicides has been recommended for controlling *Alternaria* leaf spot of various crop plants. Zineb, Ziram, Copper-fungicides, dithiocarbamates are generally recommended for this purposes. But, now-a-days, various other fungicides like sanspor, panoptine, alisan, macuprax are being marketed. These fungicides are taken into investigation to know the efficacy on *Alternaria solani* causing leaf spot of chilli. Various workers have done this type of work *in vivo* and *in vitro* conditions and the study is gaining importance now-a-days. (Mukherjee, 1974 ; Mackenrie, *et al* 1974 ; Brewer *et al* 1977 ; Kulkarni and Sharma, 1976 ; Khanna and Chandra, 1977 ; Kodmelwar *et al.* 1977 ; Mukherjee and Kundu, 1973 ; Jonnaids *et al*, 1973 ; Lukens and Harfall, 1973 ; Sen and Maity, 1871 ; Roy and Sen, 1970 ; Prasad *et al*, 1973). In the present *in vitro* study *Alternaria solani* was tested against five systemic and four non-systemic contact fungicides.

MATERIALS AND METHODS

The fungus *Alternaria solani* (Ell and Mart) Jones and Grout. was isolated from infected Chilli leaf. The infected and surrounding healthy leaves were cut into pieces, dipped in 0.1 percent mercuric chloride solution for one minute and washed in sterile distilled water then transferred to potato dextrose agar

slants and incubated at $25^{\circ}\text{C} \pm 1^{\circ}\text{C}$ in B. O. D. incubator for consecutively five days for sporulation. The pathogenicity of the fungus was tested with chilli leaves to ensure about the causal agent of the chilli leaf spot disease. The fungus was maintained in Potato carrot agar (Potato 20 g, carrot 20 g and distilled water 1 L medium. The fungicides tested *in vivo* conditions are :

Vitavax 80 — 2-3 dihydro-6-methyl-5 phenyl carbamoyl 1-4 oxathin.

Panoctine — Guanidated 9 aza-1, 17 diamino hepladecane acetate.

Sanspor 50 — (Cis N (1, 1, 2, 2-tetra chloro ethyl) thio)-4-cyclo hexene-1, 2-dicarboximide)

Demosan 50 — 1-4 dichloro-2,5-dimethoxy benzene.

Ziram — Zn-dimethyl ditho carbamate.

Macupax — (73% basic cupric sulphate and 7% ethylene-bis-di thiocarbamate complex of Zinc, manganese, copper and iron)

Alisan 50 — 2, 6-dichloro-4 mitro aniline.

Different concentrations were made considering its active ingredients in sterile distilled water at 500 ppm, 250 ppm, 125 ppm and 62.5 ppm and a single drop of fungicide suspension were placed in the groove slide. One drop of spore suspension was kept on the fungicidal drop in the slide. In each case three replications were taken into account. Simultaneously a control with sterile distilled water was run. All the slides were kept in moist chamber, and were incubated at $27^{\circ}\text{C} \pm 1^{\circ}\text{C}$ for 36 hours. The germinated spores were fixed in lactophenol and stained with cotton blue and examined under low power objective of the microscope. Total 500 number of spores were counted and inhibition to conidia germination was expressed in percentage basis.

RESULTS AND DISCUSSION

Table 1. *Effect of fungicides on germination of conidia of Alternaria solani* (Ell & Mart) Jones and Grout. (Average of three replications)

Fungicides	Percent inhibition in germinations			
	Concentrations in ppm.			
	500	250	125	62.5
Bavistin	100	100	77	44
Benlate	67	47	20	10
Panoctine	100	60	40	40
Sanspor—50	100	100	100	77
Vitavax—50	100	100	57	57
Ziram	100	87	67	67
Alisan—50	100	80	80	40
Demosan—50	37	30	20	20
Macuprax	60	40	40	40

Control 0.0

From the Table 1, it is clear that systemic fungicides like bavistin, panocrine, sanspor and vitavax showed maximum inhibition to spore germination at very low concentration (62.5 ppm) and non-systemic fungicides like ziram and alisan, also showed similar evidence than benlate as a systemic and demosan and macuprax as non-systemic fungicides. The non-systemic fungicides demosan and macuprax showed poor inhibitory action in higher concentration (500 ppm) and systemic fungicides benlate is more or less similar to demosan and macuprax. This findings are also suggested by conducting a experiment on *Aspergillus niger* in dithiocarbamate fungicide (Kodmelwar *et al*, 1977). Mukherjee (1974) and Mukherjee and Kundu (1973) showed some antifungal activities of some phenolics and related compounds. Lukens and Horfall (1973) suggested that *A. solani* conidia are inhibited by some metabolic inhibitors. Sen and Maity (1971) and Roy and Sen (1970) showed that metal ions and various organic substances inhibited spore germination of *H. oryzae*.

REFERENCES

- Brewer, D., Mass, W. S. G. and Taylor, A. (1977). The effect on fungal growth of some 2,5-dihydroxy-1,4-benzoquinones-*Can. J. Microbiology* **23** (7), 845-851.
- Ionnaidis, N., and Mad Main, CE (1973). Effect of culture medium on production and pathogenicity of *Alternaria alternata*. *Pl. Dis. Report.* **57** (1), 39-42.
- Khanna, K. K and Chandra, S. (1977). Effect of some homoeopathic drugs on the spore germination of four isolates of *A. alternata* *Ind. Phytopath.* **29** (2), 195-197.
- Kulkarnia, S. N. and Sharma, O. P. (1976). Evaluation of some systemic and non-systemic fungicides against two plant pathogenic fungi, *Pesticides* **10** (8), 32.
- Kodmel war, R. V., Wangikar, P. D. and Shukla, V. N. (1977). In vitro evaluation of dithio carbamate fungicides. *J. Maharashtra Agril. Universities* **2** (1), 50-51.
- Lukens, R. I. and Horfall, J. G. (1973). Processes of sporulation in *A. solani* and their response to metabolic inhibitors. *Phytopath* **63** (1), 176-182.
- Mackenzie, D. R., Cole, H. and Nelson, R. R. (1974). The effect of thiram concentration on the spore germination of isolates of *Cochliobolus carbonum*. *Mycopath and Mycologia Applicata* **54** (1), 85-90.
- Mukherjee, N. (1974) Antifungal activities of some oils and detergents. 1. Action on spore germination, growth and sporulation of some plant pathogenic fungi, *Z. für pflauzen Krankheiten and pflanzenschute* **87** (8), 468-471.
- Mukherjee, N. and Kundu, B. (1973). Antifungal activities of some phenolics and related compounds. *Phytopath. Z.*, **78**, 89-92.
- Prosad, B., Dutt, B. L. and Nagaich B. B. (1973). Inducing sporulation in *A. solani*. 1. Effect of water treatment. *Mycopath. et. Mycol Applicata.* **49** (2/3), 141-146.
- , Roy, D. K. and Sen, C. (1970). Effect of various organic substances on germination of conidia of *H. oryzae*. *Sci. and Culture* **36** (12), 662-663.
- Sen, C. and Maity, S. S. (1971). Effect of temperature and metal ions on the germination of conidia of *H. oryzae*. *Breda. de. Haan. Sci and Culture* **37** (1), 32-33.