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EFFECT OF PH ON IN VITRO ACTIVITY OF FOSETYL-AL ON PHYTOPHTHORA PALMIVORA' MF_4

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Introduction

While evaluating some of the anti-oomycetous fungicides for efficacy on different stages of the life cycle of '*Phytophthora palmivora*' MF_4 (morphological form-4), the 'foot rot' pathogen of black pepper (*Piper nigrum* L.) we found that the activity of fosetyl-Al was reduced in alkaline medium. The results of our studies are reported here.

Materials and Methods

The effect of fosetyl-Al (Aliette 80 w.p.; Rhone-Poulenc) on mycelial growth of *P. palmivora* MF_4 was studied at different levels of pH using corn meal agar. Fifty-ml samples of distilled water containing required quantities of Difco corn meal agar were taken in 100 ml conical flasks and were adjusted to different levels of pH with 0.1 M hydrochloric acid or 0.1 M potassium hydroxide before autoclaving. Stock solution of fosetyl-Al was added to the cool sterile medium to get a final concentration of 200 µg/ml. The contents of each conical flask were uniformly dispensed into three 15 x 100 mm Petriplates which served as replicates. A similar set of culture plates containing buffered corn meal agar unamended with the fungicide served as control. pH of the medium was monitored at different stages (Table 1). The culture plates were inoculated with 3 mm fungal discs taken from the margins of 3-day old *P. palmivora* MF_4 cultures grown on carrot agar medium. The colony diameters were recorded after 72 h of incubation at 25 ± 1°C and the inhibition percentages were calculated.

The effect of the fungicide on sporangial production was studied by keeping two 5-mm culture discs in each of three 15 x 50 mm Petriplates at each pH containing 5 ml of fungicide solution of 5 µg/ml concentration. The fungicide solutions were prepared in sterile distilled water, buffered to different pH. Culture discs kept in buffered sterile distilled water served as controls. These discs were incubated under fluorescent light for 72 h and the sporangia in each of four microscopic fields per disc were counted at 400x magnification. The inhibition percentages were calculated (Table 1).

Results and Discussion

The data (Table 1) show that fosetyl-Al is less inhibitory to both mycelial growth and sporangial production of the fungus in alkaline medium. Using a liquid medium Guest (1984) concluded that the fungicide was more inhibitory at alkaline pH(6). However, we could not get any conclusive results with carrot broth as the originally adjusted alkaline pH was almost neutralised after autoclaving. In view of its low activity *in vitro* an indirect mode of action through host resistance was attributed to fosetyl-Al (1 & 5). According to some recent reports it primarily has a direct mode of action (2, 3, 4 and 7). This fungicide is known to breakdown rapidly into phosphorous acid which is fungitoxic (2). The loss in activity of the fungicide observed in our studies can be attributed to the inactivation of its active principle in alkaline medium.

Table 1: pH of the medium and its influence on the effect of fosetyl-Al on mycelial growth and sporangial production in Phytophthora palmivora MF 4

Corn meal agar	pH of the medium						
Initially adjusted	4	5	6	7	8	9	10
After autoclaving	3.7	4.7	5.6	6.5	7.6	8.1	8.7
After incorporating fosetyl-Al (200 µg/ml)	3.3	4.0	4.6	5.5	6.5	7.2	7.7
Inhibition (%) of mycelial growth	@	77.9	82.5	82.4	76.9	62.1	25.4
pH of fungicide solutions (5 µg/ml)	4	5	6	7	8	9	10
Inhibition (%) of Sporangial production	96.6	90.0	91.9	98.7	92.5	13.9	10.3

@ Could not be tested as medium did not solidify

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