

Poison Plate Analysis of Fungicides against *Pythium aphanidermatum* and *Phytophthora cinnamomi*.

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Abstract

A laboratory bioassay was used to determine the fungistatic levels of three commercial fungicides to reduce growth of *Pythium aphanidermatum* and *Phytophthora cinnamomi*. Koban 30WP[®] (7ppm) inhibited *Pythium* growth up to 72 hours, while Subdue 2EC[®] controlled both fungi up to 192 hrs at 7ppm. Aliette 80G[®] provided no control of *Phytophthora*, and only slight control of *Pythium* at 20ppm at 24hrs. *Pythium* in general grew much faster on the non-amended corn meal agar than the *Phytophthora* and similar results were obtained with the fungicides.

Introduction

Determining levels of activity for experimental fungicides is possible using laboratory studies. The poison plate technique is rapid and effective for determining the approximate levels of activity of fungicides. Fungicide amended cornmeal agar (0-40ppm) was used to determine the fungicidal/fungistatic effect of commercial fungicides against two water mold fungi, *Pythium aphanidermatum* and *Phytophthora cinnamomi*.

Materials and Methods

Cornmeal agar was prepared and allowed to cool to 45C, before amending with 0-40 ppm a.i.(active ingredient) of each fungicide. Amended agar was placed on a stir-plate for ca 1 minute to fully incorporate each fungicide into the melted and cooled agar media. Plates were poured and allowed to harden overnight before inoculating each plate with a 0.5cm disc of *Pythium aphanidermatum* or *Phytophthora cinnamomi*. A non-amended check was included for each pathogen to use as a comparison for fungi growth rate.

Data was taken at 24hr, 48hr, 72hr, 96hr and 192 hours as colony diameters in cm to determine the effect of each fungicide on each pathogen. Overall, the isolate of *Phytophthora cinnamomi* exhibited slower growth than the *Pythium aphanidermatum* isolate.

Results and Discussion

Effects of the fungicides were noticed 24hours after inoculation of the poison plates with the two pathogens. Overall data with three fungicides are shown for 48, 72, and 192 hours in the accompanying figures. *Pythium aphanidermatum* grew almost four times faster than the *Phytophthora cinnamomi* check within 24 hours. The commercial fungicides Koban 30WP[®] and Subdue 2EC[®] both provided fungicidal activity against *Pythium aphanidermatum* even at 1ppm after 72 hours. Aliette 80[®]

provided little protection against the *Pythium* or the *Phytophthora* isolates. Koban 30WP[®] (1ppm) and Subdue 2EC[®] (1ppm) were suppressive at 48 hours, and remained suppressive at 1ppm, Subdue 2EC[®] (192hr). Koban[®] was suppressive after 72 hrs but not after 192 hrs. Subdue 2EC[®](1ppm) continued to provide substantial suppression of both pathogens at 192hrs post inoculation.

Results of these investigations indicated Subdue[®] was the most effective of the commercial fungicides used in the in vitro study. Results were similar for both *Pythium* and *Phytophthora*. Koban[®] fungicide was also very effective for suppression of both of the fungi, however, the fungicide had a lower effectiveness after 192 hrs (Table 1). Results with Aliette[®] were only temporary fungistatic suppression that appeared to break down rapidly.

Table 1. Growth Suppressive Effects of Fungicides on Two Plant Pathogenic Fungi Investigated Using a Laboratory In-Vitro Bioassay.

Treatment	a.i. ppm	Growth Rate (cm diam)*							
		<i>Pythium aphanidermatum</i>				<i>Phytophthora cinnamomi</i>			
		24hr	48hr	72hr	192hr	24hr	48hr	72hr	192hr
Check	--	4.6	8.5	8.5	8.5	1.2	3.0	5.0	8.5
Aliette [®]	1	5.0	8.5	8.5	8.5	1.3	3.0	5.0	8.5
	3	5.0	8.5	8.5	8.5	1.1	3.0	4.8	8.5
	7	4.8	8.5	8.5	8.5	1.0	2.7	4.0	8.5
	10	3.4	8.5	8.5	8.5	1.0	2.1	3.9	8.5
	20	2.0	8.5	8.5	8.5	1.0	2.3	4.1	8.5
Koban [®]	1	0.2	2.1	3.9	6.0	0.0	0.26	1.1	8.5
	3	0.02	1.4	2.4	4.0	0.0	0.0	0.08	8.5
	7	0.01	1.3	1.9	3.0	0.0	0.0	0.0	8.5
	10	0.0	1.0	0.08	0.08	0.0	0.0	0.0	8.5
	20	0.0	0.03	0.04	---	0.0	0.0	0.0	8.5
Subdue [®]	1	1.7	4.0	4.0	5.0	0.01	0.20	0.20	1.5
	3	1.3	3.5	3.7	4.0	0.0	0.0	0.0	1.7
	7	1.0	3.0	3.2	3.7	0.0	0.01	0.01	2.0
	10	0.87	2.9	3.0	3.6	0.0	0.0	0.0	2.5
	20	0.8	2.1	1.9	---	0.0	0.0	0.0	0.7
	30	0.8	1.1	1.0	---	0.0	0.0	0.0	---
	40	0.6	0.9	1.0	---	0.0	0.0	0.0	---

* Growth rate mean (cm) of two replicate plates per treatment, with each pathogen. The symbol
[†] - - - indicates fungal growth could not be determined accurately, due to bacterial contamination on the plate.