

Mushroom Supply
ATTN: Dave Iaconi
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The Effect of Sporekill on Growth of *Trichoderma aggressivum* and *Verticillium fungicola*

Materials and methods used in this analysis

This analysis is to test the effect of Sporekill on growth of mushroom pathogens. In the preliminary tests, four high sporekill concentrations (0.75%, 1.0%, 1.5% and 20%) and three low concentrations (0.01%, 0.05% and 0.1%) were tested on two mushroom pathogens (*Trichoderma aggressivum* and *Verticillium fungicola*). Then four medium concentrations (0.2%, 0.3%, 0.4% and 0.5%) were added in the analysis to fill in the concentration gap between 0.1% and 0.75%.

The two pathogens (*Trichoderma aggressivum* and *Verticillium fungicola*) are pure cultures obtained from Penn State University disease culture collection. Both pathogens were inoculated on PDA plates (without Sporekill) and incubated at 77F (25C). The pathogens were ready for analysis when the fungi fully colonized the plates.

DIFCO® potato-dextrose agar (PDA) (Becton Dickinson Microbiology Systems, Sparks, MD) was made and sterilized in 100ml autoclavable bottles. Then a certain amount of Sporekill was added into PDA to reach final concentration of 0.01%, 0.05%, 0.1%, 0.2%, 0.3%, 0.4%, 0.75%, 1.0%, 1.5% and 20%.

Each plate (90mm in diameter, with different concentration of Sporekill) was inoculated with a 4-mm diameter plug of agar, which has been colonized by the pathogen fungus. The plate was then sealed with Parafilm® to prevent dehydration. Inoculated plates were incubated in growth chambers for 1~3 weeks at 77F (25C) in darkness. Three replicates

for each Sporekill concentrations were performed for each pathogen in a completely randomized design. Plates were observed daily. Colony diameters were measured 7 days after inoculation. Data was collected and presented in figures and tables.

Results:

a). The effect of Sporekill on growth of *Verticillium fungicola*.

In the preliminary tests, an increasing degree of growth inhibition was observed on *Verticillium fungicola* (Figure 1) when Sporekill concentration increase from 0.01% to 0.1%. The growth of this pathogen was completely inhibited when sporekill concentration was greater than 0.75%. The average colony diameters were shown in Table 1. A concentration of 0.05% Sporekill significantly suppressed growth of *Verticillium fungicola* by almost 50% as compared to the control.

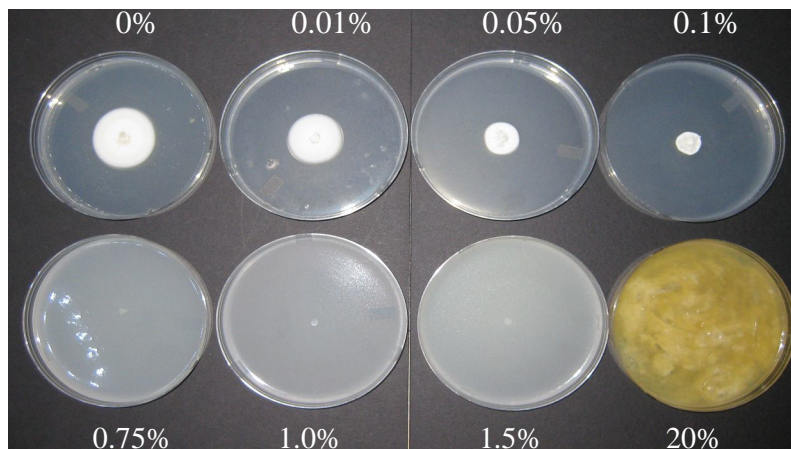


Figure 1. The effect of seven different Sporekill concentrations (0.01%, 0.05%, 0.1%, 0.75%, 1.0%, 1.5% and 20%) on growth of *Verticillium fungicola* on PDA media. The plate with 0% sporekill is the no-fungicide control.

When four medium concentrations (0.2%, 0.3%, 0.4% and 0.5%) of Sporekill were tested, the results clearly showed that the growth of *Verticillium fungicola* was effectively inhibited between at 0.4% (Figure 2 and Table 2).

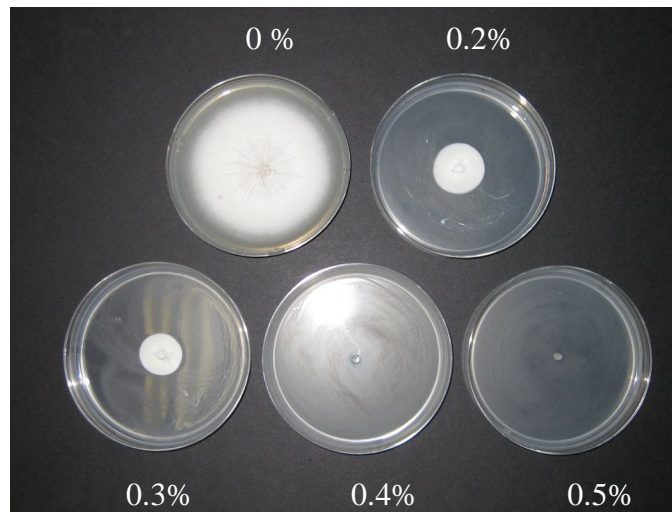


Figure 2. The effect of four different Sporekill concentrations (0.2%, 0.3%, 0.4% and 0.5%) on growth of *Verticillium fungicola* on PDA media. The plate with 0% sporekill is the no-fungicide control.

b). The effect of Sporekill on growth of *Trichoderma aggressivum*

Sporekill fully inhibited *Trichoderma aggressivum* when the concentration was greater than 0.75%. The same result was obtained for *Verticillium fungicola*. However, only slight inhibition on growth of *Trichoderma aggressivum* (Figure 3) was observed by Sporekill concentration between 0.01% and 0.1%. A 0.01% of Sporekill showed virtually no inhibition of growth as compared to the control, while 0.1% of this fungicide started to show some degree of inhibition (Table 1).

The further analysis on four medium concentrations (0.2%, 0.3%, 0.4% and 0.5%) showed that the growth of *Trichoderma aggressivum* was also totally inhibited at 0.4% (Figure 4 and Table 2, concentration of 0.5% was not shown in the Figure), just like the effect on growth of *Verticillium fungicola*.

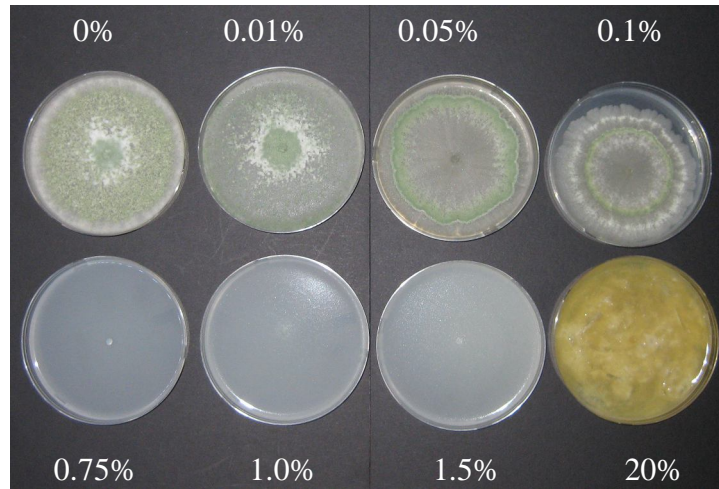


Figure 3. The effect of seven different Sporekill concentrations (0.01%, 0.05%, 0.1%, 0.75%, 1.0%, 1.5% and 20%) on growth of *Trichoderma aggressivum* on PDA media. The plate with 0% sporekill is the no-fungicide control.

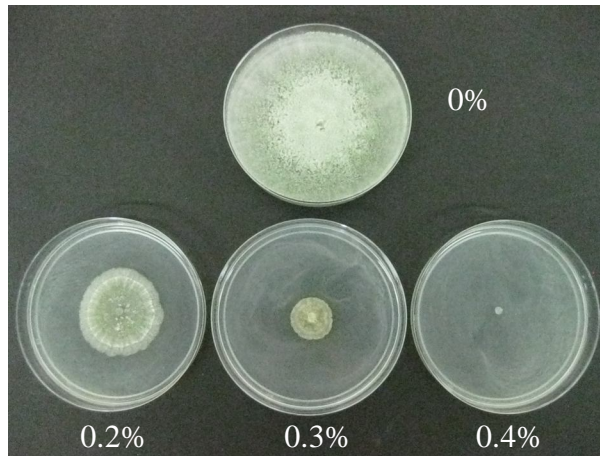


Figure 4. The effect of three different Sporekill concentrations (0.2%, 0.3% and 0.4%) on growth of *Trichoderma aggressivum* on PDA media. The plate with 0% Sporekill is the no-fungicide control.

LONGWOOD BIOLOGICAL LABORATORIES
PO BOX 1147, AVONDALE, PA 19311
610-444-3903

Table 1. The effect of different Sporekill concentration (0.01%, 0.05%, 0.10%, 0.75%, 1.00%, 1.50% and 20.0%) on the growth of *Trichoderma aggressivum* and *Verticillium fungicola*. Mean colony diameters (mm) are given for each treatment after 7 days of growth at 77F (25C).

Sporekill concentration	Mean colony diameters (mm)	
	<i>Trichoderma aggressivum</i>	<i>Verticillium fungicola</i>
0.00%	90.0	35.2
0.01%	89.5	28.7
0.05%	87.8	18.8
0.10%	85.2	13.5
0.75%	4.0*	4.0*
1.00%	4.0*	4.0*
1.50%	4.0*	4.0*
20.0%	4.0*	4.0*

* A 4.0-mm colony diameter indicates no growth because the initial inoculated plugs is in 4 mm diameter.

Table 2. The effect of different Sporekill concentration (0.2%, 0.3%, 0.4% and 0.5%) on the growth of *Trichoderma aggressivum* and *Verticillium fungicola*. Mean colony diameters (mm) are given for each treatment at 77F (25C) after 7 days of growth for *Trichoderma aggressivum* and 19 days of growth for *Verticillium fungicola*.

Sporekill concentration	Mean colony diameters (mm)	
	<i>Trichoderma aggressivum</i>	<i>Verticillium fungicola</i>
0.0%	90.0	70.5
0.2%	40.2	26
0.3%	21.7	21.5
0.4%	4.0*	4.0*
0.5%	4.0*	4.0*

* A 4.0-mm colony diameter indicates no growth because the initial inoculated plugs is in 4 mm diameter.

Conclusion:

Sporekill had significant effect on mushroom pathogens *Trichoderma aggressivum* and *Verticillium fungicola*. The growth of both molds can be effectively inhibited at concentration of 0.4% on PDA media.