Analyzing the Degradation of Fipronil Insecticide via *Trametes versicolor*

Research Team Members

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Research Question

Can the degrading properties of white rot fungi be used to treat urban stormwater contaminants?

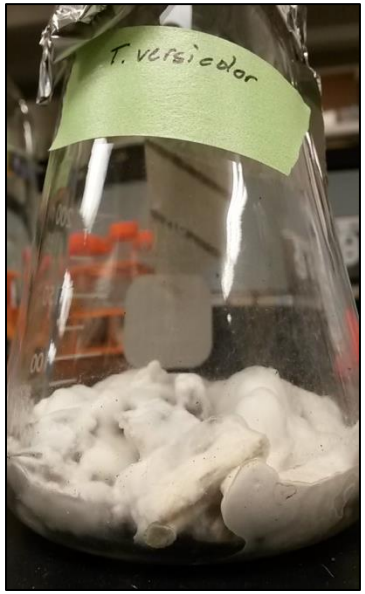
Summer Objectives

- Understand which enzyme systems in *T. versicolor* are utilized for fipronil degradation.
- Determine the ability of *T. versicolor* mycelium to grow and thrive in different controlled environments (e.g. sterile woodchips, non-sterile woodchips, synthetic stormwater).

Incubation bottles from Enzyme Study #1

Incubation bottles from Enzyme Study #2

Sterile (left) and non-sterile (right) woodchip & stormwater media after seven days of fungus incubation.



T. versicolor mycelium on dry woodchip media

T. versicolor incubated in malt-extract media

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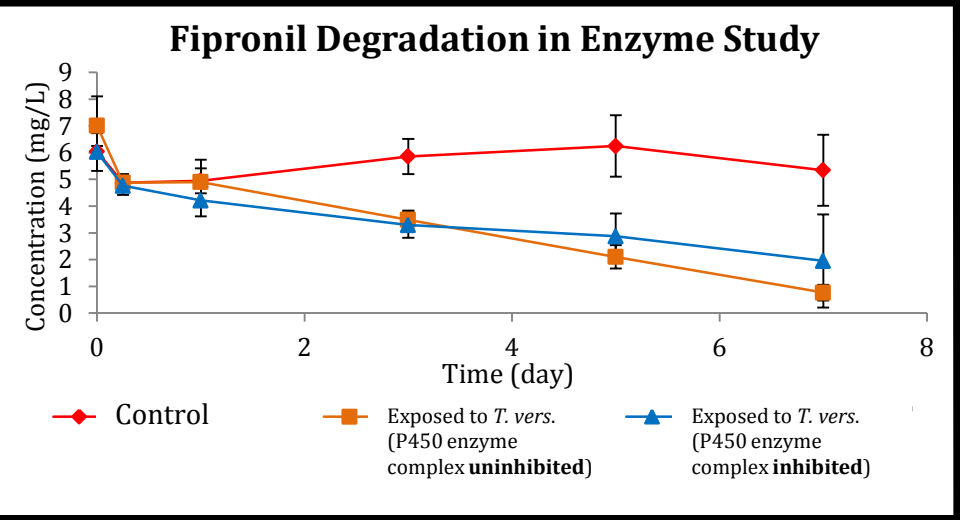
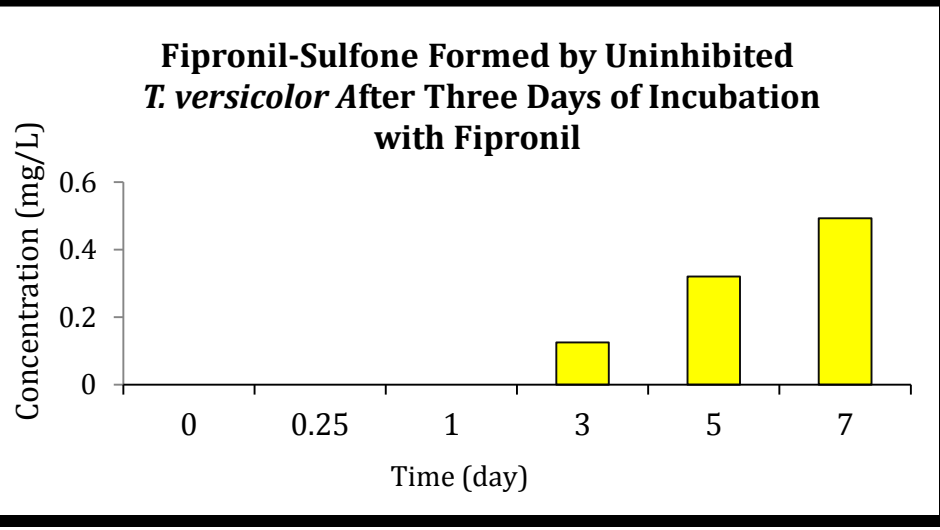
Major Outcomes





Conclusions

- The solubility of fipronil in water and aqueous solutions is lower than originally anticipated; concentrations need to be reduced in future studies to create less variable results and to better replicate real environmental conditions.
- P450 enzyme complexes (intracelluar) may be vital in oxidizing fipronil into fipronil-sulfone.
- *T. versicolor* thrives best in sterile environments with substantial nutrients available.
- Fipronil sorption onto biomass and other organic media should be studied and well-characterized before transitioning to large-scale studies and field applications.

T. versicolor incubated in sterile woodchip-stormwater matrix after seven days. Familiar fungi spheres have formed onto woodchips, in addition to long, wormlike structures indicating healthy growth.