Development of biocontrol products from vermicomposted cow manure

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The Problem: Soil dwelling pathogens infect seeds of crop plants

The Solution: Beneficial microbes found in vermicompost can protect plants

SOIL

VERMICOMPOST

VERMICOMPOST without microbes

All plants were exposed to the same amount of pathogen: Pythium zoospores

ZOOSPORE INFECTION STAGES WHERE DISEASE PROTECTION COULD OCCUR

Zoospores produced in Pythium sporangium

Zoospores swim towards pathogen attractants released from the seed

Zoospores encyst and germinate to infect the seed

Can vermicompost microbes prevent zoospore formation?

Sporangium

Zoospore swimming maze

Encysted zoospores germinating

Pathogen attractant

Pathogen attractant modified by vermicompost microbes

Attractant modified by vermicompost microbes

Water

Attractant

Microbes from vermicompost interfere with zoospore attraction and encystment

Are earlier stages of zoospore development affected as well?

Which seed colonizing microbes from vermicompost are responsible for controlling disease? How exactly are they interacting with the pathogen?

Conclusions & Questions

Significance of our findings

Understanding how protection is achieved will enhance our ability to implement biological disease control

Vermicomposts may be a source of novel biopesticides

Identifying beneficial microbes may allow us to develop better predictive tools for disease protection in a variety of composts

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