

# IPM IL integrated pest management innovation lab success story

## TRICHODERMA, THE FIGHTING FUNGUS

**“Trichoderma has been a godsend in treating fungal diseases in developing countries.”**  
—Muni Muniappan, IPM IL program director.

In the world of life that happens below our ability to see it, there lives a tiny hero. Trichoderma, a fungus, helps us humans in many ways. It is used to give denim a stone-washed look. It is used to increase the digestibility of barley that is mixed into chicken feed. But it is also, scientists have found, especially good at eating “bad” fungi. And in developing countries, fungal diseases that attack and destroy crops are a major problem. This makes trichoderma, if not a panacea, a welcome tool in the agriculturalist’s toolbox.

Scientists with the USAID-funded Integrated Pest Management Innovation Lab (IPM IL, formerly the IPM CRSP), managed by Virginia Tech, are using trichoderma to combat a range of fungal diseases that affect crops from India to Honduras.

“Trichoderma has been a godsend in treating fungal diseases in developing countries,” says Muni Muniappan, director of the IPM IL. “It is easy to produce, and in addition to helping farmers regain their livelihood, it has created a new source of income.”

In India, the commercial production of trichoderma has been so successful that Tamil Nadu Agricultural University built a new plant pathology building out of the money it made from the sale of the fungus.

Fungi, for those of us who have forgotten our high school biology, are single-celled organisms that live by decomposing and absorbing the organic material in which they grow. In the case of trichoderma, it has several ways of destroying other fungi. It can attack fungi that live on plant roots. It can colonize and parasitize fungi on plants by injecting itself into hyphae — the strands of a fungus — and then eat up all the organic material inside.

This versatility is part of what makes trichoderma so popular. With fungal diseases that attack plant roots, it is used to colonize the plant roots and “eat” the plant-destroying fungi. Scientists have found that they can even treat the seeds with trichoderma, thereby preemptively protecting the seedlings, in effect inoculating them. This protection can be effective for as much as 18 months after application. In addition to producing stronger roots, trichoderma can also produce longer ones, making plants more resistant to drought. This can be especially valuable in areas where rainfall is not reliable.



Pak Ujang, a farmer in West Java, explains how trichoderma is produced.





A commercially produced bag of trichoderma in the Philippines shows a colorful design.

Some strains of trichoderma, in fact, can actually turn on the defense mechanisms of plants.

Trichoderma is also popular because it is good at combating a range of diseases on vitally important crops. In India, it is used against fusarium wilt and pythium rot, which attack vegetable crops. In Indonesia, it is used against clubroot, which attacks broccoli. It is also being tested on diseases of chili and tomato – horticultural crops that many farmers depend on. And in the Philippines, it is used to combat anthracnose bulb rot, damping off, and pink rot – diseases that decimated fields of onion before trichoderma came to the rescue.

Trichoderma occurs naturally in nearly all soils, so it is easy to find. It is also easy to cultivate. Producers can mix it with compost and sell it in bags. Or, it may be produced in liquid form to be sprayed on leaves for the treatment of foliar fungal diseases.

Another beauty of trichoderma is that it can be used to combat almost every pathogenic fungus that people want to control. This makes it widely applicable.

“We are using trichoderma in Bangladesh, India, Indonesia, and the Philippines to great effect,” says Muniappan.

In Bangladesh and Indonesia, trichoderma is mixed with compost and applied in the field to combat soilborne diseases of vegetable crops, oil palm, citrus, vanilla, langsat, durian, and cacao. In India and the Philippines, the fungus is sprayed on seedlings as a treatment for vegetable crops. And in Honduras, it is being tested on watermelon for the control of fusarium wilt.

Pak Ujang, a farmer in West Java, has made a successful on-farm business venture out of producing trichoderma to share with farmer groups in his area. He now produces enough of the fungus to supply a private company that packages and markets the product across Indonesia.

“Trichoderma is responsible for the profits I earn from my farm,” he says proudly.

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