

Nanotechnology: A Potential Solution for Plant Fungal Diseases

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EDITORIAL

Fungal diseases destroy a third of all harvests each year, posing a serious danger to global food security. Rice, wheat, potatoes, and maize are among the world's food staples that are under threat. Farmers fumigate the soil with toxic chemicals to prevent the spread of fungal diseases, destroying the land and killing even the helpful organisms that live there. Fungicides, on the other hand, are only effective in the short term, until harmful fungus develop resistance to these synthetic chemicals. Now, a new concept is gaining momentum: assisting plants in standing their ground by providing them with the resources they need to fight their own conflicts. A group of researchers are supplementing crops with nutrients packaged in nanosized packets, which strengthen plants' inherent protection against harmful fungus more effectively than regular plant feeding.

According to reports, researchers have developed numerous nano-nutrient concoctions that improve the fungal resistance of soybeans, tomatoes, watermelons, and, most recently, eggplants

over the last few years. Researchers used this method in eggplants and tomatoes to determine if it could give certain nutrients. The researchers sprayed metallic nanoparticles onto immature plant leaves and shoots, and then infected them with harmful fungi. The plants treated with nanoparticles had larger yields and higher levels of nutritional metals in their roots.

Nanonutrients are more effective than traditional fertilizers because of their smaller sizes, which govern how quickly they disintegrate. Nanonutrients are thousands of times smaller than the diameter of a human hair and thousands of times larger than nutrient salts that are easily dissolved. They dissolve faster than a larger chunk of the same nutrient because they have a vast, exposed surface. On the other hand, nanonutrients are large enough to not dissolve completely at once, allowing nutrients to be released gradually over weeks. Plants, on the other hand, get a transient nutrition boost from readily dissolved nutrients, similar to a sugar rush. Not only may the size be adjusted, but the shape, composition, and surface chemistries can also be changed to stimulate different levels of a plant's responses. It's a technology with a lot of potential.

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