Suppressing Fusarium wilt disease via soil microbiomes with plant residue soil amendments

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Video Byte

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Abstract

Leveraging the soil microbiome is one way we can sustainably improve crop yields, but little is known about how, or if, specific soil amendments encourage the development of plant-protective soil microbiomes. A recent study examined the impact of pineapple residues on soils heavily burdened with the banana Fusarium wilt disease pathogen. Adding pineapple residues to the soil reduced the number of pathogens and the incidence of disease. The researchers traced this to fungal taxa affiliated with Aspergillus fumigatus and Fusarium solani. Isolates of these fungi (F.S-F and A.F-F) also suppressed the incidence of wilt disease in controlled experiments. While A. fumigatus isolates had clear antagonistic effects on the Fusarium wilt disease pathogen, F. solani did not. Instead, F. solani may compete against the wilt-causing pathogen (Foc4) for nutrients, as it has a similar carbon source utilization pattern. This study is a successful example of modulating the soil microbiome to protect plants against economically important soilborne diseases, and the results suggest that adding pineapple residues to soil reduced pathogen pressure by increasing the abundance of antagonistic fungal groups.