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Interactions of nitrogen fixing bacterium *Gluconacetobacter diazotrophicus* with rhizosphere micro-organisms associated with Tomato

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Gluconacetobacter diazotrophicus (Gd) is a non-nodulating endophytic nitrogen-fixing bacterium isolated from the intercellular spaces of sugarcane. The aim of this study was to investigate the effect of this bacterium on Tomato plants in presence and absence of Trichoderma asperellum (T34 commercial strain). Trichoderma spp. is one of the most widely employed biological control agents used against plant pathogens and is an opportunistic avirulent plant symbiont. This fungus is known to antagonize other soil fungi either parasitizing on them or inhibiting their growth due to the production and release of cell wall degrading enzymes. Furthermore, T. asperellum has been shown to synthetize a wide range of other plant protective molecules that can enhance the plant's response to pathogens. However, the details of its modes of action still remain to be clarified. To investigate the effect of the combined action of T34 and Gd on crop plants, Tomato Money Maker seeds were treated with Gd and sown into Levington M3 soil in presence and absence of T. asperellum. T34 biocontrol agent from FarGro® was mixed to the soil before sowing. Four months after sowing, differences in plants' strength and biomass production were observed: plants grown in presence of both Gd and T34 showed healthier phenotypes and higher leaf and biomass production in comparison to untreated control plants or to plants that were inoculated with Gd only. Flowering and fruiting were also showed to be positively affected in plants co-inoculated with both the Gd and T. asperellum with higher fruit yield. This preliminary experiment provides promising data for further investigating the mechanisms that lie behind the interaction between Gd, T34 and crops, and may potentially lead to the formulation of a new enhanced biofertilizer.

Recent Publications:

1. Evdokia Syranidou et al., "Biodegradation of Weathered Polystyrene Films in Seawater Microcosms," Scientific Reports 7, no. 1 (2017): 1–12.

Biography

Martina Franchini main interests in Biology have driven her to concentrate her studies in the microbiological field. During the years, her expertise has been focused on the investigation of the environmental main issues and how Biology, and more specifically, Microbiology, can approach them. Bioremediation has been the subject of her latest studies: from the use of bacteria for reduction of toxic oxianions with concurrent bioproduction of Nanoparticles to a participation in a study aimed to isolate a bacterial consortium of plastic biodegraders. Martina has worked in international contexts, learning the importance of constructive team work and open knowledge sharing.

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