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05- EVALUATION OF A MICROBIAL CONSORTIUM FOR BIOCONTROL OF *Alternaria alternata* IN TOMATO

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Alternaria alternata is a pathogenic fungus that affects tomato plants. It is a significant concern in agriculture and controlling its spread is crucial. The use of fungicides has been the primary method for controlling *A. alternata*, but there is growing consumer concern about pesticide residues in food. As a result, researchers have been exploring alternative methods, including biological control and environmentally friendly compounds. Microbial consortia composed of carefully selected and compatible beneficial microorganisms, including bacteria and fungi, have been shown to effectively control foliar diseases in tomato plants. These microbial consortia display an extended functionality and versatility in the biocontrol of a wider range of plant diseases, including foliar diseases. They can control pathogens through diverse mechanisms and application methods, such as direct antagonism or induced systemic plant resistance. The objectives of the present work were to evaluate the biocontrol effect of *Trichoderma harzianum* ITEM 3636 and *Pseudomonas putida* PCI2, applied at the root level, on the severity of tomato leaf blight caused by *A. alternata,* and to determine if the inoculated plants show a strengthening of the production of defense enzymes. Plants were grown in a growth chamber. After four weeks, they were transplanted into pots and transferred to a greenhouse. Two weeks after transplanting, 2 ml per plant of a suspension of PCI2 (1 x 10^6 cfu ml^{-1}) mixed with ITEM 3636 (1 x 10^5 conidia ml^{-1}) was inoculated in the area adjacent to the roots. One week after inoculation, *A. alternata* spores (1 x 10^4 conidia ml^{-1}) were sprayed on the leaves. A pathogenicity control (plants treated only with *A. alternata*) was included. At 1, 3, 5 and 7 days post infestation, leaf samples were collected and used as a source of enzyme to estimate peroxidase (PO), polyphenol oxidase (PPO) and β-1, 3 glucanase. The severity of leaf blight was recorded two weeks after infestation with the pathogen. Pathogenicity control plants showed an average percent disease index (PDI) of 45. Pre-inoculation with ITEM 3636 + PCI2 significantly reduced the average PDI to a value of 10. Plants inoculated with ITEM 3636 + PCI2 showed a 40% increase in PO activity at 5 days post infestation, compared to the patogenicity control. On the other hand, inoculation did not modify the activity levels of PPO, compared to the pathogenicity control. Finally, it was observed that, after 7 days in the presence of *A. alternata*, the leaves of the co-inoculated plants showed a significant increase in β-1,3-glucanase activity. Thus, we can conclude higher levels of PO and β-1,3 glucanase, caused by inoculation with the microbial consortium, may have contributed to plant resistance against this foliar pathogen.

06- TOMATO GROWTH STIMULATION BY A MICROBIAL CONSORTIUM

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Individually, strains of *Trichoderma* spp. And plant growth-promoting bacteria (PGPB) can be effective as biocontrol and crop growth promotion agents. However, combinations of different *Trichoderma* species with PGPB have been shown to be more effective than a single microorganism. Numerous studies point towards a synergistic interaction of this type of consortium, given that this combination enhances the benefits on plants. Thus, it is essential to harness this intricate network of natural interactions to create microbial consortia that substantially and consistently benefit plant growth and health, increase crop production and decrease the use of chemical compounds. The objective of the present study was to analyze the potential of the strains *Pseudomonas putida* PCI2 and *Trichoderma harzianum* ITEM 3636 to promote the growth of tomato plants under commercial field conditions and to eventually control diseases affecting this crop. The field assays were carried out in an organic production greenhouse, located in Tres Acequias (33°01 '33.2 "S 64°25' 53.7"W), and in greenhouses intended for traditional tomato production, which were located in the 38eriphery of Río Cuarto (33°04'46.6"S 64°20' 37.2"W), during the 2022-2023 production period. The following treatments were carried out: (1) Control without inoculation; (2) inoculation with PCI2; (3) inoculation with ITEM 3636 and (4) inoculation with PCI2 + ITEM 3636. At the time of transplanting, seedlings were inoculated by immersion of their roots in the corresponding suspension, at a concentration of 1 x 10^5 conidia ml^{-1} for ITEM 3636 and 1 x 10^6 CFU ml^{-1} for PCI2. In the organic greenhouse, with focus on the consortium inoculation treatment, we observed statistically significant increases in leaf area (74%) and number of fruits per plant (225%), compared to the controls. Also, we observed that the inoculated treatments were always in a more advanced phenological stage than the control treatment, which was left behind due to competition with weeds. Thus, inoculation also contributed to the rapid establishment of the crop. On the other hand, in the traditional production greenhouses, we observed that the consortium inoculation treatment caused statistically significant increases in leaf area (68%), internode length (28%), equatorial diameter of fruits (20%) and polar diameter of fruits (28%), compared to the control. No disease occurred in any of the greenhouses. PGPB and fungi such as *Trichoderma* are examples of microbial players within the rhizosphere that can enhance nutrient availability, modulate phytohormones, provide biocontrol, and improve biotic and abiotic stress tolerance in plants. We can conclude that inoculation of tomato roots with PCI2 + ITEM 3636 favored the growth, yield and health of tomato plants, compared to the controls, under two different production systems.