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Endophytic Fungi Recovered from Lycium arabicum as an Eco-Friendly Alternative for Fusarium Crown and Root Rot Disease Control and Tomato Growth Enhancement

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Abstract : Seven endophytic fungi were isolated from the wild Solanaceous species Lycium arabicum growing in the Tunisian Centre-East and were assessed for their ability to suppress Fusarium Crown and Root Rot disease caused by Fusarium oxysporum f. sp. radicis lycopersici (FORL) and to enhance plant growth. Fungal isolates were shown able to colonize tomato cv. Rio Grande roots, crowns, and stems. A significant promotion in all studied growth parameters (root length, shoot height, and roots and shoots fresh weight) was recorded in tomato plants treated with fungal conidial suspensions or their cell-free culture filtrates compared to FORL-inoculated or pathogen-free controls. I15 and I18 isolates were shown to be the most effective leading to 85.7-87.5 and 93.6-98.4% decrease in leaf and root damage index and the vascular discoloration extent, respectively, over FORL-inoculated and untreated control. These two bioactive and growth-promoting isolates (I15 and I18) were morphologically characterized and identified using rDNA sequencing gene as being Alternaria alternata (MF693801) and Fusarium fujikuroi (MF693802). These fungi significantly suppressed FORL mycelial growth and showed chitinolytic, proteolytic and amylase activities whereas only F. fujikuroi displayed a lipolytic activity. This study clearly demonstrated the potential use of fungi naturally associated with L. arabicum as biocontrol and bio-fertilizing agents.

Keywords : biocontrol, endophytic fungi, Fusarium oxysporum f. sp. radicis-lycopersici, tomato promotion, Lycium arabicum
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