

Tomato Endophytes *Trichoderma asperellum* AAUTLF and *Stenotrophomonas maltophilia* D1B Exhibits Plant Growth-Promotion and Fusarium Wilt Suppression

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Abstract : Endophytic microbes and their metabolites positively impact overall plant health, which may have a potential implication in agriculture. In the present study, 177 bacterial endophytes and 57 fungal endophytes were isolated, with the highest recovery rate from tomato roots. A maximum of 112 endophytes were isolated during monsoon, followed by 64 isolates and 58 isolates isolated during pre-monsoon and post-monsoon periods, respectively, indicating the rich diversity in bacterial and fungal endophytes of tomato crops from different locations of Assam, India. Further, the endophytes were evaluated for their antagonistic potential against *Fusarium oxysporum* f. sp. *lycopersici*. Fungal endophytic isolate AAUTLF (Endophytic Fungi of Tomato Leaf from Assam Agricultural University, Assam, India area) and bacterial endophyte D1B (Endophytic bacteria of tomato from Dhemiji, India district) showed the highest antifungal activity against the pathogen both in vitro and in vivo. Based on 5.8 rDNA sequence analysis of fungal and 16S rDNA sequence of bacteria endophytes, the most effective fungal and bacterial isolates against FOL were identified as *Trichoderma asperellum* AAUTLF and *Stenotrophomonas maltophilia* D1B, respectively. The isolates showed an antagonistic effect against *Fusarium oxysporum* f.sp. *lycopersici* in-vitro and reduced the disease index of Fusarium wilt in tomatoes by 64.4% under pot conditions. *Trichoderma asperellum* AAUTLF produced an antifungal compound viz., 6-pentyl-2H-pyran-2-one, which also possesses growth-promoting characteristics. The bacteria *Stenotrophomonas maltophilia* D1B produced antifungal compounds, including benzothiazole, oleic acid, phenylacetic acid, and 3-(Hydroxy-phenyl-methyl)-2,3-dimethyl-octan-4-one. This would be of high importance for the source of antagonistic strains and biocontrol of tomato Fusarium wilt, as well as other plant fungal diseases.

Keywords : root endophytes, *Stenotrophomonas*, *Trichoderma*, benzothiazole, 6-pentyl-2H-pyran-2-one

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