Trichoderma, an endophytic fungus isolated from Codonopsis pilosula, promotes plant growth and active ingredient accumulation

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Abstract

Fungal endophytes from medicinal plants have the potential to promote plant growth and the accumulation of active ingredients via different mechanisms. In this study, an endophytic fungus was isolated from the roots of Codonopsis pilosula, and was identified as Trichoderma strain RHTA01 based on morphological analysis, fatty acid composition, Fourier infrared spectroscopy and molecular analysis. The strain exhibited good plant growth promoting capacity. In C. pilosula plants inoculated with Trichoderma strain RHTA01, the plant defense system, total chlorophyll content and root activity were enhanced, and levels of antioxidant enzymes, non-enzymatic ingredients and single molecules including nitric oxide (NO), jasmonic acid (JA), salicylic acid (SA) and hydrogen peroxide (H2O2) were up-regulated in different tissues (Root, Stem and Leave). Activities of enzymes involved in polysaccharide and Lobetyolin biosynthesis were up-regulated, thus increasing their accumulation in C. pilosula plants. The function of endophytic fungi was further clarified by structural equation modeling (SEM). Overall, our results provide a strong foundation for further investigation of the interaction between endophytic fungi and plants.

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