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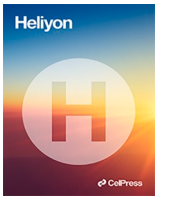

Microbial consortium mediated acceleration of the defense response in potato against *Alternaria solani* through prodigious inflation in phenylpropanoid derivatives and redox homeostasis

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A B S T R A C T

The present study was carried out in a pot experiment to examine the bioefficacy of three biocontrol agents, viz., *Trichoderma viride*, *Bacillus subtilis*, and *Pseudomonas fluorescens*, either alone or in consortium, on plant growth promotion and activation of defense responses in potato against the early blight pathogen *Alternaria solani*. The results demonstrate significant enhancement in growth parameters in plants bioprimed with the triple-microbe consortium compared to other treatments. In potato, the disease incidence percentage was significantly reduced in plants treated with the triple-microbe consortium compared to untreated control plants challenged with *A. solani*. Potato tubers treated with the consortium and challenged with pathogen showed significant activation of defense-related enzymes such as peroxidase (PO) at 96 h after pathogen inoculation (hapi) while, both polyphenol oxidase (PPO), and phenylalanine ammonia-lyase (PAL) at 72 hapi, compared to the individual and dual microbial consortia-treated plants. The expression of antioxidant enzymes like superoxide dismutase (SOD) and catalase (CAT) and the accumulation of pathogenesis-related proteins such as chitinase and β-1,3-glucanase were observed to be highest at 72 hapi in the triple microbe consortium as compared to other treatments. HPLC analysis revealed significant induction in polyphenolic compounds in triple-consortium bioprimed plants compared to the control at 72 hapi. Histochemical analysis of hydrogen peroxide (H_2O_2) clearly showed maximum accumulation of H_2O_2 in pathogen-inoculated control plants, while the lowest was observed in triple-microbe consortium at 72 hapi. The findings of this study suggest that biopriming with a microbial consortium improved plant growth and triggered defense responses against *A. solani* through the induction of systemic resistance via modulation of the phenylpropanoid pathway and antioxidative network.

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