

Defense responses against *Rhizoctonia solani*, interactions with bacterial inoculants and root exudation of antifungal compounds in lettuce are differentially expressed on different soils

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Previous studies conducted on a unique field site, comprising three contrasting soils (diluvial sand DS, alluvial loam AL, loess loam LL) under identical cropping history, demonstrated soil type-dependent differences in biocontrol efficiency against *Rhizoctonia solani*-induced bottom rot disease in lettuce by two bacterial inoculants (*Pseudomonas jessenii* RU47 and *Serratia plymuthica* 3Re-4-18). Disease severity declined in the order DS > AL > LL. These differences were confirmed under controlled conditions, using the same soils in minirhizotrone experiments. GC-MS profiling of rhizosphere soil solutions revealed benzoic and lauric acids as antifungal compounds, previously identified in root exudates of lettuce. Pathogen inoculation and pre-inoculation with bacterial inoculants significantly increased the release of antifungal root exudates in a soil type-specific manner, with the highest absolute levels detected on the least-affected LL soil. Soil type-dependent differences were also recorded for the biocontrol effects of the two bacterial inoculants, showing the highest efficiency after double-inoculation on the AL soil. However, this was associated with a reduction of shoot growth and root hair development and a limited micronutrient status of the host plants. Obviously, disease severity and the expression of biocontrol effects are influenced by soil properties with potential impact on reproducibility of practical applications.