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Plant growth promoting H₂-oxidizing bacteria as seed inoculants for cereal crops

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ABSTRACT

The long-term success of hydrogenase uptake negative legume-rhizobia associations, in spite of their apparent inefficiency, may be explained by the positive effects of H₂ release to soil. A primary benefit of H₂ release to soil is the stimulation of H₂-oxidizing, plant growth promoting rhizobacteria (PGPR) [1]. Two such previously isolated strains were tested as seed inoculants for barley and spring wheat; there were significant differences between treatments and controls in tiller and grain head production, supported by data from greenhouse trials. T-RFLP analysis of barley soil samples, supported by DNA sequencing data, successfully distinguished both species inoculated. Successful re-isolation indicates that these isolates can reproduce themselves in soils and can be used as effective inoculants with peat as the standard carrier. This study showed that we are able to achieve some of the beneficial effects of crop rotation without the need to implement actual crop rotation.

KEYWORDS

Legumes; Crop Rotation; Uptake Hydrogenase; ACC Deaminase; PGPR; Biofertilizer

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