RESEARCH LETTER

Expression of an exogenous 1-aminocyclopropane-1-carboxylate deaminase gene in *Mesorhizobium* spp. reduces the negative effects of salt stress in chickpea

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Abstract

Our goal was to study the symbiotic performance of two *Mesorhizobium ciceri* strains, transformed with an exogenous 1-aminocyclopropane-1-carboxylate deaminase gene (*acdS*), in chickpea plants under salinity stress. The EE-7 (salt-sensitive) and G-55 (salt-tolerant) *M. ciceri* strains were transformed with an *acdS* gene present on plasmid pRKACC. Salinity significantly reduced the overall growth of plants inoculated with either wild-type strains. Although the growth of plants inoculated with either salt-sensitive or salt-tolerant strain was reduced under salinity, the salt-tolerant strain showed a higher ability to nodulate chickpea under salt stress compared with the salt-sensitive strain. The shoot dry weight was significantly higher in plants inoculated with the *acdS*-transformed salt-sensitive strain compared with the plants inoculated with the native strain in the presence of salt. The negative effects of salt stress were also reduced in nodulation when using *acdS*-transformed strains in comparison with the wild-type strains. Interestingly, by expressing the exogenous *acdS* gene, the salt-sensitive strain was able to induce nodules in the same extent as the salt-tolerant strain. Although preliminary, these results suggest that genetic modification of a *Mesorhizobium* strain can improve its symbiotic performance under salt stress and indicate that ACC deaminase can play an important role in facilitating plant–*rhizobium* interaction under salinity conditions.