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**Dinitrogen fixation activity of *Azorhizobium caulinodans*
in the rice (*Oryza sativa* L.) rhizosphere assessed
by nitrogen balance and nitrogen-15 dilution methods**

Abstract *Azorhizobium caulinodans* was directly inoculated onto rice plants in three short-term pot trials. Addition of increasing amounts of sucrose (23, 46, 92 kg ha⁻¹) did not influence the N economy of the *A. caulinodans*-rice association during the early vegetative growth stage. *A. caulinodans* inoculation alone and in combination with the highest amount of sucrose had a significantly positive effect on the N balance, with small but significant N gains in the system. Application of 60 kg urea-N ha⁻¹ had a negative impact on the N economy of the inoculated treatments. N losses increased and the amount of atmospheric N₂ fixed and incorporated decreased significantly as compared to the amounts under the 20 kg urea-N ha⁻¹ regime. However, N losses were low – a maximum of 8% – at the early vegetative growth stage under the conditions of the experiments. C limitation does not seem to be a limiting factor for the incorporation of fixed N₂ in this bacteria-plant association. Biological N₂ fixation caused by *A. caulinodans* inoculation was responsible for 14% of the plant N at the vegetative growth stage and under low N conditions.

Keywords *Azorhizobium caulinodans* · Rice · Seedling inoculation · Nitrogen derived from the atmosphere · Total nitrogen difference method