

Lettuce performances as influenced by different nitrogen dosages and *A. brasilense* strains

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Abstract

Nitrogen (N) supply is an imperative agricultural technique for enhancing and safeguarding yield of vegetable crops. However, synthetic N fertilizers have a negative impact on environment and human health. At this regard, introducing new eco-friendly tools capable of increasing resource use efficiency could be useful to reduce nitrogen application rate and to preserve the ecosystem. The current study was accomplished to evaluate the combined effect of two *A. brasilense* strains [(from the German collection of microorganisms (DSM))] (DSM 1690 and DSM 2298) and different N fertilization doses - administered using ammonium nitrate - (0, 30, 60 or 120 kg ha⁻¹) on yield, dry matter content, ascorbic acid, total phenols, carotenoids, chlorophyll, nitrogen and nitrogen use efficiency (NUE) index of lettuce plants cultivated under polyethylene-covered tunnel. Our data pointed out that yield was significantly enhanced by *A. brasilense* DSM 2298 inoculation when plants were exposed to medium/low N levels (30 or 60 kg ha⁻¹). Overall, ascorbic acid, total phenolics, carotenoids and chlorophyll were increased by the combined effect of *A. brasilense* DSM 1690 and a N dose of 30 or 60 kg ha⁻¹. Both *A. brasilense* strains enhanced N concentration, especially in plant inoculated with DSM 1690 strain. Interestingly, the NUE index was significantly increased by both microorganisms, however, the best results were showed by plants treated with the strain DSM 2298. Our data highlighted that both plant growth promoting bacteria tested are able to improve lettuce yield, qualitative parameters and NUE index, especially when combined with a mild N dose (30 or 60 kg ha⁻¹).

Keywords: 'Canasta' lettuce; nutritional features; functional traits; plant growth promoting bacteria; nitrogen use efficiency