



Effect of immobilized rhizobacteria and organic amendment in bulk and rhizospheric soil of *Cistus albidus* L.

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A field experiment was carried out to assess the effectiveness of the immobilized microbial inoculant and the addition of organic olive residue. The microbial inoculant contained two rhizobacterial species identified as *Azospirillum brasilense* and *Pantoea dispersa* immobilized in a natural inert support. Bacterial population densities were 3.5×10^9 and 4.1×10^9 CFU g⁻¹ of *A. brasilense* M3 and *P. dispersa* C3, respectively. The amendment used was the organic fraction extracted with KOH from composted "alperujo". The raw material was collected from an olive-mill and mixed with fresh cow bedding as bulking agent for composting. The inoculation of rhizobacteria and the addition of organic residue were employed for plant growth promotion of *Cistus albidus* L. and enhancement of soil physicochemical, biochemical and biological properties in a degraded semiarid Mediterranean area. One year after planting, the available phosphorus and potassium content in the amended soils was about 100 and 70% respectively higher than in the non-amended soil. Microbial inoculant and their interaction with organic residue increased the aggregate stability of the rhizosphere soil of *C. albidus* (by 12% with respect to control soil) while the organic residue alone not increased the aggregate stability of the rhizosphere of *C. albidus*. Microbial biomass C content and enzyme activities (dehydrogenase, urease, protease-BAA and alkaline phosphatase) of the rhizosphere of *C. albidus* were increased by microbial inoculant and organic residue interaction but not by microbial inoculation alone. The microbial inoculant and organic residue interaction were the most effective treatment for stimulating the roots dry weight of *C. albidus* (by 133% with respect to control plants) and microbial inoculant was the most effective treatment for increase the shoot dry weigh of plants (by 106% with respect to control plants). The combined treatment, involving microbial inoculant and addition of the organic residue directly into the soil, had additive effect on the root growth of *C. albidus* and chemical and biological quality of soil.