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Characterization of microorganisms associated with *Macleania rupestris* and evaluation of their effect on seedling development

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Abstract

Among the large number of organisms that the soil hosts, there are relationships of different types; the well-known symbiotic relationships between microorganisms and plants have been reported for different species, however, little is known about the interactions between *Macleania rupestris* and the microorganisms associated with it. *M. rupestris*, known locally as «joyapa» is a native species of the Andes belonging to the *Ericaceae* family, its fruit is an edible berry consumed by local communities, birds (including some in danger of extinction) and mammals such as the Andean bear, being a species of great ecological importance. To identify cultivable microorganisms that promote plant growth, bacteria were isolated from joyapa roots and the ability of the isolates to solubilize phosphates and produce indole acetic acid [IAA] was evaluated *in vitro* conditions. Twelve of the 20 bacterial strains isolated showed halos of phosphate solubilization when sown in NBRIP medium and none showed IAA production when evaluated by staining with Kovacs reagent after culturing for 24 hours in medium enriched with 1% tryptophan. Strains that showed positive results for the phosphate solubilization test were inoculated into joyapa seedlings to evaluate their effect on development. After 12 weeks, plant growth (final size minus initial size), number of leaves, number and length of roots, and biomass were recorded. The results showed statistically significant differences between the control treatment (not inoculated) and strain 12 for the growth variable and between the control treatment and strains 2, 6, 11 and 12 for the biomass variable, surpassing the control in both cases. The results show the ability of some bacterial isolates associated with *M. rupestris* to solubilize phosphates *in vitro* conditions and show the positive effects that some of them have on the plant development of this species. The isolation and characterization of bacterial strains that promote plant development could lead to the development of biofertilizers that facilitate the cultivation of these Andean species of ecological importance and enhance their use in production systems to generate alternatives for the conservation and sustainable use of this and other Andean berries and the fauna associated with them. Finally, it is important to emphasize that the soil is a source of valuable resources that need to be conserved and explored for sustainable use.

Keywords: Ericaceae, Joyapa, Phosphate solubility, Shrimp grape