



Siderophore production and iron phosphate solubilization by root endophytic bacteria isolated from maize

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Tropical soils generally exhibit acidic condition with predominant phosphate immobilized in insoluble forms of iron (P-Fe). Many soil microorganisms solubilize P from P-Fe by siderophores and organic acids production. The microorganisms that live in the rhizosphere and in the interior of plants (facultative endophytic) with potential for phosphate solubilization are important to enhance the production of the maize crop in order to reduce the use of soluble fertilizers. The objective of this work was to isolate efficient facultative endophytic bacteria solubilizing iron phosphates and evaluate their production of siderophores. Maize plants were harvested at flowering stage and 113 bacteria were isolated from roots (54.9%), leaves (20.4%) and sap (24.8%). Fifty-eighty selected strains, most root endophytic, were evaluated in liquid culture medium containing iron phosphate, after 9 days of incubation. Soluble phosphorus was determined using modified ammonium molybdate method. The production of siderophores was through inoculation of microorganisms in solid medium containing the indicator chromoazurol. Strains were identified based in the 16S rDNA gene. Maize plants had a high diversity of endophytic bacteria solubilizing iron phosphate and siderophore producing. One strain of *Pantoea* and two of *Bacillus* showed the highest P solubilization, releasing 68.7; 64.1 and 64.08 mgP.L⁻¹, respectively. The siderophore produced by 65% of the evaluated microorganisms was the type carboxylate, and the most strains producing siderophores are efficient in solubilizing P associated with iron. The use these facultative endophytic solubilizing microorganisms as inoculant may be considered a promising strategy in environmental and economic terms for maize production.