Libro de resúmenes

PGPR Latinoamérica 2014

II Workshop Latinoamericano sobre PGPR

21 al 26 de septiembre
La Falda / Córdoba / Argentina

UNRC

Universidad Nacional de Quilmes

Tomato Plant-growth promoting effect and phosphate-solubilizing capacity of rhizobacteria isolates associated with biological control of *Meloidogyne* spp.

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Plant growth-promoting rhizobacteria (PGPR) are the rhizosphere bacteria that can enhance plant growth by a wide variety of mechanisms like phosphate solubilization, induction of systemic resistance to phytoparasitic pathogens, between other effects. The PGPR have became attractive to agriculture as substitute for chemical fertilizers and pesticides and other supplements The aim of this study was to evaluate the influence of eight isolates of rhizhobacteria associated with three phosphate rocks on tomato plant growth. These isolates were previously selected for in vitro phosphate solubilization activity, control of *Meloidogyne* spp. and growth promotion in rice and fig plants. Individual pots containing sterilized soil and three phosphate rocks (Itafós phosphate, Carbonatito Joca Tavares and Alvorada natural phosphate) received an aqueous saline suspension containing eight bacterial isolates previously selected for in vitro phosphate solubilization. The experiment was conducted under greenhouse conditions using five replicates per treatment. After introducing the bacteria isolates in the soil, the treatments were incubated in the presence or absence of the phosphate rocks. As control, pots containing sterilized soil that received aqueous saline suspension were used. Additionally, the in vitro root colonization capacity of bacterial isolates was evaluated. Thirty days after incubation, 'Santa Cruz' tomato seedlings were planted in each pot. A month later, the tomato plant of each replication was evaluated concerning root weight, shoot weight and stem diameter. The treatment effects were statistically evaluated for each bacterium separately in a factorial assay 2 x 4 considering the bacterium and phosphate type presence, respectively, using Duncan test at 5%. The interactions between phosphates and microorganisms were specific for each bacterium x phosphate type combination. Tomato plants showed a significant increase for all evaluated parameters when the soil was incubated with Itafós phosphate and XT39 (*Micrococcus luteus*) bacteria isolate. However, considerable increase was observed in root (PR) and shoot (PPA) tomato weight with Itafós phosphate even in those treatments without this bacterium. The same behavior was showed in the Joca Tavares phosphate treatment were root weight increased without XT39 addition. Although in vitro tomato root colonization by XT39 was weak, this bacterial isolate may be associated with Itafós phosphate solubilization. Besides that, significant increase in PPA was also observed in the pots that received Alvorada and Joca Tavares phosphates and no bacteria. Using P10 isolate (not identified), an increase of one or more variables were observed either in the phosphate absence or with incorporation of Alvorada and Itafós natural phosphates in the soil. Tomato roots were also weakly colonized by P10. The interactions between phosphates and microorganisms were specific for each bacterium x phosphate type combination.