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Effect of phosphate solubilizing microorganisms on maize yield and yield attributes in the Sete Lagoas region

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Brazilian agribusiness is still highly dependent on the foreign market for fertilizer supply. In order to develop a safe and low-cost technology that could reduce and / or supplement phosphate fertilization in corn plantation areas, the use of phosphate solubilizing microorganisms (MSP) associated to fertilization with low solubility phosphate sources has been proposed. To address this, the use of bacteria as inoculants in the corn crop has been evaluated so that the efficiency of the crop's nutrient acquisition could be enhanced. The purpose of this study was to evaluate the effect of the MSP inoculation over the maize productivity as well as to analyse how the soil attributes change after maize cycle. The experiment was conducted by analysing the 2016/17 harvest in the experimental field of Embrapa Milho e Sorgo in Sete Lagoas-MG. The crop was planted in a split-plot design with four 5 - meter lines and three replicates, spacing 0.70 meters from each other. Three bacterial strains of the genus *Bacillus* were used. Phosphate fertilization was based on the total dose of 100 kg P₂O₅ / ha by using two different sources of phosphate: the triple superphosphate and the Araxá rock phosphate. The mixture of this two phosphate sources was conducted in the same proportion and the control treatment was carried without phosphate fertilization. It was examined: the grain productivity and the dry mass, the N, P and K contents in the grain as well as N and P in the aerial portion. They were quantified, submitted to analysis of variance and the medium values were compared by using the SCOTT-KNOTT test. The use of a fertilization mixture composed by Araxá rock phosphate and A strain has resulted in a 29% rise in the productivity in relation to the non-inoculated treatment . Another studied combination was Araxá phosphate with B strain that has showed an 52% increase in the Mg content on soil when compared to the uninoculated treatment with the same fertilization. The best solubilization performance was noticed by A and B strains : it has resulted in productivity increases, higher N, P and K contents in the grains as well as higher P and N contents in aerial portion. Among the microorganisms evaluated in this work, the A and B strains have presented a high potential to be used as inoculants in order to enhance the biosolubilization of nutrients.

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