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Effect of *Bacillus* spp. inoculation on phosphorus mineralization and root architecture in maize

M. R. Queiroz^{1*}, W. R. Soares², A. P. B. Teles², T. Tezotto², M. C. Q. Verdi², P. E. Cipriano², P. S. Pavinato².

¹Universidade Federal de Goiás, Câmpus Samambaia, Goiânia - GO

²Escola Superior de Agricultura Luiz de Queiroz (ESALQ), Piracicaba - SP

*queiroz.millena@discente.ufg.br

The use of microbiological strategies has gained relevance in the efficiency of nutrient use in tropical agricultural systems, and, in particular, the genus *Bacillus* spp. it's a highlight in modulating soil phosphorus (P). This study evaluated the effects of inoculation with different *Bacillus* spp. strains on root architecture and P mobilization in maize plants at 30 days after emergence (V6), grown in a greenhouse with 30 mg P kg⁻¹. Eight strains were tested, in addition to *B. megaterium* and *B. subtilis* as positive controls, and a control without inoculation. Root parameters were obtained using the WinRHIZO® scanner, while P dynamics considered the labile fractions of the soil (Olsen method), with emphasis on organic P. The strains FS3-7, MGB1337, and RZ2MS13 showed the highest values for root surface area, length, and volume. The FS3-7 lineage showed lower organic P content and high inorganic P content, indicating mineralization and consumption of mobilized P. The results indicate that inoculation modulated P stock and favored root exploration, influencing soil-plant flow. This aspect is especially relevant for a nutrient with limited diffusion in the soil and reinforces the potential of these strains to increase the efficiency of P use in tropical environments.

KEYWORDS: Bioinoculant, *Zea mays*, nutrient mobilization, fertilizer efficiency, tropical soils.