TITLE: *IN VITRO* PHOSPHATE SOLUBILIZATION BY ENDOPHYTIC AND RHIZOSPHERIC BACTERIA ISOLATED FROM *PASPALUM* SPP.

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ABSTRACT:

Paspalum species are one of the main constituents of native pasture in the tropical and subtropical regions of the Americas. They can hold a great forage production ability, nutritional quality, and adaptability to diverse ecosystems. The increasing in livestock production to respond the population demand depends directly on better efficiency of pastures management. Thus, phosphate fertilizers play an important role, since phosphorus (P) is an essential nutrient for growth and development of plants. Although total P is present in high concentration in most soils, a huge majority of it remains unavailable, therefore, soil phosphorus deficiency is solved by the application of chemical fertilizers to improve agricultural productivity. However, the use of phosphate fertilizers has been causing several environmental issues such as waterway eutrophication, groundwater contamination, and soil fertility depletion. Endophytic bacteria colonize the internal tissues of plants, while rhizospheric bacteria are typically found around plant roots, and they can enhance plant nutrient acquisition by their ability to make P available to plants via solubilization and mineralization process. The use of phosphate solubilizing bacteria as inoculants is an eco-friendly strategy to replace chemical fertilizers and improve forage production. This study aimed to evaluate the phosphate solubilization potential of endophytic and rhizospheric bacteria associated with *Paspalum* species. The strains were isolated from leaves, roots, and rhizospheres of *Paspalum rojasii* (BGP 272), *P. lenticulare* (BGP 281) and *P. compressifolium* (BGP 380), which were collected from the Germplasm Bank of *Paspalum*, maintained by Embrapa Pecuária Sudeste - São Carlos, São Paulo, Brazil. To this end, 107 bacterial isolates were grown in Tryptic Soy Broth and the bacterial inocula were standardized. Subsequently, they were incubated in a solid medium containing $CaHPO_4$ for 120 hours at 28 °C. The colonies were measured with a pachymeter and the phosphate solubilization index (SI) was obtained by SI = halo diameter/colony diameter. Among 107 bacterial isolates tested, 50 isolates were able to solubilize phosphate. The SI ranged from 1.20 cm to 4.71 cm, and 28 isolates presented SI >= 2.00 cm, showing potential to be used as biofertilizers in *Paspalum* species.

Keywords: phosphate solubilization, phosphorus, *Paspalum*, bacteria, biofertilizers

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