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1038-1 DIVERSITY, PLANT GROWTH-PROMOTING TRAITS, AND BIOCONTROL POTENTIAL OF BACTERIAL ENDOPHYTES OF Paspalum vaginatum Swartz

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Resumo:

Paspalum species are important constituents of native pastures in tropical and subtropical regions of the Americas. *Paspalum vaginatum* Sw. is native to coastal areas in Brazil and is widely used on golf courses in the United States due to its hardiness and tolerance to abiotic stresses such as drought, waterlogging and salinity. Bacteria located within this species (endophytic) may be partially responsible for tolerance to these extreme conditions. The use of bacteria capable of promoting plant growth directly via phosphate solubilization (PS), biological nitrogen fixation (BNF) and 3-indoleacetic acid (IAA) production or indirectly via antagonism to phytopathogenic fungi, as bioinoculants is an eco-friendly strategy to replace agrochemicals and improve crop production. This study aimed to evaluate the endophytic bacteria associated with *P. vaginatum* potential for inorganic phosphate solubilization (IPS), biological nitrogen fixation (BNF), 3-indoleacetic acid (IAA) production and antagonism to *Bipolaris* sp. as well as to identify the genus of all isolates. The bacteria were isolated from roots and leaves of *P. vaginatum, and collected at the Active Paspalum Germplasm Bank of Embrapa Pecuária Sudeste, São Carlos, SP. For the phosphate solubilization test, the inoculum was incubated on a solid medium containing* $CaHPO_4$ *for 120 hours at 28°C. The colonies were measured with a caliper and the phosphate solubilization index was obtained by PSI=halo diameter/colony diameter. For the IAA production test, the inoculums were incubated in the dark in a broth medium containing L-tryptophan (IAA precursor) at 28°C for 72 hours under agitation, followed by centrifugation and the supernatant incubated together with Salkowski's reagent. The reading of the absorbances of the samples was carried out in the spectrophotometer (λ =520nm) and normalized by means of a standard curve. For the BNF test, the 72 bacterial isolates were grow on Tryptone Soy Agar, inoculated in a nitrogen-free semi-solid medium, and incubated at 28°C for 96 hours. The formation of a film near the surface indicates a positive result. For the antagonism test, the isolates were submitted to direct pairing with the phytopathogen Bipolaris sp., the plates were incubated at 28°C for 14 days. Then, the treatment and control mycelial diameters were measured to calculate the percentage of inhibition obtained by %i=[(Dcontrol-Dtreatment)/Dcontrol]*100. All bacteria were identified by sequencing the 16S rDNA gene. Among the 72 bacterial isolates tested, 43 fixed nitrogen, 28 solubilized inorganic phosphate (the PSI ranged from 1.06 to 4.46), 70 produced IAA (the amount ranged from 0.11 to 82.15* $\mu g.mL^{-1}$*) and ten showed antagonistic potential against Bipolaris sp. (the percentage of inhibition varied between 12 and 77%). Isolates belonging to the genera Agrobacterium, Bacillus, Enterobater, Jeotgalicoccus, Lysinibacillus, Micrococcus, Myroides, Paenibacillus, Pantoea, Pseudomonas, Psychobacillus, Rhizobium, Staphylococcus, Streptomyces were identified. Such results demonstrate the potential of P. vaginatum isolates to be used as biofertilizers in Paspalum species and possibly in other genera of forage grasses. Keywords: bacteria, bioinoculant, plant growth-promoting, antagonism, endophytic Development Agency: This study was partly financed by the CAPES and FAPESP (Proc. n. 2020/11315-6).*

Palavras-chave:

Bacteria, Bioinoculant, Plant growth-promoting, Antagonism, Endophytic

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