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PHOSPHATE FERTILIZATION IMPACTS THE STRUCTURE OF BACTERIAL COMMUNITY OF MAIZE AND SORGHUM RHIZOSPHERE

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Chemical fertilizers have been fundamental in the development of agriculture, however when applied in excess, they can contaminate the environment and significantly increase the production cost. An alternative aiming a more sustainable agriculture is to increase phosphorus (P) use efficiency using partially P-soluble sources associated with microorganisms and efficient genotypes. The aim of this study was to evaluate the rhizosphere bacterial diversity of maize and sorghum grown under different sources and levels of P. Four commercial maize and four sorghum genotypes were grown under field conditions with Triple Superphosphate, Bayovar and Itafós phosphate sources, and three levels of P (0, 50 and 100 kg. ha^{-1}). Samples of rhizospheric soil and bulk soil were collected during the flowering time, and analyzed by the T-RFLP (Terminal Restriction Fragment Length Polymorphism) and MiCA III (Microbial Community Analysis). Within each crop, no significant effect of genotype and phosphate source was observed. However, the P doses within each phosphate source affected significantly the structure of the microbial community, forming three distinct groups: I) bulk soil; II) 0 kg P_2O_5 ha^{-1} and III) 50 and 100 kg P_2O_5 ha^{-1} for maize and sorghum, indicating that P availability is the predominant factor structuring bacterial communities. The identification of phyla and microbial families revealed direct impacts of P on taxon richness and abundance, especially in the families Bacillaceae, Burkholderiaceae and Pseudomonadaceae. In the families Rhizobiaceae and Streptomycetaceae, there was an increase in the number of bacteria in less soluble P sources. The observed phyla indicate an oligotrophic to copyotrophic remodeling in relation to the availability of P for both crop species. These results suggested that understanding the remodeling of microorganisms at different trophic levels could support an increase in P availability in the soil.

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