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Dynamics of cacti rhizosphere bacterial communities in the Brazilian semiarid climate

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The current world scenario of climate change, global warming and the increase in areas undergoing desertification, have directly impacted current patterns of agricultural crop production. The Caatinga is a semiarid Brazilian biome characterized by hot weather, with temperatures up to 40°C and low rainfall, showing two very contrasting seasons throughout the year: a rainy season in the winter and a dry season in the summer. In order to understand the dynamics of bacterial communities in the rhizosphere of the mandacaru cactus (*Cereus jamacaru*) we used metagenomic to sequencing rhizosphere sample during the rainy and dry seasons. We aimed to analyze differences in the patterns of distribution of bacterial communities in the both evaluated seasons to identify which microbial groups could be contributing to the maintenance of the host throughout these adverse conditions, as well as to identify which microbial functions were more abundant. Sampling was performed in a conserved area of the Caatinga biome (S09°04'27.0''/W40°19'48.0'') during the rainy and dry seasons. Three different cacti with 5 to 10 m of distance among them were selected and the samples were collected in three different points of each rhizosphere, with up to 15 cm from the plant and up to 10 cm deep. The three samples of each cactus were homogenized and used for humidity determination, chemical analysis and DNA extraction for Ion Torrent (PGM) sequencing. The bacterial community was well represented by the phyla Actinobacteria, Proteobacteria and Acidobacteria. The Actinobacteria was the most abundant microbial phyla during the dry season, while the Proteobacteria was the most abundant microbial phyla during the rainy season. Overall, genes related to virulence, disease resistance and defense were more abundant during the dry season as well as stress response regulation genes, revealing some of the potential traits that could be explored from this microbiome. The understanding of the dynamics of bacterial communities associated to this Brazilian cactus might contribute to the development of further research concerning the use of specific target microbial groups as inoculants in plants under abiotic stresses, such as drought, contributing to the maintenance of agricultural crop production.