

TITLE: EFFECT OF SULFENTRAZONE HERBICIDE ON BACTERIAL DIVERSITY IN *Canavalia ensiformis* AND *Crotalaria juncea* RHIZOSPHERE

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ABSTRACT:

Brazil is the largest consumer of pesticides in the world. Indiscriminate and excessive application of pesticides damaged not only the environment and agriculture, but also has entered into the food chain thereby affecting health and development. Phytoremediation is a bioremediation process that uses various types of plants to remove, transfer, stabilize, and/or destroy contaminants in the soil and groundwater. Microorganisms living in association with plant roots may metabolize these substances helping the recovery the contaminated areas. This study investigated the effect of sulfentrazone herbicide on the bacterial communities in rhizosphere and non-rhizosphere soil planted with *Canavalia ensiformis* and *Crotalaria juncea*. The study was conducted in the greenhouse. The experimental design used 2x2x3 factorial (two groups of soil - rhizosphere and non-rhizosphere, cultivated with two plant species - *C. ensiformis* and *C. juncea*, treated with the combination of three levels of sulfentrazone herbicide). After extraction of the DNA directly from the soils, amplification of 16S rDNA gene from the bacteria was performed by PCR (Polymerase Chain Reaction) and fragments that have same length but with different base pair sequences were separated by DGGE (Denaturing Gradient Gel Electrophoresis). The gels were photographed and the images were analyzed using Bionumerics software where the similarity between the profiles generated by DGGE was assessed to creating a dendrogram. Our studies did not find a statistical difference in species richness between all treatments. Dendrogram analysis revealed four bacterial profiles. First group has samples from non-rhizosphere with *C. ensiformis* more rhizosphere sample from *C. ensiformis* with 800 g/ha of herbicide. Second profile has rhizosphere samples from *C. ensiformis* with 0 to 200 g/ha herbicide levels. Third and fourth groups brought together all rhizosphere and non-rhizosphere samples with *C. juncea*, respectively. The bacterial profile was determined by plant species and the condition the rhizosphere and non-rhizosphere soil. Bacterial population has been shown stable among different concentrations of sulfentrazone. The maintenance of bacterial profiles even in high doses of herbicide reinforces its potential to sulfentrazone degradation with the plant in phytoremediation of contaminated soils.

Keywords: Biodegradation, DGGE (Denaturing Gradient Gel Electrophoresis), microorganisms, PCR (Polymerase Chain Reaction), phytoremediation.

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