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Diversity of Prokaryotic and Eukaryotic Communities in an Experimental Rice Planting with a History Of Pesticide Use

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Abstract

Abundance and diversity of microbial communities in an experimental rice planting with a history of pesticide were determined using rRNA high-throughput sequencing from samples of the affluent, rice rhizosphere soil; storage pond sediment; and the effluent. A similarity between aquatic environments and terrestrial environments concerning the prokaryotic communities was observed. This pattern differs for eukaryotic communities, where there is a difference between the effluent (lower diversity indexes) and the other three sites (diversity indexes similar to those found in the sample). Proteobacteria overwhelmingly dominated the bacterial OTUs in the affluent, soil rhizosphere, and the storage pond sediment. Actinobacteria dominated in the effluent. At the genus level, the most frequent microorganism in both aquatic locals were an Actinomycetes from the family Sporichthyaceae followed by an OTU belonging to the Comamonadaceae family and Polynucleobacter (Proteobacteria). A Thaumarchaeota OTU (average 4.7%) and Geobacter (average 3.9%) were the most abundant genera in the rice rhizosphere and an Acidobacteria belonging to the candidate division DA052 (average 8.8 %), followed by a Thaumarchaeota OTU (average 6.5%) in the storage pond sediment. The rice rhizosphere and storage pond sediment would have better environmental quality due to the lower content of pesticides represented by the higher relative abundances of Acidobacteria, Nitrospirae, Gemmatimonadetes and Verrucomicrobia, and the lower values of Actinobacteria in comparison to the affluent and the effluent. Not only the structure of soil microbial populations but also those of aquatic environments would act as indicators of environmental quality concerning pesticide residues.

Biography:

Maria Pilar Serbent has completed his PhD in Environmental Engineering at the age of 37 years from Regional University of Blumenau. She is the professor at Santa Catarina State University, Brazil. She has been serving as an editorial board member of repute.