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Detection by denaturing gradient gel electrophoresis of ammonia-oxidizing bacteria in microcosms of crude oil-contaminated mangrove sediments

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ABSTRACT. Currently, the effect of crude oil on ammonia-oxidizing bacterium communities from mangrove sediments is little understood. We studied the diversity of ammonia-oxidizing bacteria in mangrove microcosm experiments using mangrove sediments contaminated with 0.1, 0.5, 1, 2, and 5% crude oil as well as non-contaminated control and landfarm soil from near an oil refinery in Camamu Bay in Bahia, Brazil. The evolution of CO_2 production in all crude oil-contaminated microcosms showed potential for mineralization. Cluster analysis of denaturing gradient gel electrophoresis-derived samples generated with primers for gene amoA, which encodes the functional enzyme ammonia monooxygenase, showed differences in the sample contaminated with 5% compared to the other samples. Principal component analysis showed divergence of the non-contaminated samples from the 5% crude oil-contaminated sediment. A Venn diagram generated from the banding pattern of PCR-denaturing gradient gel electrophoresis was used to look for operational taxonomic units (OTUs) in common. Eight OTUs were

found in non-contaminated sediments and in samples contaminated with 0.5, 1, or 2% crude oil. A Jaccard similarity index of 50% was found for samples contaminated with 0.1, 0.5, 1, and 2% crude oil. This is the first study that focuses on the impact of crude oil on the ammonia-oxidizing bacterium community in mangrove sediments from Camamu Bay.

Key words: Impacted mangrove sediment; PCR-DGGE; amoA; Ammonia-oxidizing bacteria

