Spatial Heterogeneity of Bacterial Activity and Community Structure at a Long-Term Contaminated Site. (S03-becker111157-Oral)

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Abstract:

In a heavily disturbed anthropogenic soil (88% sand, 8% silt, 4% clay) artificially induced aggregate formations were studied to examine the microscale relationship of bacterial community structure to heavy metal contaminants. The study site in Seymour, IN was contaminated beginning 40 years ago with solvents and excess road paint containing PbCrO4. The spatial relationship of metal contamination to microbes was tested after gathering samples at known distances: <1, 5, 15, and 50cm. Using 14C-glucose, microbial activity of artificial aggregates was determined. DNA was extracted from this same sample and community structure determined using PCR-DGGE. Finally, this same material was subjected to nitric acid digestion to determine Pb and Cr content using ICP-AES. The data showed that metal concentration and microbial activity did not correlate. Metabolic activity varied by as much as a factor of 10 in samples <1cm apart, illustrating the heterogeneity of active microbes within soil. DGGE analysis showed that community fingerprint patterns did not group by metal concentration or spatial distribution. Community structure differed at the smallest scales, <1cm and 5cm (similarity <0.45).

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