Biodegradation of Perchlorate by Microbial Communities in Soil. (S11-nozawa212659-Poster)

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Abstract:

Perchlorate contamination of groundwater has emerged as a significant concern for human health. Perchlorate, originating from improper disposal of ammonium perchlorate in solid rocket propellants, is very water soluble and readily moves to groundwater. Perchlorate is microbially reduced anaerobically and several perchlorate-reducing bacteria are isolated. However, little is known about the microbiology of perchlorate biodegradation in surface soil. Microcosm experiments compared perchlorate reduction by native microorganisms in Yolo silt loam under different anaerobic conditions. Perchlorate reduction to chloride occurred under flooded or unsaturated anaerobic conditions and was accelerated by adding acetate. Perchlorate was also reduced in a hydrogen headspace in presence and absence of added bicarbonate, but more slowly than with acetate. Denaturing gradient gel electrophoresis (DGGE) analysis of PCR-amplified community DNA revealed changes in microbial community composition with perchlorate reduction and will be used to help identifying of perchlorate-degrading bacteria. In conclusion, there is potential for bioremediation of perchlorate-contaminated surface soil.

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