Characterization of anaerobic biotransformation of β-hexachlorocyclohexaneMohammad

Numan Ibne Asad[1], Yaqing Liu [1], Ivonne Nijenhuis [1]

[1]Department of Isotope Biogeochemistry, Helmholtz Centre for Environmental Research-UFZ, Permoserstraße 15, 04318 Leipzig, Germany

Hexachlorocyclohexane (HCH) is a contaminant of concern worldwide. HCH has four main isomers α, β, δ, and γ-HCH. Since only γ-HCH (Lindane) has a specific pesticide activity, the purification of Lindane resulted in the production of other waste residues. β-HCH is the most persistent one, has relatively low water solubility and is considered highly carcinogenic and health hazardous. A large amount of β-HCH produced as a by-product which was dumped at landfill sites has caused heavy contamination in soil, groundwater, and atmosphere. In this study, we focused on the anaerobic degradation of β-HCH. Thus far, only one anaerobic, *Dehalobacter sp.* containing, a culture was reported in the literature. Contaminated soil was collected from a highly contaminated site in China and anaerobic microcosms were set up to enrich β-HCH degrading microorganisms. The degradation potential was evaluated by measuring the concentration of the products benzene and mono chlorobenzene (MCB). At the same time, cell growth was monitored by fluorescent microscopy. Illumina sequencing was done for the first and second generation and bacteria belonging to the Firmicutes, including *Dehalobacter*, *Gelria*, and *Gracilibacter*, were dominant. Additionally, the genomic DNA from an active, fourth generation, the β-HCH degrading culture was isolated and a 16s-rRNA clone library was prepared for subsequent sequencing to analyze the overall microbial diversity. Furthermore, compound-specific carbon stable isotope analysis (CSIA) will be applied to investigate the transformation pathway.