Fe^{III} facilitates methan-ogenic biodegradation of hydro-carbons in oil sands tailings

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Surface mining of bitumenous (oil) sands from the Athabasca region of northern Alberta, Canada has resulted in over 930 m^3 of fluid fine tailings which are contained in massive basins/ponds on-site and that settles into a microbiologically active slurry of 25-30% solids known as mature fine tailings (MFT). Our prevous studies have revealed that residual hydrocarbons in oil sands tailings are degraded syntrophically by indigenous microbial community, remediating the slurry and increasing clay settling and porewater recovery; this is at the cost of biogenic methane (CH_4) emissions. Th current research utilizes anaerobic hydrocarbon-degrading enrichment cultures to study the pathways of anaerobic hydrocarbon biodegradation in tailings ponds. The cultures were amended with hydrocarbons such as *iso*-alkanes (C_6-C_8) or monoaromatics (BTEX) with or without the addition of Fe^{III} mineral (FeOOH). The baseline control containing culture without any amendement was also included. Our preliminary resultssuggested that addition of Fe^{III} mineralaccelerated biodegradation of hydrocarbon into CH_4. The research is in progress to characterize Fe^{III}-Fe^{II} cycling along with identification of metabolites to fully elucidate the pathways of hydrocarbon biodegradation. The results will provide great insight into the anaerobic mechanisms of hydrocarbon biodegradation and transformation of Fe minerals that can impact the reclamation strategy for managing oil sands tailings ponds. et al. et al.h