



Biological Degradation of Complex Crude Oil Refinery Waste Sludge by Consortia of Bacteria during Tailored Composting

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Abstract: This study aimed at biologically degrading complex crude oil refinery waste sludge by using a consortium of bacteria in a tailored composting process. All experimental process was incubated for 10 months at room temperature. The results revealed that microbial growth and activities were enhanced as indicated by an increase in temperature, moisture level, pH value, and respiration rate in all the compost pile. Polymerase chain reaction with specific universal primers was used for identification, and other molecular techniques were employed for the characterization of bacteria that utilized PAHs. The sequenced amplicons were identified as *Bacillus*, *Microbacterium hominis*, *Rhodococcus*, *Brevibacterium frigoritolerans*, *Enterococcus mundtii*, *Sanguibacter soli*, *Gordonia*, *Burkholderia*, *Pseudomonas*, *Clostridium sordelli*, *Cellulosimicrobium funkei*, *Sphingomonas*, *Micrococcus aloeverae*, *Ochrobactrum*, *Sporosarcina*, *Dietzia*, *Streptomyces*, *Bhargavaea*, *Arthrobacter* and *Staphylococcus* species. Automated Soxhlet extractor with Dichloromethane and gas chromatography/mass spectrometry was used to quantitatively determine the PAH reduction. Results showed a reduction between 36.52 and 99.98%. Tailored co-composting with animal manures was positive in degrading PAHs present in complex crude oil waste sludge.

Keywords: Animal manures, Bacteria spp., Bioremediation, Co-composting, Crude oil refinery sludge, PAHs
