

Biodegradation of BTX and MTBE and their Inhibitory or Synergistic Effects by Interaction

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This study evaluated the removal capacities of individual BTX and MTBE and total BTX in a polyurethane biofilter inoculated by a BTX-degrading microbial consortium and their interactive effects in various mixtures. Further, this study compared microbial community structures for each samples using PCR-DGGE method. The maximum elimination capacities (MECs) of individual BTX were 200, 250, and 450 g m⁻³ h⁻¹, respectively, showing higher values than the previous reports (no significant elimination for MTBE). The MEC of total gases (BTX together) was 340 g m⁻³ h⁻¹, showing the highest value so far, and became 200 g m⁻³ h⁻¹ by the addition of MTBE. In addition, MTBE elimination capacities increased within 50 g m⁻³ h⁻¹ co-metabolically in the presence of individual BTX. Meanwhile, the microbial community structure analysis revealed that two large groups were grouped according to whether or not MTBE was present and the dominant bacteria in the consortium mainly were closely related to the bacteria isolated from aromatic hydrocarbon-contaminated site or oil wastewater. In conclusion, the polyurethane biofilter system with the BTX-degrading consortium isolated in this study may be useful for the removal of gaseous benzene, toluene, xylene, MTBE, or their mixtures