Biodegradation of Methane and Halocarbons in Simulated Landfill Biocover Systems Containing Compost Materials - DTU Orbit (24/06/2018)

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The attenuation potential of methane (CH4) and of selected volatile organic Compounds (VOCs) was compared in four types of compost materials using dynamic flow column experiments over a period of 255 d. Garden waste compost mixed with wood chips showed the highest steady-state CH4 oxidation rate (161 g m(-2) d(-1)), followed by a commercial compost product Supermuld (110 g m(-2) d(-1)). In the column containing the highest fraction of compost (compost/sand mixed in 1:1), CH4 oxidation declined significantly during the period of operation, probably due to clogging by formation of exopolymeric substances. After 40 d of operation, CH4 production was observed. All the VOCs tested were degraded. CFC-11 (CCl3F) and HCFC-21 (CCl2FH) were anaerobically degraded by reductive dechlorination, generating HCFC-31 (CClFH2) and HFC-41 (CFH3), which were both aerobically degraded in the oxic portion of the columns. Overall, the highest removal of VOCs was observed in the column containing the compost/wood chip mixture. This study demonstrates that biocovers consisting of compost materials have the potential to attenuate trace gas emissions from landfills.

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