

## **Effects of Zeolite-Containing Material and Ammonium Nitrate on Biodegradation of n-Tridecane in Heavy Clay-Loam Leached Chernozem with High Organic Matter Content**

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### **Abstract**

Biostimulation based on usage of soil amendments is growing due to their efficiency in removing different petroleum hydrocarbons (PHC) from contaminated sand or loam-sand soils. However, the research on clay-rich soils with higher organic carbon content, in which PHC biodegradation may proceed differently and which are more difficult to clean up, has been less extensive. In a pot experiment, we studied and compared the effects of two soil amendments, natural zeolite-containing material (ZCM, 50 g kg<sup>-1</sup>) as a bulking agent and ammonium nitrate (0.3 g N kg<sup>-1</sup>) as a nitrogen fertilizer, on biodegradation of n-tridecane (1 wt.%) in a weakly acidic heavy clay loam leached chernozem with fairly high organic carbon content (3.71%). After 48 days, the nitrogen-amended contaminated soil showed enhancement of both respiratory activity (basal and substrate-induced respiration rates) and the number of n-tridecane-degraders. As a consequence, the extent of n-tridecane biodegradation (86.5%) was essentially higher in the presence of added nitrogen than that in the non-amended soil (73.7%). In contrast, due to the partial retention of n-tridecane molecules in its pores, ZCM retarded biodegradation to 56.0%, showed no significant effect on the number of n-tridecane-degraders and, moreover, enhanced the decomposition of the soil intrinsic organic matter. The obtained data indicate that more precautions should be considered when using porous sorbents such as ZCM for remedial arrangements in PHC-contaminated soils. © 2011 Copyright Taylor and Francis Group, LLC.

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