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# Effect of Nitrogen Source Type on n-Alkane Biodegradation in Sandy Soils

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***One of the most widespread environmental problems is petroleum hydrocarbons contamination in soil and groundwater environments. Among the components of petroleum hydrocarbons, n-alkanes constitutes highest proportion and are the most readily biodegraded components. Bioremediation is a low cost and environmentally friendly technology in order to cleanup soil and groundwater contamination. Nutrient enhancement of bioremediation with nitrogen and phosphorus is called "biostimulation", and increases process performance. Especially nitrogen is the most important nutrient for the hydrocarbon bioremediation due to the elevated carbon concentrations compared to nitrogen in petroleum contaminated soils. Many researchers have investigated optimum nitrogen levels in order to enhance bioremediation. However there is a limited number of studies on the effects of different nitrogen sources on n-alkane biodegradation in soil.***

***In this study, it is aimed to reveal the effects of different nitrogen sources on biodegradation of n-alkane compounds in diesel fuel spiked soil. Biodegradation of n-alkanes in diesel fuel contaminated soil was monitored in respirometric reactors for 15 days. Ammonium sulfate, potassium nitrate and urea were used as nitrogen sources for biostimulation. Carbon dioxide and oxygen levels in the reactors were continuously recorded to monitor microbiological activity. Contaminant removal process was investigated by heterotrophic plate count, total petroleum hydrocarbons (TPH) and C10-C25 n-alkane analyses carried out on days 4, 8, 12, 15. Respirometric measurements showed apparent biodegradation in natural soil used in the experiments. Ammonium, nitrate and urea enhancements caused 66 %, 56 % and 37 % total C10-C25 n-alkane removal, respectively. Highest n-alkane degradation rate was calculated for ammonium sulfate enhancement (0,13 $d^{-1}$) while rates of potassium nitrate and urea enhancements were slower (0,06 and 0,05 $d^{-1}$ respectively).***

***Keywords— Biodegradation, Biostimulation, n-Alkane, Nitrogen, Diesel***

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