The feasibility test as a flushing agent of vegetable oil emulsion for the remediation of DNAPL(dense non-aqueous phase)

이영철, 권태순[1], 양중석, 양지원*
한국과학기술원; [1]한국에너지기술연구원
(jwyang@kaist.ac.kr*)

The feasibility of micro-sized emulsion, using vegetable oils such as corn and olive, was investigated in one dimensional column flushing of TCE (trichloroethylene) and PCE (perchloroethylene). Then removal efficiencies of 98.2% with corn oil emulsion and 99.1% with olive oil emulsion were obtained. Corn and olive oil showed a similar flushing performance. The inhibition in mass transfer between TCE and emulsion was not observed because TCE was well flushed out by emulsion within 12 hours. In latter phase of flushing, tails of low TCE concentration existed. The residual contents of oil were 5.217 g corn oil/kg sand and 4.348 g olive oil/kg sand. This means that 2~3% of total oil flowed through column was sorbed on sands. The sorption oil onto soil would be expected to be enhanced degradation of chlorinated solvents by microbial activities. Similar to the results of TCE flushing, the removal efficiencies of 98 % with corn oil emulsion and 98.7 % with olive oil were obtained for PCE. TCE has extraordinarily high aqueous solubility (1099 ppm at 25℃) among the chlorinated solvents (PCE, 200 ppm at 25℃). Therefore, flushing of TCE was completed within a short time.