Laboratory Assessment of Soil Flushing of Nonaqueous Phase Liquids with Ethyl Lactate and Limonene Solutions. (S11-lee093156-Oral)

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Abstract:

Biofriendly compounds, ethyl lactate and d-limonene were investigated as cosolvents for use in in-situ flushing of nonaqueous phase liquids. Ethyl lactate (EL) is made from corn, nontoxic, and hydrolyzes to known biodegradable intermediates. Limonene is extracted from citrus rind and has been reported to enhance degradation of organics. Basic characteristics important for evaluating in-situ flushing potential such as interfacial tension (IT), viscosity and solubility enhancement were measured for EL-water and limonene-water solutions with tetrachloroethene (PCE), toluene, and dodecane. IT decreased exponentially from 38 to 2.5 dyne/cm going from 0 to 60 % EL. For limonene solutions, IT values were between 2-3 dyne/cm. Viscosity versus % EL was parabolic with a maximum of 3.09 mm2/sec at 70% EL. For limonene, a maximum viscosity of 5mm2/sec was observed for 1:1:4 emulsifier:limonene:water, which decreased with increasing water content. PCE and toluene solubility in EL solutions followed the log-linear cosolvency model with a cosolvency power of 4.2 and 1.4, respectively. For 1:1:4 emulsifier:limonene:water, PCE solubility was about 50000 mg/L (300 times aqueous solubility).

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