

Effects of dissolved oxygen and surfactant treatment on the sorptive capacity of a local soil for phenol

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Abstract: The soil used in this study was found to have 24% clay (Muscovite) and a surface area of 173 m²/g. Hexadecyl-trimethyl-ammonium bromide (HDTMA) surfactant was mixed with the soil in order to investigate its effect on the soil sorptive capacity. Fourier transform infrared spectroscopy (FTIR) spectrums showed interaction between the soil and HDTMA. Phenol adsorption isotherms conducted for the soil under different combinations of HDTMA and dissolved oxygen (DO) revealed that both HDTMA and DO enhance the adsorption capacity of the soil for phenol. HDTMA-induced increase of 48.5% and 312% in the soil sorptive capacity was attained at a residual phenol concentration of 100 g/l under anoxic and oxic conditions, respectively. On the other hand, DO increased the soil sorptive capacity by 26% and 249% at 100 mg/l phenol residual concentration for untreated and treated samples, respectively. The sorptive capacity enhancement was investigated at different residual phenol concentrations. DO without HDTMA treatment caused a constant enhancement around 40%. Up to a residual phenol concentration of 240 mg/l, DO caused an additional capacity enhancement over that treated with HDTMA only. Above the aforementioned residual concentration, an opposite trend was observed.