

Effect of groundwater velocity on pilot scale bioremediation of gasoline contaminated sandy aquifers

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Abstract: The effect of groundwater velocity on bioremediation of gasoline contaminated sandy soil has been investigated using a pilot scale sand tank model. The effect of hydrogen peroxide and contaminant concentration are also included. A factorial experiment has been conducted to study three factors, groundwater velocity, inlet BTX concentration and hydrogen peroxide dose. Observed concentration data collected from the sand tank model have been used for estimating the transport parameters. Three different biodegradation kinetics, namely first-order/zero-order, Monod and Michaelis Menten (a modification of Monod kinetics considering no microbial growth) kinetics have been used to model the biodegradation. The data have been found to fit all three models with acceptable coefficient of regression. Groundwater velocity has been found to be the most significant factor governing the biodegradation rate constants (determined from the first-order rate constant) of BTX compounds. Hydrogen peroxide dose and BTX concentration have also been found to be significant factors.