



Effect of glucose on toluene biodegradation during transport through quartz sand column

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In this study we investigated the effect of glucose on possible enhancement of toluene biodegradation by *Pseudomonas putida* in both batch and column conditions. Kinetic batch experiments were conducted by inoculating bacteria into toluene solution in the presence or absence of glucose while column experiments were conducted using quartz sand by applying pulse input of tracer solutions under three different conditions: 1) toluene only, 2) toluene and bacteria and 3) toluene, bacteria and glucose. In the presence of glucose as an additional carbon source from the batch experiment, toluene concentration showed a sharp decline with a rapid increase of bacterial concentration while slight decrease of toluene was observed with little change in bacterial populations in the absence of glucose. Column experiment also showed that substantial increase of biodegradation occurred during transport through quartz sand when glucose was supplied as a secondary substrate in addition to bacteria in the tracer solution. These results indicate that glucose plays an important role in enhancement of toluene degradation during transport and can be readily applied to in situ bioremediation of aquifers contaminated with toluene.