Modeling Biodegradation of Chlorinated Groundwater Contaminants Under Iron-Reducing Conditions of a Constructed Wetland: A System Dynamics Approach

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Biblioscholar Sep 2012, 2012. Taschenbuch. Book Condition: Neu. 246x189x14 mm. This item is printed on demand - Print on Demand Neuware - The purpose of this study is to determine and explore the fundamental processes associated with biodegradation of chlorinated ethenes in iron-reducing conditions of a constructed wetland and to evaluate the impacts of changing conditions (both natural and engineer-controlled) on the system. The modeler uses a system dynamics approach to construct a model that represents behavior in the iron-reducing environment. The model incorporates hematite, a form of oxidized iron (Fe^{3+}), as the electron acceptor in microbial biodegradation in the system. Vinyl chloride, cis-dichloroethene, and trans-dichloroethene are known to anaerobically degrade to carbon dioxide in the presence of oxidized iron. Other biodegrading processes, including those associated with hydrogen and natural organic materials, compete with the contaminant degrading processes for the oxidized iron. These processes are all incorporated into the model. Model simulations show that the organic material parameters have a greater influence on hematite depletion compared with parameters of the modeled contaminants. By increasing the amount of hematite in the soil, the time period that biodegrading processes exist in the constructed wetlands

Reviews

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