Effects of Cu and Ca on Ciprofloxacin Transport in Saturated Porous Media

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Ciprofloxacin (CIP), an emerging contaminant of antibiotics, has been frequently detected in soils and water; however, their fate and transport in soil and groundwater systems remain largely unknown. This study examined environmental behavior of CIP with both batch sorption and column transport experiments under the influence of two divalent cations (Cu^{2+} and Ca^{2+}). Sorption ability of quartz sand for 200ppb CIP was examined using different co-existed cation concentration. Both Cu and Ca decrease Cip adsorption and Cu have stronger ability to increase CIP mobility. Laboratory columns packed with quartz sand were used to determine the effects of co-existence of the two cations on CIP retention and transport. Simulations from an advective-dispersive transport model matched well with the experimental data collected from column breakthrough studies. Our results indicate that both cations involved in the reversible and irreversible part of CIP.