

Competitive Effects of Phosphate and Sulfate on the Kinetics of Arsenate Sorption on Goethite

S. E. O'Reilly

To make sound decisions regarding arsenate (As) contamination of soils, it is necessary to have a thorough understanding of As sorption over time and how it is effected by common soil nutrients. Very few studies have examined the effects of competitive sorption, especially, over time. Adsorption of anions in soil components is strongly influenced by competition from other absorbing counter anions. Potential competing anions for As include sulfate (S) and phosphate (P) which are commonly present in nature. The major objectives of this study were to determine the effects of aging on the sorption of As on goethite in competition with P or S and to examine the effects of varying concentration ratios of the competing anions. Regardless of the concentration ratio, there was less sorption of the anion in a competitive situation than there was for that anion alone. Decreases ranged from approximately 25-75% for P and 30-60% for As. For equal concentrations of As and P (at pH 6), P sorption was initially greater than As sorption, but, after five hours, As sorption was greater than P sorption.