Electrostatic Sorption of Acidic Organic Chemicals by Variable-Charge Soils as a Function of Chemical and Soil Charge Properties. (S11-hyun123144-Poster)

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Abstract:

Organic-carbon normalized sorption coefficients and pH are the parameters typically used in predicting sorption of organic acids, which considers only hydrophobic partitioning of neutral and anionic species. We evaluated the significance of sorption to positively charged sites on variable-charge soils as a function of pH, chemical pKa, soil ZPC, and ionic composition. Sorption isotherms for 2,4-D, prosulfuron, and 5 chlorinated phenols were measured on several variable-charge mineral dominant soils from aqueous solutions of CaCl2, CaSO4, and Ca(H2PO4) 2 as a function of pH. Chemical's pKa values ranged from 2.8 to 7.85. The amount of sorption that was suppressed in the presence of sulfate and phosphate was attributed to anion exchange. Contribution of anion exchange to the total amount sorbed was inversely proportional to chemical pKa and was greatest when soil-solution pH was closest to the soil ZPC. Anion exchange decreased with increasing pH proportional to the decrease in AEC with pH. When AEC was small relative to the total surface charge, the presence of phosphate did not impact sorption with the exception of 2,4-D where large impacts were still observed.

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