Effects of Supporting Electrolytes and Fertilizer Mixture on Sorption Behavior of Phosphorus in Immokalee Soil Used for Sugarcane Production

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Researchers have been studying phosphorus (P) sorption behavior using electrolytes of varying ionic strength and composition. Appropriate electrolytes for different field conditions need to be identified. Use of appropriate electrolytes will help in conducting P sorption experiments that yield reliable sorption coefficients (K_D) for modeling P movement. Immokalee fine sand (Sandy,siliceous, hyperthermic Arenic Alaquods) is used for sugarcane production in Southwest Florida. Phosphorus fertilizer is applied to sugarcane fields together with potassium (K) and nitrogen (N) fertilizers. In this study, 0.01M KCl, 0.005M $CaCl_2$, deionized water, and simulated Florida rain were the supporting electrolytes. The fertilizer mixture (P, K and N) solution was prepared in simulated Florida rain. Soil samples of A and Bh horizons were taken at five different positions in a 30 acre sugarcane field. P sorption isotherms were measured at a soil to solution ratio of (1:2) and the maximum initial P concentration was based on recommended application rate. The sorption coefficient values were calculated from the isotherms. Calculated linear K_D values showed that sorption of P by A and Bh horizons follows the trend 0.005M $CaCl_2$ > 0.01M KCl > deionized water. The supporting electrolyte that best mimics P sorption behavior in the fertilizer mixture prepared in simulated Florida rain is 0.01M KCl.