

## THE KINETICS OF NONEXCHANGEABLE POTASSIUM RELEASE IN COASTAL PLAIN SOILS

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### **Abstract**

The kinetics of nonexchangeable K release using H-saturated resin were investigated on a Kenansville soil (Arenic Hapludults) and on a Kalmia soil (Typic Hapludults) from the Delaware Coastal Plain. The mineralogy of the  $<2\mu\text{m}$  clay fraction of the two soils was largely kaolinite with substantial quantities of chloritized vermiculite. Both soils contained most of their total K in the mineral form. Kinetics of nonexchangeable K release in the soils was investigated from 6 min to 40 days. The data were found to conform well to first-order kinetics. Release rate coefficients ( $k_2$ ) ranged from 1.1 to  $2.2 \times 10^{-3}$  hour<sup>-1</sup>. The low  $k_2$  values indicated slow rates of K release as would be expected. The parabolic diffusion law also explained the data well with apparent diffusion rate coefficients ( $k_2$ ) ranging from 1.7 to  $2.6 \times 10^{-2}$  hour<sup>-1</sup>. Thus, diffusion appeared to be the major rate limiting step in the rate of K release.

After 40 days of H-resin extraction the  $<2\mu\text{m}$  clay fraction of the soils revealed no apparent clay mineral deterioration; thus, the use of H-saturated resin in evaluating the kinetics of nonexchangeable K release is justified.