Kinetics of Nonexchangeable Potassium Release in Surface and Subsurface Horizons of Predominant Soil Series in Kohgilouye-va-Boyerahmad Province

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Abstract

The aim of this study was to assess the kinetics of nonexcheangable potassium release in surface and subsurface soil horizons, using organic and inorganic extractions, in Kohgilouye-va-Boyerahmad Province. Kinetics of K^+ release was studied by successive extractions of K from 64 selective surface and subsurface soil samples, using 0.01 M $CaCl_2$ and 0.01 M oxalic acid, for 1948 h, with two replicates. Nonexchangeable K^+ release was fitted by Elovich, Pseudo-first order, Power function and Parabolic equations. Result showed that the average nonexchangeable K^+ released (extracted by 1M HNO_3) was 356 mg/kg, while those extracted by $CaCl_2$ and oxalic acid after 1948 h were only 58% and 52% of the total amount of nonexchangeable K^+ of the soils, respectively. In all soil samples, nonexchangeable K^+ released by oxalic acid was less than that released by CaCl2, due to the high buffering capacity resulting from high carbonates in the soils. Potassium release rate in Elovich and Parabolic equations were significantly correlated with non-exchangeable potassium and some physical and chemical characteristics. Based on high Coefficients of determination (r^2) and low Standard errors (SE), Elovich, Power function, First order and Parabolic equations were selected as the best equations for prediction of K^+ release from the soils.

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