

The Effect of Superphosphate Fertilizer Application on the Kinetics of Non-Exchangeable Potassium Release in Some Calcareous Soils

A. R. Hossienpur, M. Barati Zanyani* and M. H. Salehi¹

(Received: January 21-2023 ; Accepted: October 16-2023)

Abstract

The kinetics of potassium release may be affected by P. When phosphorus (P) fertilizer is applied to soils. The objective of this study was to the effect of $\text{Ca}(\text{H}_2\text{PO}_4)_2$ fertilizer on the kinetics of non-exchangeable potassium (NEK) release in 10 calcareous soils. The amount of 100 mg kg^{-1} of P as $\text{Ca}(\text{H}_2\text{PO}_4)_2$ was added to the soils. Treated and untreated soils were incubated at 70% of field capacity and $25 \pm 1^\circ\text{C}$ for 90 days. After that, the NEK release was studied by 0.01 M CaCl_2 extractant in 2017 hours by successive extraction methods in the treated and untreated soils. The results showed the NEK released in treated soils less than in untreated soils. The mean cumulative NEK released after 2017 h in the treated and untreated soils was 260.6 and 303.3 mg kg^{-1} , respectively. The release of NEK in all soils was fast in the initial stages and continued at a lower speed in the later stages until the end of the experiment. The kinetics of NEK release was evaluated using kinetic equations. Based on the highest coefficients of determination (R^2) and the lowest standard error (SE), the kinetics of NEK release in treated and untreated soils were described by the power function equation. The results of this research could be helpful for the precise fertilizer recommendation for the study in calcareous soils.

Keywords: Release, Mono-calcium phosphate, Non-exchange potassium

1. Department of Soil Science and Engineering, Faculty of Agriculture, University of Shahrekord, Shahrekord, Iran.
*: Corresponding author, Email: marziehbarati99@yahoo.com