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Soil transport parameters of potassium under a tropical saline soil condition using STANMOD

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Environmental responsibility and concerning about the final destination of solutes in soil, so more studies allow a better understanding about the solutes behaviour in soil. Potassium is a macronutrient that is required in high concentrations, been an extremely important nutrient for all agricultural crops. It plays essential roles in physiological processes vital for plant growth, from protein synthesis to maintenance of plant water balance, and is available to plants dissolved in soil water while exchangeable K is loosely held on the exchange sites on the surface of clay particles. K will tend to be adsorbed onto the surface of negatively charged soil particles. Potassium uptake is vital for plant growth but in saline soils sodium competes with potassium for uptake across the plasma membrane of plant cells. This can result in high Na^+:K^+ ratios that reduce plant growth and eventually become toxic. This study aimed to obtain soil transport parameters of potassium in saline soil, such as: pore water velocity in soil (v), retardation factor (R), dispersivity (λ) and dispersion coefficient (D), in a disturbed sandy soil with different concentrations of potassium chlorate solution (KCl), which is one of the most common form of potassium fertilizer. The experiment was carried out using soil samples collected in a depth of 0 to 20 cm, applying potassium chlorate solution containing 28.6, 100, 200 and 500 mg L^{-1} of K. To obtain transport parameters, the data were adjusted with the software STANMOD. At low concentrations, interaction between potassium and soil occur more efficiently. It was observed that only the breakthrough curve prepared with solution of 500 mg L^{-1} reached the applied concentration, and the solution of 28.6 mg L^{-1} overestimated the parameters values. The STANMOD proved to be efficient in obtaining potassium transport parameters; KCl solution to be applied should be greater than 500 mg L^{-1}; solutions with low concentrations tend to overestimate parameters values.