Changes in Some Chemical Properties of Arid Soils as Affected by Synthetic Polymers

A. M. FALATAH
M. I. CHOUDHARY
A. M. AL-OMRAN

Department of Soil Science
College of Agriculture
King Saud University
Riyadh, Saudi Arabia

Four soil conditioners, Broadleaf P4, Agrihope, Aquasorb, and Hydrogel, were used in a laboratory study to investigate the effect of these polymers on chemical properties of two calcareous sand and loam soils. Four concentrations of each polymer used were 0.0%, 0.2%, 0.4%, and 0.6% (w/w). All treatments were irrigated weekly to 60% water holding capacity for a total of 16 wetting and drying cycles. The addition of conditioners induced a substantial change in the selected soil chemical properties. For both soils, pH and EC values increased significantly with corresponding increase in concentrations of all conditioners. The extractable nutrients (Zn, Cu, Mn, Fe, P, and K) fluctuated irregularly with the four concentrations of each conditioner. In sandy soil the application of all conditioners significantly increased extractable P, whereas extractable Zn remained unaffected. Extractable Mn significantly decreased with Broadleaf and Aquasorb application but increased with Agrihope. Extractable Fe increased with Broadleaf and Hydrogel. In loamy soil the extractable Zn, Mn, and P were not affected by the applied conditioners. Extractable Fe decreased by Broadleaf application, but significantly increased with Aquasorb addition. Extractable Cu decreased only at the highest concentration of Broadleaf conditioner. Extractable K significantly increased with Hydrogel. The results obtained confirm our previous conclusions that application of synthetic conditioners may have deleterious effects on some chemical properties of arid calcareous soils.

Keywords arid soils, electrical conductivity, micronutrients, phosphorus, potassium, soil reaction, synthetic polymers

Many studies have been conducted using synthetic soil conditioners to improve chemical