

Leaching Losses of Fertilizer Nitrogen as Affected by Sulfur and Nitrification Inhibitor Applications

Authors : Abdel Khalek Selim, Safaa Mahmoud

Abstract : Experiments were designed to study nitrogen loss through leaching in soil columns treated with different nitrogen sources and elemental sulfur. The soil material (3 kg alluvial or calcareous soil) were packed in Plexiglas columns (10 cm diameter). The soil columns were treated with 2 g N in the form of Ca(NO₃)₂, urea, urea + inhibitor (Nitrapyrin), another set of these treatments was prepared to add elemental sulfur. During incubation period, leaching was performed by applying a volume of water that allows the percolation of 250-ml water throughout the soil column. The leachates were analyzed for NH₄-N and NO₃-N. After 10 weeks, soil columns were cut into four equal segments and analyzed for ammonium, nitrate, and total nitrogen. Results indicated the following: Ca(NO₃)₂ treatment showed a rapid NO₃ leaching, especially in the first 3 weeks, in both clay and calcareous soils. This means that soil texture did not play any role in this respect. Sulfur addition also did not affect the rate of NO₃ leaching. In urea treatment, there was a steady increase of NH₄- and NO₃-N from one leachate to another. Addition of sulfur with urea slowed down the nitrification process and decreased N losses. Clay soil contained residual N much more than calcareous soil. Almost one-third of added nitrogen might have been immobilized by soil microorganisms or lost through other loss paths. Nitrification inhibitor can play a role in preserving added nitrogen from being lost through leaching. Combining the inhibitor with elemental sulfur may help to stabilize certain preferred ratio of NH₄ to NO₃ in the soil for the benefit of the growing plants.

Keywords : alluvial soil, calcareous soil, elemental sulfur, nitrate leaching

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