Mitigating ammonia volatilization from urea in waterlogged condition using Clinoptilolite zeolite

ABSTRACT

Besides causing environmental pollution, ammonia volatilization from nitrogenous fertilizers such as urea reduce urea-N use efficiency in agriculture. Amending urea with Clinoptilolite zeolite may reduce ammonia loss from urea as well as improving chemical properties of soils. This study was conducted to determine the effects of amending an acid soil with Clinoptilolite zeolite on ammonia loss and selected soil chemical properties. An acid soil (Typic Paleudults) was mixed with three rates of Clinoptilolite zeolite. Treatments were evaluated using closed-dynamic airflow system. Standard procedures were used to determine soil pH, total nitrogen, exchangeable ammonium, available nitrate, available phosphorus, exchangeable cations, organic matter, total organic carbon, and cation exchange capacity (CEC). Application of Clinoptilolite zeolite significantly reduced ammonia loss up to 25.33%, increased soil pH, exchangeable ammonium, available nitrate (treatment with highest amount of Clinoptilolite zeolite) and exchangeable cations. However, there was reduction in total titratable acidity, exchangeable Al3+ and H+ ions. Mixing acid soil (Typic Paleudults) with Clinoptilolite zeolite minimized ammonia loss from urea and improved selected soil chemical properties (under laboratory condition).

Keyword: Ammonia loss; Urea; Clinoptilolite zeolite; Soil chemical properties; Exchangeable ammonium; Available nitrate