

Enhancing the urea-N use efficiency in maize (*Zea mays*) cultivation on acid soils amended with zeolite and TSP.

ABSTRACT

Ammonia loss significantly reduces the urea-N use efficiency in crop production. Efforts to reduce this problem are mostly laboratory oriented. This paper reports the effects of urea amended with triple superphosphate (TSP) and zeolite (Clinoptilolite) on soil pH, nitrate, exchangeable ammonium, dry matter production, N uptake, fresh cob production, and urea-N uptake efficiency in maize (*Zea mays*) cultivation on an acid soil in actual field conditions. Urea-amended TSP and zeolite treatments and urea only (urea without additives) did not have long-term effect on soil pH and accumulation of soil exchangeable ammonium and nitrate. Treatments with higher amounts of TSP and zeolite significantly increased the dry matter (stem and leaf) production of Swan (test crop). All the treatments had no significant effect on urea-N concentration in the leaf and stem of the test crop. In terms of urea-N uptake in the leaf and stem tissues of Swan, only the treatment with the highest amount of TSP and zeolite significantly increased urea-N uptake in the leaf of the test crop. Irrespective of treatment, fresh cob production was statistically not different. However, all the treatments with additives improved urea-N uptake efficiency compared to urea without additives or amendment. This suggests that urea amended with TSP and zeolite has a potential of reducing ammonia loss from surface-applied urea.

Keyword: Ammonia volatilization; Zeolite; TSP; Urea; Nitrate; Acid soils; Maize cultivation.