

## Mitigating ammonia volatilization from waterlogged acid soils using organic amendments

### ABSTRACT

In production agriculture, granular urea is the most used nitrogen fertilizer in crop production. However, increase in soil pH following application of urea causes ammonia volatilization and reduces N use efficiency. To minimize ammonia loss, organic amendments are used, however, type of organic amendment use could affect urea use efficiency. This study was to determine the effects of organic amendments derived from forest litter, *Leucaena leucocephala*, chicken litter, and cow dung on ammonia volatilization and chemical properties of a waterlogged acid soil. Treatments evaluated were: (i) T1, Soil only, (ii) T2, Existing recommended fertilization, (iii) T3, Biochar-forest litter compost, (iv) T4, Biochar-chicken litter compost, (v) T5, Biochar-cow dung compost, (vi) T6, Biochar-*Leucaena* compost, and (vii) T7, Biochar-*Leucaena* - chicken litter compost. Standard procedures were used to quantify ammonia volatilization and soil chemical properties. The findings of this present study also revealed that the total amount of ammonia loss from urea over a period of forty-two days depends on the influence of the organic amendments on urea hydrolysis. Emissions of ammonia from T6 and T7 were significantly higher because, the decomposition of *Leucaena leucocephala* favours urea hydrolysis compared with those of T3, T4, and T5. Therefore, *Leucaena leucocephala* composts should be carefully co-applied with urea to minimize ammonia loss if the aim of using this type of amendments is to improve N use efficiency and soil and crop productivity.

**Keyword:** Agricultural wastes; Ammonia volatilization; Chemical fertilizers; Soil organic amendments; Urea hydrolysis