

EFFECT OF SOIL MOISTURE ON UREA VOLATILIZATION FROM AN ALFISOL IN DRY ZONE OF SRI LANKA

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The effect of soil moisture on urea volatilization from an Alfisol in the dry zone, Sri Lanka was investigated. A bulk soil sample was collected from the research field of Faculty of Agriculture, Rajarata University of Sri Lanka. A pot experiment was arranged under completely randomized design (CRD) with four treatments and four replicates. For the treatments soil moisture were maintained at, saturated conditions (SC, volumetric water content (VWC): 33%), field capacity (FC, VWC: 16%), half field capacity (HFC, VWC: 8%) and air-dried condition (DC) by applying pre-determined amount of water to each pot. A 50% overhead shade net was hung at 1.8 m above ground to simulate the canopy shading effect. Urea was applied at a rate of 1,276.5 mg kg⁻¹ to each pot and the NH₃ emitted from each pot was collected using the enclosure method. Soil NO₃⁻-N, NH₄⁺-N, pH and EC were analyzed at six time points in two-day intervals. The effect of soil moisture, time and their interaction effect on NH₃ volatilization were analyzed using repeated measure ANOVA with post-hoc Tukey HSD test. NH₃ volatilization was significantly reduced with time ($p < 0.05$). Time and treatment interactions effect were significant ($p < 0.05$) for volatilized NH₃ and the measured soil parameters except soil NO₃⁻-N. The decreasing order of NH₃ volatilizations were recorded in SC (mean: 6.3 gm⁻² day⁻¹), HFC (mean: 4.9 gm⁻² day⁻¹), FC (mean: 4.7 gm⁻² day⁻¹) and DC (mean: 0.065 gm⁻² day⁻¹). A decreasing trend was observed for both NH₃ volatilization and soil NO₃⁻-N in each treatment during the studied period. Further, soil NH₄⁺-N and EC significantly fluctuated and soil pH did not fluctuate significantly in each treatment over time. It is concluded that the soil FC is the optimum soil moisture level for maintaining high N use efficiency of the applied urea in Alfisol in the dry zone, Sri Lanka.

Keywords: Alfisol, Ammonia volatilization, N use efficiency, Urea