

Ammonia Volatilization from Frequently Applied Fertilizers for the Low-Country Tea Growing Soils of Sri Lanka

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ABSTRACT: Ammonia volatilization is one of the major nitrogen losing pathways in agricultural fields. Particularly, Low-country tea growing areas of Sri Lanka having warm humid climate, often records low or poor responses to current fertilizer recommendations. Therefore, a glasshouse experiment was conducted to determine the gravity of ammonia volatilized from four major tea growing Soil Series of the Low-country wet zone. Air tightened closed chambers with soils containing acid traps were used to quantify ammonia volatilized from applied fertilizers. The experiment was conducted for 100 days while monitoring temperature and relative humidity in the glasshouse which were comparable with prevailing conditions in the low-country wet zone. Volatilized ammonia was quantified daily at the beginning and later with elapsed time. Curves defining the release of ammonia with time and the change of pH with time were plotted from the results. Significant differences were observed in soil pH changes among treatments. Sulphate of ammonia based T1130 mixture recorded the least change in soil pH while urea based VPLC 880 showed the highest variation. During the experimental period, highest pH was recorded at the fourth day after treatment application which confirms the peak hydrolysis of urea. No significant differences were recorded in soil pH changes with soil series. Ammonia volatilization was the lowest in T1130 treatment and it behaved similar to the control treatment without fertilization. Ammonia losses were the highest in VPLC 880 fertilizer amounting to 29%. Other urea based mixtures also showed considerably high losses as U 709 – 27%, U834 – 27%, UT 752 – 26%. T 1130 showed the minimum losses as 1% similar to control. Among soil Series, NH₃ losses were sequenced as Dodangoda>Weddagala>Malaboda>Pallegoda. As these soils show low pH buffering ability, split application of urea based fertilizers may effective to minimize NH₃ losses.

Keywords: ammonia volatilization, fertilizers, pH, soil series, tea

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