

ABSTRACT

Volatilization of Ammonia from Urea in
Contrasting Trinidad Soils.

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Laboratory and field experiments were conducted to assess the volatile loss of ammonia from urea applied to soil, to determine the factors which affect it and to investigate methods of reducing it.

The rate of ammonia volatilization which was observed from applied urea depended on the method by which it was determined. The laboratory method provided optimum conditions for urea hydrolysis and therefore, the rates of ammonia loss obtained by this method were significantly greater than those of the field determinations.

The volatile loss of ammonia from applied ammoniacal carriers varied between 0 and 46 per cent of the applied nitrogen, most of it occurred within five days after application. Volatilization was higher from urea than from ammonium sulphate due to the increase in soil pH which resulted when the former carrier underwent enzymatic hydrolysis to the alkaline product, ammonium carbonate.

Texture was the most important soil factor which influenced ammonia loss, greater loss was observed in coarse than in fine textured soils due to the higher maximum pH values obtained in the poorly buffered soils when urea hydrolysis took place.

Ammonia loss was observed in the field only during the day when soil temperatures were high, provided that low soil moisture contents did not limit urea hydrolysis. Rapid loss of soil moisture after fertilizer application reduced volatilization by limiting the rate of urea hydrolysis. The presence of plants in the field reduced the rate of moisture loss and increased volatilization. When heavy rainfall occurred within 48 h after fertilizer application, the carrier was leached into the soil and volatilization was not detected.

The incorporation of the N carrier to a depth of 4 cm in the soil and the use of a 2 cm thick mulch significantly reduced the volatile loss of ammonia from applied urea.