

AMMONIUM THIOSULFATE AS A NITRIFICATION AND UREASE INHIBITOR - PRESENT STATUS

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ABSTRACT

Since most of the author's work on ammonium thiosulfate (ATS) as a nitrification or urease inhibitor has already been published, only an Abstract and Bibliography are presented here. Major findings are: 1) Thiosulfate ($S_2O_3^{2-}$) has significantly inhibited nitrification in laboratory incubations. 2) This effect has been difficult to reproduce in the field, due to the fact that thiosulfate is too easily leached below the ammonium retention zone. 3) Thiosulfate has significantly inhibited soil urease activity/in laboratory incubations. 4) Modest additions (1-5% v/v) of ATS to urea-ammonium nitrate (UAN) have significantly reduced ammonia volatilization in both lab and field tests. However, ammonia loss directly from ATS can occur if the inclusion of ATS is too high, as many ATS products are alkaline. 5) Common ammonium polyphosphate (APP, 10-34-0) can also reduce the ammonia volatilization potential of UAN, presumably because of a pH buffering effect. Addition of APP to UAN-ATS mixtures seems to prevent the ammonia loss from ATS observed at higher levels of ATS addition. 6) The beneficial effects of ATS and APP on ammonia loss are strengthened by dribbling rather than spraying the fertilizer on the soil surface. 7) Ammonia losses from UAN have consistently been the least when both ATS and APP were present. 8) Trial rates of 2% (v/v) ATS and 10-20% (v/v) APP in the fertilizer mixture are suggested for trial, until further research indicates otherwise. 9) These concepts may prove to reduce ammonia losses from surface applied UAN with very little extra expense and research in this area is urged. 10) In any case, adding ATS or APP will never replace incorporation as the most sure way of reducing ammonia loss. However, ATS-APP-UAN mixtures may prove to reduce ammonia losses in cropping systems where immediate incorporation is not feasible.

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