

ABSTRACT

Experiments to determine the toxic concentrations of $\text{NO}_2\text{-N}$ to plants were performed in water and sand culture and in two Trinidad Soils (River Estate loam and Montserrat clay). $\text{NO}_2\text{-N}$ was applied to tomato plants in water, sand and soil, and to maize in sand.

At concentrations up to 100 ppm, $\text{NO}_2\text{-N}$ was found to be non-toxic to tomato plants grown in sand at pH 6.0. Similarly for maize at concentrations up to 200 ppm $\text{NO}_2\text{-N}$, at pH 4.5 and 6.0. In water culture experiments, tomatoes were shown to be susceptible to 100 ppm $\text{NO}_2\text{-N}$ only at the lower pH of 4.5 and to 200 ppm $\text{NO}_2\text{-N}$ at both pH 4.5 and 6.0. Toxicity symptoms were more advanced in the presence of $\text{NH}_4\text{-N}$ than $\text{NO}_3\text{-N}$ as the main source of nitrogen.

Tomato plants were not killed in soil until a concentration of 240-280 ppm $\text{NO}_2\text{-N}$ had been produced in the River Estate loam (pH 5.8) and 300-350 ppm in the Montserrat clay (pH 6.5).

$\text{NO}_2\text{-N}$ toxicity appeared to be closely linked with pH and this is suggested to be due to the dissociation of nitrous acid.

Figures for the persistence of $\text{NO}_2\text{-N}$ in water and sand are given and these indicate that failure to produce toxicity symptoms at lower concentrations was not due to the decomposition of $\text{NO}_2\text{-N}$ over the period of application. The accumulation and persistence of $\text{NO}_2\text{-N}$ was also followed in the two soils used in the experiments. $\text{NO}_2\text{-N}$ was found to persist in River Estate loam but not in Montserrat clay. Decomposition and gaseous loss of added $\text{NO}_2\text{-N}$ occurred in both soils. Rapid oxidation of any $\text{NO}_2\text{-N}$ present to $\text{NO}_3\text{-N}$ is suggested to be the cause of low $\text{NO}_2\text{-N}$ concentrations in the Montserrat soil compared with River Estate loam.

Toxicity symptoms, obtained for tomatoes in water culture and in soil, are described in the text and photographs of representative plants are included.