

EFFECT OF HYDROLYSIS OF UREA ON pH OF ALKALINE SOILS UNDER DIFFERENT CROPPING SYSTEMS

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ABSTRACT

Experiments were conducted under laboratory conditions for studying the effect of different concentrations of urea on pH changes in alkaline calcareous soils under different cropping systems. Five soils were included in this study; two soils (S1 and S5) were cropped to flooded rice (lowland soils) and three soils (S2, S3 and S4) were under maize, cotton and sorghum, respectively (upland soils). Urea was applied at six urea-N concentration; 0.28, 0.56, 0.84, 1.12, 1.40 and 1.68 mg N g⁻¹ soil. The treated soil samples were incubated at 20% moisture for 14 days and pH was measured in 1:1 soil:water suspension at different intervals. The results showed that there was a consistent increasing trend in soil pH as the hydrolysis proceeded upto day 3 of incubation. After that the samples with complete hydrolysis of urea showed a decrease in pH. The highest increase in pH (0.81 - 1.02 unit) occurred in soils treated with highest rate of urea N (1.68 mg N g⁻¹ soil). The pH of soils from maize, cotton and sorghum area treated with 0.28 mg N g⁻¹ soil tended to become normal within six days; whereas the pH values of rice soils remained elevated for extended period of time (14 days). This was due to slower hydrolysis of urea in rice soils. The results suggest that high rate of urea application should be avoided to eliminate the adverse effects on plant growth.