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Effect of application of urea with and without dolomite on soil nitrogen in coconut growing gravelly soil

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The effect of application of urea with and without dolomite on soil nitrogen in coconut growing gravelly soils was studied. This experiment comprised of eight treatments viz., T_1-Control, T_2–dolomite only (835 kg ha^{-1}), T_3–urea only (666 kg ha^{-1}), T_4–separate application of urea (666 kg ha^{-1}) and dolomite (835 kg ha^{-1}) without time gap, T_5–separate application of urea(666 kg ha^{-1}) and dolomite (835 kg ha^{-1}) with one month time gap, T_6–application of 1:25 urea and dolomite mixture at 1500 kg ha^{-1}, T_7–T_3 with mulch, T_8–T_6 with mulch. An experimental unit consists of cement pots which were filled with 8 kg of fresh soil (pH 4.5). Experiment was in Randomized Completely Block Design with 3 replicates.

Representative soil samples were drawn from 10 cm depth in each pot and analyzed for pH, moisture, total nitrogen (N), ammonical nitrogen (NH_4-N) and nitrate nitrogen (NO_3-N) before treatment application and then at 2 day intervals after the treatment application to six weeks. The moisture content of the soil (dry basis) was in the range of 8.9% to 25.7% and soil temperature was 27^0C to 37^0C during the study period. The soil pH of the urea only and urea and dolomite treatments increased by 3.5 units within 2 days after treatment application and thereafter sharply dropped to the range of 5.7 to 6 in four days. The soil pH of the dolomite only treatment increased by only one unit within two days of the treatment application. The pH increased significantly due to urea application to the gravelly soil but such an increase was not observed with dolomite application alone. The pH increase in all urea treatments was not dependent on the presence of dolomite since there was no significant difference between urea only and urea dolomite treatments. The total soil N showed a sharp increase in all urea treatments until two days after treatment application and thereafter it decreased sharply by six days and gradually decreased to the initial level in 44 days. The above rates of decrease were not significantly different between T_3 and T_4, T_5, T_6, T_6, T_8. The NH_4-N content in soil varies in almost a similar pattern to the total N and soil pH. The NO_3-N content of the soil increased in all urea only and urea and dolomite treatments by 3-5 times in 12 days and 7 times in 20 days. No significant effect of dolomite was observed on NH_4-N or NO_3-N. The results showed that when gravelly soil is treated with urea or urea and dolomite, their total N rapidly increases within two days and thereafter gradually decreases. The rate of this decrease was not significantly affected by dolomite application with urea.

Keywords: urea, dolomite, soil nitrogen, ammonical, nitrate