

# Inhibitory effect of chloride application on nitrification rates of coconut growing Aquic Quartzipsamments

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Nitrification is an important microbial process which governs the pool size of plant available nitrogen. A pot experiment was conducted to identify the effect of sodium chloride (NaCl) application together with adult palm mixture for coconut (APM) on nitrification rates of a coconut growing Aquic Quartzipsamments in Sri Lanka and to evaluate the nitrate losses under rainfall simulated conditions. Pots were filled with 15 kg of soil (Aquic Quartzipsamments) and the treatments; T1 - Zero NaCl and zero APM application (ZF), T2 – APM, T3- APM+1kg NaCl/palm/year, T4 - APM+2kg NaCl/palm/year, T5 - APM+3kg NaCl/palm/year were imposed with three replicates in a completely randomized design. The pots were maintained with 60% of the water holding capacity. Soil samples were collected at 10 cm depth at two weeks intervals up to three months and analyzed for pH, electrical conductivity,  $\text{NH}_4^+\text{-N}$ ,  $\text{NO}_3^-\text{-N}$ ,  $\text{Na}^+$ ,  $\text{Cl}^-$  and  $\text{K}^+$  contents, population of nitrifiers and potential nitrification rates using standard methods. Pots were saturated with distilled water and leachates were collected at 6 and 12 weeks after treatment application (WTA) and they were assessed for  $\text{NH}_4^+\text{-N}$  and  $\text{NO}_3^-\text{-N}$  contents. Mean comparisons were done at a significant level of 0.05 using SAS 9.1.3. Soil nitrification rates ranged from 1.27 to 2.51  $\mu\text{g N/g dry soil/h}$  at 2 WTA and 0.14 to 1.38  $\mu\text{g N/g dry soil/h}$  at 12 WTA. The increase of soil chloride contents with the use of NaCl has reduced soil nitrification rates and a similar trend was observed in soil  $\text{NO}_3^-\text{-N}$  content and the nitrifier population. However, the lowest nitrification rate was observed in soil treated with APM+3kg NaCl/palm/year compared to other treatments except ZF. In addition, increasing chloride levels of soil has significantly reduced leaching losses of  $\text{NO}_3^-\text{-N}$  at 6 WTA indicating the inhibitory effect of chloride on soil nitrification.