

**EFFECT OF SODIUM CHLORIDE APPLICATION  
ON NITRIFICATION RATE IN COCONUT  
GROWING SOILS**

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## ABSTRACT

Nitrification is the main transformation that governs the pool size of the two plant available N forms;  $\text{NH}_4^+$  and  $\text{NO}_3^-$  in soil. A study was conducted to identify the effect of NaCl application together with KCl on nitrification rates of coconut growing soils and to evaluate the  $\text{NO}_3^-$ -N losses with respect to chloride application under rainfall simulated conditions.

The experiment was conducted as a pot experiment using soils of Madampe soil series with five treatments i.e. (i) Zero fertilizer application (NF), (ii) Adult palm mixture (APM) for Coconut in intermediate zone, (iii) APM + 1 kg NaCl/palm/year, (iv) APM + 2 kg NaCl/palm/year, (v) APM + 3 kg NaCl/palm/year with three replicates ( $n = 3$ ). Soil sampling were carried out at the 2<sup>nd</sup>, 4<sup>th</sup>, 6<sup>th</sup> and 10<sup>th</sup> weeks after imposing the treatments and they were assessed for pH, electrical conductivity,  $\text{NH}_4^+$ -N,  $\text{NO}_3^-$ -N,  $\text{Na}^+$ ,  $\text{Cl}^-$ ,  $\text{K}^+$  contents, ammonium oxidizer and nitrite oxidizer population and potential nitrification rates. Soils were leached simulating rainfall conditions at the 6<sup>th</sup> and 12<sup>th</sup> weeks after treatment application and the leachate was analyzed for  $\text{NH}_4^+$ -N and  $\text{NO}_3^-$ -N contents.

Soil treated with 2 kg NaCl and 3 kg NaCl/palm/yr showed significantly ( $p \leq 0.05$ ) higher  $\text{NH}_4^+$ -N content throughout the experimental period where as significantly ( $p \leq 0.05$ ) lower soil  $\text{NO}_3^-$ -N content was observed in NF followed by APM + 3 kg NaCl/palm/yr during the whole experimental period except in 2 weeks after imposing the treatments. Potential nitrification rates ranged from 1.27 to 2.51 and 0.68 to 3.65 and 0.13 to 1.15  $\mu\text{gNO}_3^-$ -N/g dry soil/h in 2<sup>nd</sup>, 6<sup>th</sup> and 10<sup>th</sup> weeks after treatment application respectively. The soil nitrification rates in the treatment of APM + 3 kg NaCl/palm/yr were significantly reduced with the time. Application of NaCl showed reduction in leaching losses of  $\text{NO}_3^-$ -N and  $\text{NH}_4^+$ -N up to 6<sup>th</sup> week but, it was not effective in 12 weeks after treatment application.

As a conclusion, it was obtain that, addition of extra  $\text{Cl}^-$  as NaCl helps decrease the  $\text{NO}_3^-$ -N content in the soil. It was also reflected by high  $\text{NH}_4^+$ -N content in the  $\text{Cl}^-$  treated soils and leachate. Moreover, application of 3 kg NaCl/palm/yr with APM has an effect of nitrification rate as well as  $\text{NO}_3^-$ -N content.

**Key words: Ammonium, leaching loss, nitrate, nitrogen, nitrifiers, potassium chloride**