

Effects of moisture level on nitrogen availability in tropical peat soil cultivated with oil palm (*Elaeis guineensis* Jacq.)

ABSTRACT

Nitrogen release from soil is controlled by the soil moisture. Soil incubation was conducted to evaluate the effect of different moisture condition (75%, 100% and 150%) on water holding capacity and fluctuating conditions between (150% and 100% water holding capacity) after application of urea and without urea addition. Ammonium and nitrate released were measured periodically over 70 days of incubation. Net mineralization and nitrification were measured at the end of the incubation period. Potential nitrification rate (PNR) was measured at the start and the end of incubation period. The results showed that the dynamics of NO₃⁻ did not show significant change with increased soil moisture without addition of urea. This results indicated nitrification in peat soil needed reactive N supply (urea) regardless of soil moisture conditions. Addition of urea increased the PNR ranging from 27.91 to 55.10% compared to without urea. Fluctuating moisture condition with urea addition increased PNR by 21.82% compared with a waterlogged condition. However, increasing soil moisture condition resulted in lower nitrate and PNR which reflect that soil moisture controlled the magnitude of PNR when urea was added.

Keyword: Nitrogen availability; Oil palm; Peat soil; Soil moisture