

N-(n-Butyl) Thiophosphoric Triamide (NBPT) coated urea (NCU) improved maize growth and nitrogen use efficiency (NUE) in highly weathered tropical soil

ABSTRACT

Nitrogen (N) fertilizer is commonly used to supply sufficient N for plant uptake, for which urea is one of the highly preferred synthetic N fertilizers due to its high N content. Unfortunately, N provided by urea is rapidly lost upon urea application to soils through ammonia volatilization, leaching, and denitrification. Thus, treatment of urea with urease inhibitor (N-(n-Butyl) Thiophosphoric Triamide (NBPT)) is among the solutions to slow down urea hydrolysis, therefore reducing loss of NH₃ and saving N available for plant uptake and growth. A field study was carried out to evaluate the effects of NBPT-coated urea (NCU) at varying rates on growth, yield, and nitrogen use efficiency (NUE) of maize in tropical soil. The experiment was conducted at Field 15, Universiti Putra Malaysia, Serdang, Selangor, Malaysia, and maize (*Zea mays* var. Thai Super Sweet) was used as the test crop. The results showed that all maize grown in soils applied with urea coated with NBPT (NCU) (T2, T3, T4, and T5) had significantly ($P \leq 0.05$) higher chlorophyll content compared to the control (T0 and T1). The surface leaf area of maize grown in NCU-treated soils at 120 kg N ha⁻¹ (T3) was recorded as the highest. NCU at and 96 kg N ha⁻¹ (T3 and T4) were relatively effective in increasing maize plant dry weight, yield, and N uptake. Improvement of NUE by 45% over urea was recorded in the treatment of NCU at 96 kg N ha⁻¹. NBPT-coated urea (NCU) at 96 kg N ha⁻¹ had potential to increase the growth, yield, nitrogen uptake, and NUE of maize by increasing the availability of N for plant growth and development.

Keyword: N losses; NBPT-coated urea (NCU); Urease inhibitor; *Zea mays* var. Thai super sweet