

ABSTRACT

An approach to minimize the nitrogen (N) loss evaporating from urea is by inhibiting the urease activity. The inhibitory process of urease activity may be carried out by coating urea with N-(*n*-butyl) thiophosphoric triamide (NBPT) and N-(*n*-propyl) thiophosphoric triamide (NPPT). The urease enzyme is capable to catalyze urea hydrolysis so rapidly that releases carbon dioxide and ammonia, a form of N that can be easily lost from the soil by evaporation. The purpose of this study was to study the effect of urease inhibitor coated urea on growth, physiological activity and yield of maize in Inceptisol Jogonalan, Klaten, Indonesia. The treatment was laid out in a Randomized Complete Block Design with 8 replications namely (1) without fertilizer, (2) urea kg ha⁻¹ (broadcast) 3 times, (3) urea 348 kg ha⁻¹ (soil incorp) 2 times, (4) urea 348 kg ha⁻¹ (broadcast) 2 times, (5) urea 348 kg ha⁻¹+ NBPT+NPPT (broadcast) 2 times, (6) urea 348 kg ha⁻¹ (broadcast) 1 times, (7) urea 348 kg ha⁻¹+ NBPT+ NPPT (broadcast) 1 times, and (8) Urea 278 kg ha⁻¹ + NBPT+NPPT (broadcast) 1 times. The results showed that fertilization affected all observed variables. The urea coated with NBPT+NPPT (urease inhibitors) was more effective at lower dose of 278 kg ha⁻¹ and tended to provide better results indicated by the growth and yield of maize in Inceptisol, Jogonalan, Klaten.

Keywords: nitrogen efficiency, Inceptisol, urease inhibitor, maize, nitrogen fertilizer

INTISARI

Pendekatan untuk meminimalisir hilangnya nitrogen (N) yang menguap dari urea yaitu dengan menghambat aktivitas urease. Proses penghambatan aktivitas urease dapat dilakukan dengan melapisi urea menggunakan N-(n-butil) thiophosphoric triamide (NBPT) dan N-Propyl-Thiophosphoric-Triamide (NPPT). Enzim urease mampu mengkatalisis hidrolisis urea sangat cepat yang melepaskan karbon dioksida dan amonia, suatu bentuk N yang dapat hilang dari tanah melalui penguapan. Tujuan penelitian yaitu untuk mempelajari pengaruh pemupukan urea berlapis inhibitor urease terhadap pertumbuhan, aktivitas fisiologis dan hasil jagung di Inceptisol Jogonalan, Klaten, Indonesia. Penelitian ini menggunakan metode percobaan lapangan, Rancangan Acak Kelompok Lengkap (*Randomized Complete Block Design*) faktor tunggal dengan 8 perlakuan yaitu (1) tanpa pupuk, (2) urea 398 kg/ha (sebar) 3 kali, (3) urea 348 kg/ha (benam) 2 kali, (4) urea 348 kg/ha (sebar) 2 kali, (5) urea 348 kg/ha + NBPT+NPPT (sebar) 2 kali, (6) urea 348 kg/ha (sebar) 1 kali, (7) urea 348 kg/ha + NBPT+NPPT (sebar) 1 kali, dan (8) Urea 278 kg/ha + NBPT+NPPT (sebar) 1 kali. Hasil penelitian menunjukkan bahwa pemupukan mempengaruhi semua parameter. Perlakuan pemupukan urea berlapis inhibitor urease NBPT+NPPT lebih efektif digunakan pada dosis urea yang lebih rendah sebanyak 278 kg ha⁻¹ dan cenderung memberi hasil lebih baik pada parameter pertumbuhan dan hasil jagung di inceptisol Jogonalan, Klaten.

Kata kunci: *efisiensi nitrogen, Inceptisol, inhibitor urease, jagung, pupuk nitrogen*