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Pengaruh Pembenah Tanah dan Urea terhadap Sifat Tanah dan Serapan N Bawang Merah pada Entisol Bugel Kulon Progo
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INTISARI

Entisol bertekstur pasiran memiliki kemampuan rendah dalam menahan air dan unsur hara sehingga efisiensi pemupukan nitrogen menurun akibat tingginya kehilangan hara melalui pencucian. Penelitian ini bertujuan mengevaluasi pengaruh pemberian zeolit, kalium humat, dan variasi dosis pupuk urea terhadap sifat fisika dan kimia tanah, serapan nitrogen, serta pertumbuhan bawang merah pada Entisol pesisir Bugel, Kulon Progo. Penelitian menggunakan Rancangan Acak Lengkap (RAL) non faktorial dengan 10 perlakuan dan 4 ulangan (40 sampel), dengan rincian perlakuan meliputi kontrol negatif (N0), N100, Z100N50, Z100N100, K100N50, K100N100, Z50K50N50, Z50K50N100, Z100K100N50, serta Z100K100N100. Keterangan dari kode perlakuan antara lain N100 = Urea 185 kg/ha (100%), Z100 = zeolit 10 kg/ha (100%), K100 = kalium humat 10 kg/ha (100%). Terkait dengan pupuk NPK dan pupuk kandang menggunakan pupuk dasar berupa Urea 185 kg/ha, ZA 225 kg/ha, TSP 204 kg/ha, KCl 185 kg/ha, pupuk kandang 2 ton/ha, arang sekam 1 ton/ha, dan nano-Si 3 kg/ha. Data dianalisis menggunakan analisis ragam, *Duncan's Multiple Range Test* (DMRT) taraf 5%, dan analisis regresi. Hasil penelitian menunjukkan Perlakuan Z100K100N100 dibandingkan N100 meningkatkan retensi air sebesar 60,95–93,03% dan sifat kimia tanah, meliputi pH sebesar 8,14–8,21%, C-organik 293,75%, bahan organik 291,07%, KPK 86,41%, N total 171,43%, serta Si tersedia 68,04%. Kombinasi zeolit 5kg/ha, kalium humat 5kg/ha, dan pupuk urea 92,5kg/ha menghasilkan serapan nitrogen dan efisiensi pemanfaatan nitrogen tertinggi melalui pengurangan kehilangan hara akibat pelindian sebanyak 266,67% dari perlakuan N100. Perbaikan sifat tanah tersebut mendukung pertumbuhan vegetatif bawang merah, sehingga kombinasi perlakuan tersebut berpotensi meningkatkan efisiensi pemupukan nitrogen pada Entisol pasir.

Kata kunci: Entisol, zeolit, kalium humat, nitrogen.

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ABSTRACT

Entisols with a sandy texture have a low capacity to retain water and nutrients, resulting in reduced nitrogen fertilizer efficiency due to high nutrient losses through leaching. This study aimed to evaluate the effects of zeolite, potassium humate, and varying urea fertilizer rates on soil physical and chemical properties, nitrogen uptake, and shallot growth in a coastal Entisol in Bugel, Kulon Progo. The study employed a non-factorial Completely Randomized Design (CRD) consisting of 10 treatments and four replications, resulting in 40 experimental units. The treatments comprised a negative control (N0), N100, Z100N50, Z100N100, K100N50, K100N100, Z50K50N50, Z50K50N100, Z100K100N50, and Z100K100N100. The treatment codes indicated that N100 represented urea at 185 kg/ha (100%), Z100 represented zeolite at 10 kg/ha (100%), and K100 represented potassium humate at 10 kg/ha (100%). Basal fertilizers and soil amendments included urea (185 kg/ha), ammonium sulfate (ZA; 225 kg/ha), triple superphosphate (TSP; 204 kg/ha), potassium chloride (KCl; 185 kg/ha), manure (2 t/ha), rice husk charcoal (1 t/ha), and nano-silica (3 kg/ha) Data were analyzed using analysis of variance, Duncan's Multiple Range Test (DMRT) at the 5% significance level, and regression analysis. The results showed that, compared with N100, the Z100K100N100 treatment increased water retention at pF 2.54 and pF 4.2 by 93.03% and 60.95%, respectively. It also improved soil chemical properties, including pH by 8.14–8.21%, organic carbon by 293.75%, organic matter by 291.07%, cation exchange capacity (CEC) by 86.41%, total nitrogen by 171.43%, and available silicon by 68.04%. The combination of zeolite at 5 kg/ha, potassium humate at 5 kg/ha, and urea at 92.5 kg/ha (Z50K50N50) produced the highest nitrogen uptake, representing a 266.67% increase compared with N100. Improvements in soil properties supported the vegetative growth of shallots, indicating that this treatment combination has potential to improve nitrogen fertilization efficiency in sandy Entisols.

Keywords: Entisol, zeolite, potassium humate, nitrogen.