

ABSTRACT

Relationship between Adsorption Behavior and Availability of Phosphorus (P) with P-Harvested by Corn Plants (*Zea mays L.*) due to the Effect of Tillage and Fertilization in Ultisol Soil of GedungMeneng, 3rd Planting Period

By

ANDIN ALVIMAIGAWATI

One way to reduce P adsorption on Ultisol soil is by adding organic matter. This study aims to determine the effect of tillage and fertilization on maize biomass and P-harvested, maximum adsorption (X_{max}), and relative phosphorus binding energy (KL) in the soil, and the correlation of maximum adsorption (X_{max}), and the relative bond energy of phosphorus (KL) with available P, maize plant biomass, and P-harvested by maize plants. This study was designed using a randomized block design using two factors and 4 replications. The first factor is the tillage system which consists of minimum tillage and intensive tillage and the second factor is the application of fertilizer which consists of no fertilizer and with fertilizer. The data obtained will be analyzed through the homogeneity of variance test (Barlett test) and data additivity (Tukey test). The data were analyzed by analysis of variance and continued with the 5% BNT test. The relationship between maximum adsorption (X_{max}), relative phosphorus binding energy (KL), and corn biomass was tested by correlation test. The results of this study showed that: (1) fertilizer application had a significant effect on increasing maize biomass, production, and P uptake, but tillage treatment had no significant effect on these variables. The interaction between tillage and fertilization had a significant effect on the P uptake of stover and on the P uptake of seeds, but had no significant effect on the P uptake of cornhusks, (2) application of compound fertilizers on topsoil and subsoil had not been able to reduce maximum adsorption (X_{max}) in the soil, and (3) maximum adsorption and relative phosphorus binding energy were not correlated with available phosphorus, biomass, and transported phosphorus in maize plants.

Keywords: *maximum adsorption (X_{max}), tillage, fertilization, relative phosphorus binding energy (K_L), ultisol soil.*

ABSTRAK

HUBUNGAN PERILAKU JERAPAN DAN KETERSEDIAAN FOSFOR (P) DENGAN P-TERANGKUT OLEH TANAMAN JAGUNG (*Zea mays* L.) AKIBAT PENGARUH OLAH TANAH DAN PEMUPUKAN DI TANAH ULTISOL GEDUNG MENENGG PERIODE TANAM KE-3

Oleh

ANDIN ALVIMAIGAWATI

Salah satu cara yang dapat digunakan untuk menurunkan jerapan P pada tanah Ultisol yaitu dengan penambahan bahan organik. Penelitian ini bertujuan untuk mengetahui pengaruh perlakuan olah tanah dan pemupukan terhadap biomassa dan P terangkut, jerapan maksimum (X_{max}) dan relatif energi ikatan fosfor (K_L) di dalam tanah, dan korelasi jerapan maksimum (X_{max}) dan relatif energi ikatan fosfor (K_L) dengan P tersedia, biomassa, dan P terangkut. Penelitian ini dirancang menggunakan Rancangan Acak Kelompok menggunakan dua faktor dengan 4 ulangan. Faktor pertama yaitu sistem olah tanah dan faktor kedua yaitu aplikasi pupuk. Data yang diperoleh dianalisis melalui uji homogenitas ragam (uji Barlett) dan aditivitas data (uji Tukey). Data dianalisis dengan analisis ragam dan dilanjutkan dengan uji BNT 5%. Hubungan antara jerapan maksimum (X_{max}), relatif energi ikatan fosfor (K_L), dan biomassa jagung diuji dengan uji korelasi. Hasil penelitian ini menunjukkan bahwa: (1) Pemberian pupuk berpengaruh nyata dalam meningkatkan biomassa dan produksi tanaman jagung, tetapi perlakuan olah tanah tidak berpengaruh nyata terhadap variabel tersebut. Interaksi antara olah tanah dan pemupukan sangat berpengaruh nyata terhadap serapan P brankasan dan serapan P biji, tetapi tidak berpengaruh nyata terhadap serapan P kelobot, (2) lapisan *topsoil* dan *subsoil* pemberian pupuk majemuk belum mampu mengurangi jerapan maksimum P (X_{max}) yang berada di dalam tanah, tetapi sudah mampu mengurangi nilai K_L yang terdapat di dalam tanah, dan (3) Jerapan maksimum dan relatif energi ikatan fosfor tidak berkorelasi terhadap fosfor tersedia, biomassa, dan fosfor terangkut pada tanaman jagung.

Kata kunci: jerapan maksimum (X_{max}), olah tanah, pemupukan, relatif energi ikatan fosfor (K_L), tanah ultisol.