

## **ABSTRACT**

### **BEHAVIOR OF POTASSIUM EXCHANGE ( $Q/I$ ), RICE PRODUCTION, AND K ABSORPTION AS A RESULT OF MANURE AND BIOCHAR APPLICATION ON UPLAND RICE (*Oryza sativa* L.) IN ULTISOL**

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*Rice as one of crop commodities that has an important role in the agricultural sector. This research aims to study: 1) the effect of manure and biochar on potassium  $Q/I$  parameters ( $CR_K^0$ ,  $PBC_K$ ,  $\Delta K^0$ ,  $K_G$ ) in Ultisol, 2) the effect of manure and biochar on production and absorption potassium in upland rice, and 3) correlation between  $Q/I$  parameters ( $CR_K^0$ ,  $PBC_K$ ,  $\Delta K^0$ ,  $K_G$ ) and CEC with transported potassium and upland rice production due to the application of manure and biochar. Field research was arranged in a randomized block design (RBD) with 4 treatments, these are B0: control (without biochar and manure), B1: biochar ( $5 \text{ Mg.ha}^{-1}$ ), B2: manure ( $5 \text{ Mg.ha}^{-1}$ ), and B3: a combination of biochar ( $5 \text{ Mg.ha}^{-1}$ ) and manure ( $5 \text{ Mg.ha}^{-1}$ ). The results of this study indicated that 1) the soil that was given manure and biochar with a dose of  $5 \text{ Mg.ha}^{-1}$  each was able to increase the parameters  $PBC_K$  and  $K_G$ , but have not been increase the  $CR_K^0$  and  $\Delta K^0$  parameters; 2) application of manure and biochar, and the combination of manure and biochar at a dose of  $5 \text{ Mg.ha}^{-1}$  each was able to increase production of upland rice and K-transported in plants; 3) in the soil before planting  $\Delta K^0$  parameter positively correlated with K uptake of straw. Otherwise in after harvested soil, the  $K_G$  parameters in the soil after harvest did not significantly correlate with K uptake of straw and rice production, but were negatively correlated with K uptake of grain.*

**Key words** : Biochar, Manure, Potassium exchange, Upland rice, Quantity-Intensity ( $Q/I$ )

## ABSTRAK

### **PERILAKU PERTUKARAN KALIUM (Q/I), PRODUKSI PADI, DAN SERAPAN K AKIBAT PEMBERIAN PUPUK KANDANG KOTORAN AYAM DAN BIOCHAR PADA PERTANAMAN PADI GOGO (*Oryza sativa* L.) DI TANAH ULTISOL**

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Padi sebagai salah satu komoditas tanaman pangan penghasil beras yang memiliki peranan penting dalam sektor pertanian bagi kehidupan masyarakat. Penelitian bertujuan untuk mempelajari: 1) pengaruh pupuk kandang kotoran ayam dan biochar terhadap parameter Q/I kalium ( $CR_K^0$ ,  $PBC_K$ ,  $\Delta K^0$ ,  $K_G$ ) pada tanah Ultisol, 2) pengaruh pemberian pupuk kandang kotoran ayam dan biochar terhadap produksi dan serapan unsur hara kalium pada tanaman padi gogo, dan 3) kolerasi antara parameter Q/I kalium ( $CR_K^0$ ,  $PBC_K$ ,  $\Delta K^0$ ,  $K_G$ ) dan KTK dengan kalium terangkut dan produksi padi gogo akibat pemberian pupuk kandang kotoran ayam dan biochar. Penelitian di lapang disusun dalam rancangan acak kelompok (RAK) dengan terdapat 4 perlakuan yaitu B0: kontrol (Tanpa biochar dan pupuk kandang kotoran ayam), B1: biochar ( $5 \text{ Mg.ha}^{-1}$ ), B2: pupuk kandang kotoran ayam ( $5 \text{ Mg.ha}^{-1}$ ), dan B3: kombinasi biochar ( $5 \text{ Mg.ha}^{-1}$ ) dan pupuk kandang kotoran ayam ( $5 \text{ Mg.ha}^{-1}$ ). Hasil penelitian ini menunjukkan bahwa; 1) perlakuan pupuk kandang kotoran ayam dan biochar dengan dosis masing-masing  $5 \text{ Mg.ha}^{-1}$  mampu meningkatkan parameter  $PBC_K$  dan  $K_G$ , namun belum mampu meningkatkan parameter  $CR_K^0$  dan  $\Delta K^0$ ; 2) pemberian pupuk kandang kotoran ayam dan biochar, serta kombinasi keduanya dengan dosis  $5 \text{ Mg.ha}^{-1}$  mampu meningkatkan produksi tanaman padi gogo dan K terangkut pada tanaman padi gogo; 3) pada tanah sebelum tanam parameter  $\Delta K^0$  nyata berkorelasi positif terhadap serapan K jerami. Sedangkan pada tanah setelah panen parameter  $K_G$  nyata berkorelasi negatif terhadap serapan K gabah, serta parameter  $\Delta K^0$  dan  $CR_K^0$  nyata berkorelasi negatif terhadap serapan K jerami dan produksi padi.

**Kata Kunci :** Biochar, Padi gogo, Pertukaran kalium, Pupuk kandang kotoran ayam, *Quantity-Intensity* (Q/I)