

## ABSTRAK

### PERILAKU PERTUKARAN AMONIUM ( $\text{NH}_4^+$ ), N, C TERPANEN, DAN PRODUKSI JAGUNG AKIBAT PEMBERIAN BIOCHAR DAN PUPUK KANDANG AYAM DI TANAH ULTISOL PADA MUSIM TANAM KE-3

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Kandungan unsur hara dan bahan organik di tanah Ultisol yang rendah dapat membuat tanah tidak subur yang mengakibatkan menurunnya produksi tanaman jagung. Upaya yang dapat dilakukan untuk meningkatkan kesuburan yaitu dengan menambahkan biochar dan pupuk kandang ayam. Penelitian ini ditujukan untuk mengetahui efek pemberian biochar dan pupuk kandang ayam terhadap perilaku pertukaran amonium ( $\text{NH}_4^+$ ), N, C terpanen, dan produksi tanaman. Penelitian ini memakai Rancangan Acak Kelompok (RAK) non faktorial menggunakan 4 ulangan serta 4 perlakuan yaitu, PPD= Pupuk dasar, PPD + BCR= Pupuk dasar + Biochar dosis  $5 \text{ Mg ha}^{-1}$ , PPD + PKA= Pupuk dasar + Pupuk kandang ayam dosis  $5 \text{ Mg ha}^{-1}$ , dan PPD + BCR + PKA= Pupuk dasar + Biochar + Pupuk kandang ayam dengan dosis masing-masing  $5 \text{ Mg ha}^{-1}$ . Data dianalisis ragam serta dilanjutkan menggunakan uji BNT 5%, dilanjutkan dengan uji *student-t*. Selain itu, dilakukan uji korelasi untuk mengetahui korelasi antara  $\text{PBC}_{\text{NH}_4^+}$ ,  $\text{CR}_{\text{NH}_4^0}$ ,  $\Delta\text{NH}_4^0$ ,  $\text{K}_G$ , dan KTK tanah dengan N dan C terpanen serta produksi jagung. Hasil menunjukkan bahwa perlakuan biochar dan pupuk kandang ayam mengalami peningkatan daya sangga tanah ( $\text{PBC}_{\text{NH}_4^+}$ ). Produksi tanaman jagung pada perlakuan pupuk kandang ayam nyata lebih tinggi dibandingkan terhadap perlakuan lainnya. Nitrogen dan carbon terpanen tanaman pada perlakuan biochar dengan pupuk kandang ayam nyata lebih tinggi dibandingkan perlakuan lainnya. Terdapat korelasi positif antara KTK dengan C terpanen dan produksi tanaman. Tidak terdapat korelasi antara  $\text{PBC}_{\text{NH}_4^+}$ ,  $\text{CR}_{\text{NH}_4^0}$ ,  $\Delta\text{NH}_4^0$ , dan  $\text{K}_G$  dengan N dan C terpanen, serta produksi tanaman.

Kata kunci: Biochar, Pertukaran amonium, Pupuk kandang ayam, Produksi jagung

## **ABSTRACT**

### **EXCHANGE BEHAVIOR OF AMMONIUM ( $\text{NH}_4^+$ ), N, C HARVESTED, AND CORN YIELD DUE TO APPLICATION OF BIOCHAR AND CHICKEN MANURE IN ULTISOLS IN THE 3<sup>rd</sup> PLANTING SEASON**

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Corn yield in Ultisol is limited by low levels of nutrients and organic matter. Efforts to increase soil fertility can be done by applying biochar and chicken manure. This research aimed to study the effects of biochar and chicken manure on the exchange behavior of ammonium ( $\text{NH}_4^+$ ), N, C harvested, and corn yield. This research was arranged in a non-factorial Randomized Block Design with 4 groups and 4 treatments, namely PPD= Basalt fertilizer, PPD + BCR= Basalt fertilizer + Biochar 5 Mg ha<sup>-1</sup>, PPD + PKA= Basalt fertilizer + Chicken manure 5 Mg ha<sup>-1</sup>, and PPD + BCR + PKA= Basalt fertilizer + Biochar 5 Mg ha<sup>-1</sup> + Chicken manure 5 Mg ha<sup>-1</sup>. The data were analyzed by Analysis of Variance and continued with the 5% LSD test, followed by the student-t test. A correlation test was performed to determine the relationship between  $\text{PBC}_{\text{NH}_4^+}$ ,  $\text{CR}_{\text{NH}_4^0}$ ,  $\Delta\text{NH}_4^0$ ,  $\text{K}_G$ , and soil CEC with N and C harvested and corn yield. The results of this study indicated that the application of biochar and chicken manure showed an increase in soil buffering capacity of ammonium ( $\text{PBC}_{\text{NH}_4^+}$ ). The yield was significantly higher at chicken manure application compared to other treatments. The nitrogen and carbon harvested by plants in the combination treatment of biochar and chicken manure was significantly higher than in other treatments. There were positive correlations between CEC and harvested C and crop yield. There were no correlations between  $\text{PBC}_{\text{NH}_4^+}$ ,  $\text{CR}_{\text{NH}_4^0}$ ,  $\Delta\text{NH}_4^0$ , and  $\text{K}_G$  with harvested N and C, as well as crop yield.

Keywords: Ammonium exchange, Biochar, Chicken manure, Corn yield