

ABSTRACT

ACTIVITY OF SOIL MICROORGANISMS DURING THE GROWTH OF SWEET CORN (*Zea mays saccharata Sturt*) IN SECOND PLANTING TIME WITH THE APPLICATION OF COMBINATION ORGANONITROFOS AND INORGANIC FERTILIZERS, AND BIOCHAR

By

Nyang Vania Ayuningtyas Harini

Efforts to increase the production of sweet corn can be done with the application of fertilizers, either inorganic, organic or its combination. In addition, the application of soil amendments such as biochar is also expected to improve soil fertility that will indirectly increase the production of sweet corn.

Organonitrophos fertilizer is an organic fertilizer developed by lecturers of Faculty of Agriculture, University of Lampung. The research was aimed to study effect the combination of organonitrophos, and inorganic fertilizers, biochar and the interaction between fertilizer combination and biochar on soil respiration and soil microbial biomass. The research was conducted in the Integrated Field Laboratory of Lampung University using 6x2 factorial in a Randomized Block Design with 3 replications. The first factor was six levels combination of organonitrophos and inorganic fertilizers (P₀, P₁, P₂, P₃, P₄, and P₅). The second factor was two levels of biochar dosage (B₀ and B₁). Data was analyzed by Analysis of Variance and followed by the Least Significant Difference (LSD) Test

at 5% level. The observed variables were soil microorganism activity as soil respiration and soil microbial biomass. The results showed that P₃B₁ treatment (300 kg Urea ha⁻¹, 125 kg SP-36 ha⁻¹, 100 kg KCl ha⁻¹ + 2500 kg organonitrophos ha⁻¹) was the highest soil respiration at of 60 days after planting (DAP). P₅ treatment (5000 kg Organonitrophos ha⁻¹) has the highest soil microbial biomass compared to other treatments at 60 and 90 DAP. B₁ treatment (5000 kg biochar ha⁻¹) has higher soil respiration and soil microbial biomass compared to control (0 kg biochar ha⁻¹). There was an interaction between combination of organonitrophos and inorganic fertilizers and biochar on soil respiration at 90 DAP. P₂B₀ treatments (450 kg Urea ha⁻¹, 187.5 kg SP-36 ha⁻¹, 150 kg KCl ha⁻¹ + organonitrophos 1250 kg ha⁻¹ + no *biochar*) was the highest soil respiration and P₅B₁ treatments (organonitrophos 5000 kg ha⁻¹ + *biochar*) has higher soil respiration. However, there was no interaction between fertilizer combination and biochar on soil microbial biomass.

Keywords: Biochar, Fertilizer Combination, Organonitrophos, Soil Microbial Biomass, Soil Respiration.

ABSTRAK

PENGARUH PEMBERIAN KOMBINASI PUPUK ORGANONITROFOS DAN PUPUK KIMIA DENGAN PENAMBAHAN *BIOCHAR* TERHADAP AKTIVITAS MIKROORGANISME TANAH SELAMA PERTUMBUHAN JAGUNG MANIS (*Zea mays saccharata Sturt*) MUSIM TANAM KEDUA

Oleh

Nyang Vania Ayuningtyas Harini

Upaya untuk meningkatkan produksi jagung manis dapat dilakukan dengan pemberian pupuk, baik berupa pupuk anorganik, organik atau kombinasi keduanya. Selain itu, pemberian bahan pembenah tanah seperti *biochar* juga diharapkan dapat memperbaiki kesuburan tanah dan secara tidak langsung juga dapat meningkatkan produksi jagung manis. Penelitian ini bertujuan untuk mempelajari pengaruh perlakuan kombinasi pupuk organonitrofos dan pupuk kimia, *biochar* serta interaksi antara kombinasi perlakuan pupuk dan *biochar* terhadap respirasi dan C-mik tanah. Penelitian dilaksanakan di Laboratorium Lapang Terpadu Universitas Lampung menggunakan faktorial 6x2 dalam Rancangan Acak Kelompok dengan 3 ulangan. Data dianalisis dengan sidik ragam dan dilanjutkan dengan Uji Beda Nyata Terkecil (BNT) pada taraf 5%. Variabel yang diamati adalah aktivitas mikroorganisme tanah yaitu respirasi tanah dan biomassa karbon mikroorganisme tanah (C-mik). Hasil

Nyang Vania

penelitian menunjukkan bahwa perlakuan P₃B₁ (300 kg Urea ha⁻¹, 125 kg SP-36 ha⁻¹, 100 kg KCl ha⁻¹ + pupuk organonitrofos 2500 kg ha⁻¹) menghasilkan respirasi tertinggi pada saat tanaman jagung berumur 60 HST (hari setelah tanam). Perlakuan P₅ (Pupuk organonitrofos 5000 kg ha⁻¹) memiliki nilai C-mik KCl ha⁻¹ + pupuk organonitrofos 2500 kg ha⁻¹) menghasilkan respirasi tertinggi pada saat tanaman jagung berumur 60 HST (hari setelah tanam). Perlakuan P₅ (Pupuk organonitrofos 5000 kg ha⁻¹) memiliki nilai C-mik tertinggi dibandingkan dengan perlakuan lainnya pada saat tanaman jagung berumur 60 dan 90 HST. Perlakuan B₁ (*biochar* 5000 kg ha⁻¹) memiliki respirasi tanah dan C-mik lebih tinggi dibandingkan dengan perlakuan tanpa *biochar* (B₀). Terdapat interaksi antara pemberian pupuk organonitrofos dan kimia dengan penambahan *biochar* terhadap respirasi tanah pada saat tanaman jagung berumur 90 HST. Perlakuan P₂B₀ (450 kg Urea ha⁻¹, 187.5 kg SP-36 ha⁻¹, 150 kg KCl ha⁻¹ + Pupuk organonitrofos 1250 kg ha⁻¹ + tanpa *biochar*) menghasilkan respirasi tanah tertinggi dibandingkan dengan perlakuan lainnya. Sedangkan untuk perlakuan dengan penambahan *biochar*, perlakuan P₅B₁ (Pupuk organonitrofos 5000 kg ha⁻¹ + *biochar*) menghasilkan respirasi tanah tertinggi dibandingkan dengan perlakuan lainnya. Namun, tidak terdapat interaksi antara pemberian pupuk organonitrofos dan kimia dengan penambahan *biochar* terhadap C-mik tanah.

Kata kunci : *Biochar*, C-mik Tanah, Kombinasi Pupuk, Organonitrofos, Respirasi Tanah.