

ABSTRAK

EFEKTIVITAS SISTEM OLAH TANAH DAN APLIKASI KOMPOS TERHADAP EKOSISTEM DAN EMISI CO₂ TANAH SECARA BIOLOGIS DI LAHAN PERKEBUNAN NANAS PADA FASE PERTUMBUHAN VEGETATIF AWAL

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Kerusakan tanah pada lahan perkebunan nanas disebabkan oleh sistem budidaya monokultur dan pemakaian pupuk kimia dalam jangka panjang. Penerapan pertanian berkelanjutan yang melibatkan pengolahan tanah dan penggunaan pupuk organik sangat penting untuk meningkatkan kesuburan tanah dan produksi tanaman nanas. Penelitian ini bertujuan untuk mengetahui pengaruh sistem pengolahan tanah dan aplikasi kompos terhadap ekosistem dan emisi CO₂ tanah secara biologis (respirasi tanah) serta pertumbuhan vegetatif awal tanaman nanas. Percobaan disusun dalam rancangan *split plot* dengan dua faktor dan tiga kelompok di perkebunan nanas Lampung Tengah. Perlakuan petak utama adalah sistem olah tanah dan anak petak adalah jenis kompos. Pengamatan dilakukan pada tanah awal sebelum pengolahan tanah, setelah aplikasi kompos sebelum tanam (ST), 14, 30, 60, dan 90 HST (hari setelah tanam). Data yang diperoleh diuji homogenitas ragam dengan uji Bartlett dan aditifitasnya dengan uji Tukey, kemudian dilakukan analisis ragam. Jika terdapat perbedaan yang signifikan, dilanjutkan dengan uji *Duncan Multiple Range Test* (DMRT) pada taraf 5%. Hasil penelitian menunjukkan bahwa C-mik pada olah tanah 30 cm + cacah serasah kasar lebih tinggi dibandingkan olah tanah 40 cm + cacah serasah halus. C-mik dan jumlah mesofauna pada aplikasi kompos premium 50 t ha⁻¹ + konsorsium mikroba LOB lebih tinggi dibandingkan kompos GGP 50 t ha⁻¹. C-mik dan jumlah mesofauna tanah pada olah tanah 30 cm + cacah serasah kasar dan aplikasi kompos premium 50 t ha⁻¹ lebih tinggi dibandingkan kompos premium 50 t ha⁻¹ + konsorsium mikroba LOB, sedangkan emisi CO₂ tanah secara biologis (respirasi tanah) pada olah tanah 40 cm + cacah serasah halus dan aplikasi kompos premium 50 t ha⁻¹ lebih rendah dibandingkan kompos lainnya. Jumlah akar serabut tanaman nanas umur 90 HST lebih banyak pada olah tanah 40 cm + cacah serasah halus. Terdapat korelasi positif antara kadar air tanah dengan respirasi tanah. Terdapat korelasi negatif antara suhu tanah dengan respirasi tanah, antara pH tanah dengan respirasi tanah, antara kadar air tanah dengan jumlah mesofauna tanah.

Kata kunci: C-mik, kompos, mesofauna, nanas, olah tanah, respirasi tanah.

ABSTRACT

EFFECTIVENESS OF TILLAGE SYSTEM AND COMPOST APPLICATION ON ECOSYSTEM AND BIOLOGICAL SOIL CO₂ EMISSIONS IN PINEAPPLE PLANTATION DURING EARLY VEGETATIVE GROWTH PHASE

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Soil degradation in pineapple plantations is caused by monoculture and long-term use of chemical fertilizers. The application of sustainable agriculture involving tillage and the use of organic fertilizers is essential to improve soil fertility and pineapple crop production. This study aims to determine the effect of tillage system and compost application on ecosystem and biological soil CO₂ emissions (soil respiration) and early vegetative growth of pineapple plants. The experiment was arranged in a split plot design with two factors and three groups in a pineapple plantation in Central Lampung. The main plot treatment was tillage system and the subplot was compost type. Observations were made on the initial soil before tillage, after compost application before planting, 14, 30, 60, and 90 days after planting. The data obtained were tested for homogeneity of variance with Bartlett test and additivity with Tukey test, then analysis of variance was conducted. If there was a significant difference, it was followed by the Duncan Multiple Range Test (DMRT) at the 5% level. The results showed that C-mic in the 30 cm tillage + coarse litter chopping was higher than 40 cm tillage + fine litter chopping. C-mic and the number of mesofauna in the application of 50 t ha⁻¹ premium compost + LOB microbial consortium were higher than 50 t ha⁻¹ GGP compost. C-mic and the number of soil mesofauna in 30 cm tillage + coarse litter and 50 t ha⁻¹ premium compost applications were higher than 50 t ha⁻¹ premium compost + LOB microbial consortium, while biological soil CO₂ emissions (soil respiration) in 40 cm tillage + fine litter and 50 t ha⁻¹ premium compost applications were lower than the other composts. The number of fibrous roots of pineapple plants at the age of 90 days after planting was more in the 40 cm + fine litter chopping. There is a positive correlation between soil moisture content and soil respiration. There is a negative correlation between soil temperature and soil respiration, between soil pH and soil respiration, between soil moisture content and the number of soil mesofauna.

Keywords: C-mic, compost, mesofauna, pineapple, tillage, soil respiration.