ABSTRAK

PERBAIKAN LINGKUNGAN RIZOSFER MENGGUNAKAN AMELIORAN *BIOCHAR* BERBAHAN TANDAN KOSONG KELAPA SAWIT DAN KAYU KARET: RESPON PENURUNAN KEMASAMAN TANAH DAN PERTUMBUHAN BIBIT SAWIT (*Elaeis guineensis* Jacq)

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Penurunan kualitas lingkungan akibat intensifikasi pertanian dan akumulasi limbah organik menjadi tantangan serius dalam pengelolaan lahan pertanian berkelanjutan, khususnya pada pertanaman kelapa sawit. Penelitian ini bertujuan untuk mengevaluasi efektivitas *biochar* yang berasal dari tandan kosong kelapa sawit (TKKS) dan kayu karet sebagai bahan *ameliorant* dalam memperbaiki kualitas tanah dan mendukung pertumbuhan bibit kelapa sawit *(Elaeis guineensis* Jacq*). Biochar* diproduksi melalui proses pirolisis dengan metode *double drum* dan diaplikasikan media tanam bibit sawit dengan beberapa perlakuan dosis 0%, 5% dan 10%. Variabel yang diamati meliputi sifat fisik dan kimia tanah (pH dan C-karbon), pertumbuhan vegetatif tanaman. Hasil penelitian menunjukkan bahwa aplikasi *pellet biochar*, khususnya yang berasal dari TKKS dan kayu karet, secara signifikan meningkatkan kualitas tanah dan pertumbuhan tanaman. Peningkatan pH tanah, ketersediaan hara, kenaikan C-karbon turut berkontribusi terhadap produktivitas bibit sawit. Dengan demikian, pemanfaatan *biochar* dari limbah organik ini tidak hanya menjadi solusi pengelolaan limbah yang ramah lingkungan, tetapi juga strategi rehabilitasi lahan yang efektif dalam sistem pertanian kelapa sawit.

Kata kunci: *biochar*, TKKS, kayu karet, dosis

ABSTRACT

RHIZOSPHERE ENVIRONMENT IMPROVEMENT USING BIOCHAR AMENDMENTS DERIVED FROM OIL PALM EMPTY FRUIT BUNCHES AND RUBBER WOOD: RESPONSE TO SOIL ACIDITY REDUCTION AND GROWTH OF OIL PALM SEEDLINGS (*Elaeis guineensis* Jacq.)

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The decline in environmental quality due to agricultural intensification and the accumulation of organic waste poses a serious challenge to sustainable land management, particularly in oil palm cultivation. This study aimed to evaluate the effectiveness of biochar derived from oil palm empty fruit bunches (EFB) and rubber wood as soil ameliorants to improve soil quality and support the growth of oil palm (*Elaeis guineensis* Jacq.) seedlings. Biochar is produced through a pyrolysis process using the double drum method. and applied to the seedling growth medium at varying application rates of 0%, 5%, and 10%. Observed variables included soil physical and chemical properties (pH and carbon content) as well as vegetative plant growth. The results showed that the application of pelletized biochar, particularly from EFB and rubber wood, significantly improved soil quality and plant growth. The increase in soil pH, nutrient availability, and carbon content contributed positively to the productivity of oil palm seedlings. Therefore, the use of biochar from organic waste not only provides an environmentally friendly waste management solution but also serves as an effective land rehabilitation strategy in oil palm farming systems.

Keywords: biochar, EFB, rubber wood, dosage