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EFFECTS OF SOIL APPLIED ZINC AND COPPER TO YOUNG OIL PALMS (*Elaeis guineensis* Jacqs.)

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SERDANG, SELANGOR DARUL EHSAN

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EFFECTS OF SOIL APPLIED ZINC AND COPPER TO YOUNG OIL PALMS

(*Elaeis guineensis*)

By

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ENDORSEMENT

This project report entitled “Effects Of Soil Applied Zinc and Copper To Young Oil Palms (*Elaeis guineensis* Jaqs)” is prepared by Nurul Afiqah Binti Mohd Su and submitted to the Faculty of Agriculture in fulfillment of the requirement of PRT 4999 (Final Year Academic Project) for the award of the degree of Bachelor of Agricultural Science.

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ABSTRACT

Oil palm is an important commodity crop in Malaysia. Oil palm is suitable to be planted in Malaysia because of the good environmental factors. Soil is a medium for plant to grow and is a source of nutrients to the plants. Plant requires macro- and micronutrients for growth. Normally, macronutrient is required in larger amounts by the plant and only small amount of micronutrients needed. Nowadays oil palms grown in Malaysia is not being applied with micronutrient for growth but higher amounts of macronutrient.. Thus, this study was conducted to investigate the effects of zinc and copper used as soil application in young oil palm and also to investigate the differences in uptake between sulphate and EDTA source for Zinc and Copper. This experiment was conducted in Machap Estate, Melaka. The series for the soil is Bungor series. The experimental design used in this study was completely randomized design (CRD) with 7 treatments and 3 replication for each treatment. The treatments were $CuSO_4$, CuEDTA, $ZnSO_4$, ZnEDTA. N, P, K, Mg and B were applied to all the oil palm. The oil palm plants were sampled at 3 years after planting and 6 months after treatment were applied and analyzed for total nutrient contents including ZN and Cu. The soil properties such as soil pH, cation exchange capacity and exchangeable bases, organic carbon, available phosphorus, and available micronutrient were analyzed. The results of this study were non significant because there were factors that affect the data analysis. The target results of this study were the treated plants will have higher zinc and copper uptake and EDTA is a better source for Zinc and Copper than sulphate.

ABSTRAK

Kelapa sawit merupakan tanaman komoditi dan penting dalam industri Malaysia. Tanaman komoditi memainkan peranan yang penting sebagai jaminan makanan di dunia. Kelapa sawit sesuai ditanam di Malaysia kerana faktor persekitaran yang baik. Tanah merupakan satu medium untuk tumbuhan tumbuh. Biasanya tumbuhan akan mendapatkan nutrien dari tanah. Tumbuhan memerlukan makronutrien dan mikronutrien untuk pertumbuhan. Biasanya, makronutrien adalah jumlah yang paling diperlukan oleh tumbuhan dan hanya sedikit jumlah mikronutrien yang diperlukan. Bagi kes-kes tertentu perladangan kelapa sawit di Malaysia pada masa kini, kelapa sawit tidak diberikan mikronutrien untuk pertumbuhan tetapi diberi lebih tinggi kadar makronutrien. Ia adalah kerana kos baja dapat dijimatkan dan jumlah mikronutrien yang diperlukan oleh tumbuhan adalah kecil. Oleh itu, kajian ini dijalankan untuk menyiasat kesan zink dan kuprum yang digunakan secara aplikasi keatas tanah dalam kelapa sawit dan juga untuk menyiasat perbezaan dalam penyerapan antara sulfat dan sumber EDTA untuk zink dan kuprum. Eksperimen ini telah dijalankan di Machap Tanah, Melaka. Siri untuk tanah ini adalah siri Bungor. Reka bentuk eksperimen yang digunakan dalam kajian ini adalah reka bentuk rawak sepenuhnya (CRD) dengan 7 rawatan dan 3 replikasi setiap rawatan. Rawatan adalah CuSO4, CuEDTA, ZnSO4, ZnEDTA dan ia digunakan dengan plot yang berbeza kelapa sawit. N, P, K, Mg dan B digunakan untuk semua kelapa sawit. Tumbuh-tumbuhan kelapa sawit telah disampel pada penanaman 3 tahun dan 6 bulan selepas rawatan dijalankan dan juga dianalisis untuk jumlah kandungan nutrien termasuk Zn dan Cu. Sifat-sifat tanah seperti pH tanah,bes bertukarganti dab CEC, karbon organik, kadar fosforus, dan mikronutrien yang telah dianalisis. Keputusan kajian ini adalah tidak ketara kerana terdapat faktor-faktor yang memberi kesan

kepada analisis data. Keputusan sasaran kajian ini adalah tumbuh-tumbuhan dianggap akan mempunyai lebih tinggi penyerapan zink dan kuprum dan EDTA adalah sumber yang lebih baik untuk Zn dan Cu daripada sulfat.

1.0 INTRODUCTION

Malaysia is one the largest producer and exporter of palm oil in the world, accounting for 11% of the world's oils and fats production and 27% of export trade of oils and fats(MPOC,2014). Oil palm is one of the commodity crops in Malaysia and plays an important role in food security of the world(MPOB, 2014).

Soil is a medium for oil palm to grow. This natural body supports plant life in varying degrees of efficiency depending on its productivity potential and nutrient status(Ulysess, 1979).The nutrients taken up from soil is absorbed by the oil palm roots. The growth oil palm depends on the macro and micronutrients that are available in the soil and the fertilize applied to the soil. Interactions among micronutrients with major elements are known to occur and this will influence plant growth (Ulysses, 1979).

There are a number of elements that can be toxic to plants when present in the rooting medium at elevated concentrations. For example, if in high concentration in the soil solution, most of the micronutrients (B, Cl ,Cu, Mn , and Zn) can be toxic to plants(Benton, 1998).

The micronutrient Zn and Cu are important in growing oil palm. The deficiencies and excesses of these elements will give an effect to oil palm growth. The interaction of these micronutrients with itself and other macronutrients also willaffect the plant growth. The objective of this research is to investigate the effects of zinc and copper as micronutrients applied to the soil on growth and nutrient uptake by young oil palm plant.

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