THE EFFECTS OF PALM OIL MILL SLUDGE CAKE (POMSC) AS SOIL AMELIORANT ON GROWTH PERFORMANCE AND POSTHARVEST QUALITY OF ROSELLE (*Hibiscus sabdariffa* L.) GROWN ON BRIS SOIL

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MASTER OF SCIENCE

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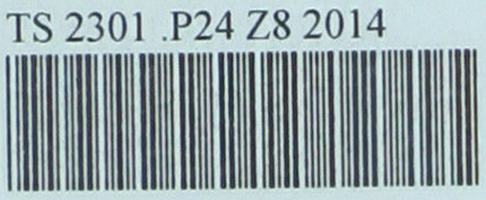

The effects of palm oil mill sludge cake (POMSC) as soil ameliorant on growth performance and postharvest quality of roselle (Hibiscus sabdariffa L.) grown on bris soil / Zurafni Mat Daud.

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September 2014

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Beach Ridges Interspersed with Swales (BRIS) soil is considered as one of the problem soils found in the east coast of Peninsular Malaysia due to its low fertility, high leaching rate and high surface temperature. Thus, it is not very suitable or non-productive for commercial planting of crops because it could not support the normal water needs for plant growth and will eventually affect the yield and quality of the produce. Palm Oil Mill Sludge Cake (POMSC) had been used as soil ameliorant for fruit plants because of its benefits as soil structure improvement and aeration, thus increasing nutrient and water holding capacities, increasing microbial activities and improving soil fertility. In this study, three roselle (*Hibiscus sabdariffa)* varieties UKMR-1, UKMR-2 and UKMR-3 were cultivated on BRIS soil enriched with POMSC to examine their effects on plant growth performance, yield parameters and postharvest quality. In general, BRIS soil enriched with POMSC showed better performance in growth parameters such as plant height, canopy diameter, number of leaves, buds, flowers and calyces and yield parameters such as calyces weight/plant, calyx weight, capsule weight, calyx size

(diameter and length) and postharvest quality such as color measurement, total soluble solids, titratable acidity, sugar acid ratio, pH, total anthocyanin contents, photosynthetic plant pigments (chlorophyll a, b and total carotenoids), ascorbic acid content, dry matter content, ash content, crude protein content, crude fat content, crude fiber content and carbohydrate content as compared to control (untreated BRIS). In conclusion, the optimum rate of POMSC that provide roselle with better growth performance and yield parameters as well as most of postharvest quality was at 20 t/ha. The present study revealed that POMSC can be effectively utilized as soil ameliorant for BRIS soils for commercial roselle production.

Abstrak tesis yang dikemukakan kepada Senat Universiti Malaysia Terengganu sebagai memenuhi keperluan untuk ijazah Sarjana Sains

KESAN KEK ENAPCEMAR SISA KELAPA SAWIT (KESKS) SEBAGAI PEMBAIK TANAH TERHADAP PRESTASI PERTUMBUHAN DAN KUALITI LEPAS TUAI TANAMAN ROSEL (*Hibiscus sabdariffa* L.) YANG DITANAMAM PADA TANAH BRIS

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Tanah BRIS ('Beach Ridges Interspersed with Swales') adalah dianggap sebagai salah satu daripada tanah bermasalah yang didapati di pantai timur Semenanjung Malaysia termasuklah Terengganu kerana kesuburan yang rendah, kadar resapan yang tinggi dan suhu permukaan yang tinggi. Oleh itu, ia tidak begitu sesuai atau tidak produktif untuk penanaman komersil kerana ia tidak dapat menampung keperluan air untuk pertumbuhan dan akhirnya akan menjejaskan hasil dan kualiti hasil. Kek Enapcemar Sisa Kelapa Sawit (KESKS) telah digunakan sebagai penambahbaikan tanah untuk tanaman buah-buahan kerana bermanfaat sebagai penambahbaikan struktur tanah dan pengudaraan, sekaligus meningkatkan nutrient dan kapasiti memegang air, meningkatkan aktiviti mikrob dan meningkatkan kesuburan tanah. Dalam kajian ini, tiga jenis rosel iaitu jenis UKMR-1, UKMR-2 dan UKMR-3 telah ditanam di tanah BRIS yang diperkayakan dengan KESKS untuk mengkaji kesannya terhadap pertumbuhan tanaman, parameter pengeluaran kaliks dan kualiti lepastuai kaliks. Secara umum, tanah BRIS yang diperkayakan dengan KESKS menunjukkan prestasi yang

lebih baik dalam parameter pertumbuhan seperti tinggi pokok, kanopi diameter pokok, bilangan daun, putik, bunga dan kaliks, parameter hasil seperti berat buah/pokok, berat kapsul, dan berat kaliks, saiz kaliks (panjang dan diameter), kualiti lepastuai seperti ukuran warna kaliks, indeks kemanisan kaliks, titrat keasidan, nisbah asid gula, pH, jumlah kandungan antosianin, pigment fotosintesis tumbuhan (klorofil a, b dan jumlah karotenoid), kandungan asidaskorbik, kandungan kering, kandungan abu, kandungan protein, kandungan lemak, kandungan serat dan kandungan karbohidrat berbanding tanah BRIS yang tidak dirawat. Kesimpulannya, pada kadar KESKS yang optimum iaitu pada 20 t/ha, akan menghasikan pertumbuhan roselle yang berprestasi baik dan parameter hasil yang lebih baik dan juga kualti lepastuai yang paling berkualiti. Kajian ini mendedahkan bahawa KESKS boleh digunakan sebagai bahan penambahbaikantanah untuk tanah BRIS bagi pengeluaran rosel secara komersial.