

**UNIVERSITI TEKNOLOGI MARA**

**EFFECT OF COMBINATION OF  
EMPTY FRUIT BUNCH (EFB)  
COMPOST WITH CHEMICAL  
FERTILIZER ON SOIL  
PROPERTIES, NUTRIENT LEVEL,  
GROWTH AND OIL PALM YIELD  
RESPONSES IN SMALLHOLDER  
OIL PALM CULTIVATION**

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## ABSTRACT

Mandatory implementation of the Malaysian Sustainable Palm Oil (MSPO) certification in oil palm plantations was imposed for smallholders by the end 2020 to ensure the sustainability of the oil palm industry. Good sustainability practices have been a major challenge to the smallholders against ecological threats to their oil palm cultivation based on a balance between the people, profits and planet. Many farmers lack the knowledge of sustainable management practices which have already been proven to support yield increases if performed correctly. Thus, this study examined the application of empty fruit bunch (EFB) compost to address the continual application of chemical fertilizers which has caused degradation of the soil chemical and physical properties. The experimental design with Randomized Complete Block Design (RCBD) was used with five treatments replicated four times in a smallholder farm with five year's old oil palms in Sarawak. The treatments were: T1 (EFB Compost), T2 (EFB Compost + Korn-Kali+B fertilizer), T3 (Korn-Kali+B fertilizer), T4 (NPK fertilizer), and T5 (EFB Compost + NPK fertilizer). Data on the soil property based on soil moisture, bulk density and soil pH were collected two months after each application in March 2016, September 2016, March 2017 and September 2017. In addition, the nutrient availability in the soil and leaf were identified based on the nitrogen (%), phosphorus (%) and potassium ( $\text{cmol kg}^{-1}$ ) levels. The growth performances of the trunk diameter and leaf area were also being measured. The oil palm yield responses were calculated based on the number of fresh fruit bunch (FFB), weight and average bunch weight (ABW) of FFB. The study showed that there was significant difference on soil properties as determined by soil moisture, soil bulk density and soil pH between treatments in the application with and without EFB compost regardless of its combination with chemical fertilizers where  $p < 0.05$ . In addition, the applications had significantly affected the content of phosphorus and potassium in the soil and leaves where  $p$  is 0.000 while there also difference in nitrogen content in soil and leaves. The application also showed significantly difference on trunk diameter but not on leaf area. Lastly, the applications also gave difference in yield performance in oil palm cultivation.

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