

## Effects of Decanter Cake Type Oil Palm Solid Waste Application on Growth Performance of *Vigna Radiata*

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### Abstract

The increased production of biowaste is one of the major problems of the palm oil industry. Among the different types of wastes, palm oil decanter cake (PODC) is a waste type with a potential to be used as an organic fertilizer. However, limited literature was found relating to the effects of PODC on plant growth performance. Thus the aim of this study was to determine the effects of PODC application on growth of *Vigna radiata* (MI 05). PODC type waste was collected from palm oil mill at Nakiadeniya, Galle, Sri Lanka during the month of April. Soil for the experiment was collected from the undisturbed area in the Department of Botany, University of Ruhuna, Sri Lanka (sandy textured soil with the pH value  $6.41 \pm 0.03$ ). PODC with the pH value of  $6.53 \pm 0.05$ , mixed with soil at rates of 0, 10, 20, 30, 40, 50% w/w and certified seeds of *Vigna radiata* (MI 05) were grown for 45 days. Decreasing trends in root length, root and shoot biomass were observed in plants grown in soils with PODC levels above 10% at 30 days of age. Plant death was recorded from the treatment with 40% and 50% w/w PODC levels at the age of 45 days. Plants grown in soil with 10% w/w PODC level had the significantly higher ( $p < 0.05$ ) total chlorophyll content, shoot and root biomass compared to control treatment. The experiment was repeated at rates of 0, 2, 4, 6, 8, 10% w/w PODC to find the best level of PODC for plant growth. Plant growth performance was measured at 30 and 60 days of age. Significant ( $p < 0.05$ ) differences in the plant growth parameters such as shoot height, stem thickness, shoot and root biomass, leaf numbers, leaf area and pod lengths were observed from the treatments with 2% and 4% w/w PODC levels when compared to control at the age of 60 days. Therefore, the 2% to 4% of range was recognized as the best level for PODC to be used as fertilizer in order to increase the plant growth of *V. radiata*. The overall results highlighted that there is an application rate specific effect of PODC on growth of *V. radiata*. Direct application of 2% - 4% w/w PODC enhances plant growth, while the higher level of PODC application may cause plant death or growth inhibition.

**Keywords:** Fertilizer, Palm oil decanter cake, Plant parameters, *Vigna radiata*

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