

UNIVERSITI TEKNOLOGI MARA

**ENHANCING OIL PALM EMPTY
FRUIT BUNCH (EFB) COMPOST BY
ADDITION OF BURNT RICE HUSK
AS CARRIER MATERIAL FOR
SELECTED NITROGEN-FIXING
BACTERIA IN MUNCHONG SOIL
SERIES**

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ABSTRACT

The current interests in reducing the application of chemical fertilizers and the increasing demand for combined effects of microorganisms with agro-waste materials are perceived to give positive impact on soil, crop productivity and sustainable agriculture. The aims of this study were to prepare a series of combinations of empty fruit bunch compost (EFBC) with burnt rice husk (BRH) as carrier materials for selected nitrogen-fixing bacteria, evaluate their suitability and determine the ability of the inoculated EFBC-BRH carrier materials to amend the Munchong soil series. Different ratios of EFBC and BRH were used to prepare the carrier materials for the selected N₂-fixing bacteria namely, *Bacillus* spp strains Sb35 and Sb42. Both coarse and fine EFBC were used in the preparations. The suitability of the EFBC-BRH combinations as carrier materials were tested by inoculating the different carrier materials combinations with the N₂-fixing bacteria and incubated at room temperature for eight weeks after which, the effects on bacteria population, pH, moisture content and contaminants were determined. The ability of the inoculated carrier materials to amend the Munchong soil series was evaluated by carrying out a glasshouse pot experiment for 30 days. The effects on the bacteria population, soil pH, soil bulk density, cation exchange capacity (CEC) and total nitrogen (N) were determined at 0 day and 10, 20 and 30 days after amendment. The results showed that the fine textured EFBC-BRH carrier materials combinations (T5, T6, T7 and T8) were better carrier materials compared to the coarse textured EFBC-BRH carrier materials combinations (T1, T2, T3 and T4). The T6 (1 fine textured EFBC: 1 BRH) inoculated carrier material showed the best response with Sb35 and Sb42 population increasing by 7.34% and 7.47% respectively. The T6-Sb35 and T6-Sb42 inoculated carrier materials did not have any significant effect on soil pH but a reduction of 47.8 % and 52.6 % respectively in soil moisture was observed after eight weeks of incubation period. Glasshouse pot experiments for soil amendment showed that T6 inoculated with Sb42 was approximately 6 % higher in population. The CEC, soil pH, soil total N and bulk density for T6-Sb42 increased by 27.6 %, 24.9 %, 43.53 % and 3.23 % respectively after 30 days as compared to other treatments and control. In conclusion, the T6-Sb42 has the potential to be developed as biofertilizer.

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