

## **Effect of seed sludge quality using oil palm empty fruit bunch (OPEFB) bio-char for composting**

### **ABSTRACT**

In this study, a comparison between oil palm empty fruit bunch (OPEFB) composting using palm oil mill effluent bio-char solution (POMEBS) aerobic sludge and palm oil mill effluent (POME) anaerobic sludge was reported. A set of experiments was designed by central composite design (CCD) using response surface methodology (RSM) to statistically evaluate the POMEBS aerobic sludge as microbial seeding. The bacteria count of POMEBS aerobic sludge ( $3.7 \times 10^6$  CFU/mL) at the optimum point was higher than that of POME anaerobic sludge ( $2.5 \times 10^5$  CFU/mL). Denaturing gradient gel electrophoresis (DGGE) and Fourier transform infrared spectroscopy (FTIR) were also performed. A rotary drum composter was then used to compost OPEFB with POMEBS aerobic sludge and POME anaerobic sludge, separately. Thermogravimetric analysis (TGA) showed that composting OPEFB with POMEBS aerobic sludge had a higher degradation rate compared to composting OPEFB with POME anaerobic sludge. In addition, the final N:P:K values for composting OPEFB with POMEBS aerobic and POME anaerobic sludge were 3.7:0.8:6.2 and 1.5:0.3:3.4, respectively. POMEBS aerobic sludge improved the composting process and compost quality.

**Keyword:** Palm oil mill effluent (POME) anaerobic sludge; Palm oil mill effluent bio-char solution (POMEBS) aerobic sludge; Response surface methodology (RSM); Denaturing gradient gel electrophoresis (DGGE); Rotary drum composting; Fourier transform infrared (FTIR)