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Harnessing Microorganism Having Potential for Biotreatment of Wastewater

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Abstract : Determining the diversity of the indigenous microorganisms in Palm Oil Mill Effluent (POME) could allow their wider application for the treatment of recalcitrant agro-based wastewater discharge into the environment. Many research studies mainly determined the efficiency of microorganism or their co-cultivation with microalgae for enhanced treatment of wastewater, suggesting a limited emphasis on the application of microbial diversity. In this study, the microorganism was cultured in POME for a period of 15 days using microalgae as a source of carbon. Pyrosequencing analysis reveals a diversity of microbial community in 20% (v/v) culture than the control experiment. Most of the bacterial species identified in POME belong to the families of Bacillaceae, Paenibacillaceae, Enterococcaceae, Clostridiaceae, Peptostreptococcaceae, Caulobacteraceae, Enterobacteriaceae, Moraxellaceae, and Pseudomonadaceae. Alpha (α) diversity analysis reveals the high composition of the microbial community of 52 in both samples. Beta (β) diversity index indicated the occurrence of similar species of microorganisms in unweighted uni fra than the weighted uni fra of both samples. It is therefore suggested that bacteria found in these families could have a potential for synergistic treatment of high-strength wastewater generated from the palm oil industry.

Keywords : diversity, microorganism, wastewater, pyrosequencing, palm oil mill effluent
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