A complete Palm Oil Mill Effluent (POME) treatment system using novel hybrid anaerobic-aerobic bioreactor

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Abstract
Malaysia is the world’s leading producer and exporter of palm oil. However, the concomitant production of highly polluting palm oil mill effluent (POME) has resulted deleterious environmental hazards. While anaerobic digestion is widely accepted as an effective method for the treatment of POME, anaerobic treatment of POME alone could hardly produce effluents that comply with Malaysian Department of Environment’s (DOE) discharge limit due to the high organic strength of POME. Hence, subsequent post treatment of aerobic treatment is vital to meet the discharge limits. Some of the palm oil mills have adopted open tank digester and extended aeration systems in POME treatment. Although this combined anaerobic-aerobic system show great potential in treating POME efficiently, the constraint lies on the availability of sufficient land for building the ponds and the length of the hydraulic retention time taken to treat the POME. Hence, the feasibility of treating POME within a short period of time at reduced space utility by using a high-rate integrated anaerobic-aerobic bioreactor may offer a solution to the treatment problems. The current research is aimed to design and optimize a novel hybrid anaerobic-aerobic bioreactor for simultaneous anaerobic-aerobic POME treatment. The methane gas generated should be at least 60% purity and suitable as a source of renewable energy. In addition, an effective pilot scale of total POME treatment scheme which includes dewatering process will also be devised. The final discharge of POME is expected to comply with the EQA 1974 requirement.

Publications
Journals
Conferences
