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Start-up operation and hydraulic retention time selectivity for palm oil mill wastewater at mesophilic temperature in anaerobic suspended growth closed bioreactor

Abstract

The start-up operation and hydraulic retention time (HRT) selectivity of anaerobic degradation for palm oil mill effluent (POME) wastewater was carried out in an anaerobic bioreactor. HRT between 35 and 5 days were investigated. The start-up process for the anaerobic degradation of POME wastewater was found to be completed after 40 days of operation. This study also recommended that the anaerobic degradation of POME wastewater should be operated at the HRT between 35 and 10 days without acid risk. The performance of anaerobic bioreactor could reach 90.55% - 87.55% chemical oxygen demand (COD) reduction, 0.06 - 0.40 ratio between volatile fatty acid (VFA) and alkalinity (Alk), -368.2 mV to -445.80 mV of oxygen reduction potential (ORP) and 9.08 - 37.2 liters of biogas production, respectively.

Keywords

Anaerobic degradation process; Palm oil mill effluent; Start-up operation