

Biodegradation of high-strength palm oil mill effluent (pome) through anaerobes partitioning in an integrated baffled reactor inoculated with anaerobic pond sludge

ABSTRACT

Performance of a laboratory-scale integrated baffled reactor for the treatment of raw palm oil mill effluent (POME) was investigated. Initially, the reactor was fed with diluted POME (COD=1,830 mg/L and OLR=0.46 g COD/L Day) which was then increased gradually to actual concentration (COD=45,500 mg/L and OLR=11.38 g COD/L Day). Reactor operation was studied in two different hydraulic retention times (HRTs) (4 and 6 days) using POME with no effluent recycled feed and after alkalinity supplementation. Chemical oxygen demand (COD) removal of 79 and 83 % at an HRT of 4 and 6 days were attained at the highest organic loading rate (OLR=11.38 g COD/ L Day). The presence of Arcella-like and Metopus-like species and pH profile in the bioreactor's compartments imply that anaerobic system is active in the reactor throughout the study. Use of methanogen-enriched inocula, smooth OLR augmentation, and appropriate separation of acidogens and methanogens in the reactor were the reasons for satisfactory performances of the system.