

Fed batch production of hydrogen from palm oil mill effluent using anaerobic microflora

ABSTRACT

Anaerobic production of hydrogen from palm oil mill effluent (POME) by microflora was investigated in 5-l bioreactor at 60 °C and pH 5.5. POME sludge was collected from the anaerobic pond of a POME treatment plant at a palm oil mill and used as a source of inocula. A batch reactor was found to yield a total of 4708 ml H₂H₂/(l POME) and the maximum evolution rate was 454 ml-H₂H₂/(l POME h). A fed batch process was conducted after 50 h. Two liters of reaction medium was removed and 2 l of fresh POME was added to the reactor every 24 h (15 times). The reproducibility of the fed batch process checked by changing the feeding time every 8 h (10 times). A yield of 2382 ml H₂H₂/(l POME) and 2419 ml H₂H₂/(l POME) at maximum evolution rate of 313 ml H₂H₂/(l POME h) and 436 ml H₂H₂/(l POME h) were obtained, respectively. Throughout the study, methane gas was not observed in the evolved gas mixture.

Keyword: POME; POME sludge; Production of hydrogen; Microflora