



## Biohydrogen production from palm oil mill effluent using immobilized mixed culture

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### ABSTRACT

Cell immobilization techniques were adopted to bio-hydrogen production using immobilized anaerobic sludge as the seed culture. Palm oil mill effluent (POME) was used as the substrate carbon source. It was found that with a POME concentration of 20 g COD/l in the feed, the suspended-cell containing reactor was able to produce hydrogen at an optimal rate of 0.348 l H<sub>2</sub>/(l POME h) at HRT 6 h. However, the immobilized-cell containing reactor exhibited a better hydrogen production rate of 0.589 l H<sub>2</sub>/(l POME h), which occurred at HRT 2 h. When the immobilized-cell containing reactor was scaled up to 5 l, the hydrogen production rate was 0.500–0.588 l H<sub>2</sub>/(l POME h) for HRT 2–10 h, but after a thermal treatment (60 °C, 1 h) the rate increase to 0.632 l H<sub>2</sub>/(l POME h) at HRT 2 h. The main soluble metabolites were butyric acid and acetic acid, followed by propionic acid and ethanol.

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