

## The Effect of Immobilization Conditions on Hydrogen Production from Palm Oil Mill Effluent

**Authors :** A. W. Zularisam, Lakhveer Singh, Mimi Sakinah Abdul Munaim

**Abstract :** In this study, the optimization of hydrogen production using polyethylene glycol (PEG) immobilized sludge was investigated in batch tests. Palm oil mill effluent (POME) is used as a substrate that can act as a carbon source. Experiment focus on the effect of some important affecting factors on fermentative hydrogen production. Results showed that immobilized sludge demonstrated the maximum hydrogen production rate of 340 mL/L-POME/h under follow optimal condition: amount of biomass 10 mg VSS/ g bead, PEG concentration 10%, and cell age 24 h or 40 h. More importantly, immobilized sludge not only enhanced hydrogen production but can also tolerate the harsh environment and produce hydrogen at the wide ranges of pH. The present results indicate the potential of PEG-immobilized sludge for large-scale operations as well; these factors play an important role in stable and continuous hydrogen production.

**Keywords :** biohydrogen, immobilization, polyethylene glycol, palm oil mill effluent, dark fermentation

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