Effect of Pre-treatment Palm Oil Mill Effluent POME on Biohydrogen Production by Local Isolate Clostridium butyricum

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Abstract

Palm oil mill effluent (POME) contains approximately 6% fiber. The effectiveness of pre-treatment on POME can serve a very good feedstock for hydrogen production in fermentation process. In this research, the effectiveness of pre-treatment methods on POME treated using acid and base were analysed based total carbohydrate and reducing sugar content. By using 1M NaOH with heat treatment, 26.12% carbon source converted to reducing sugar while by using 1M H2SO4 with heat treatment, over 32.09% carbon source converted to reducing sugar. The highest increment of total carbohydrate where from acid-heat treatment with 26.1% increment from initial concentration. At the initial pH (5.5) with fermentation temperature 37 degrees C, the highest hydrogen production rate given by acid-heat treatment was 0.5mL H-2/mL POME. Different for initial pH 7.0 with the same temperature, the highest hydrogen produced rate was given by base-heat treatment with 0.59 mL H-2/mL POME. The production of hydrogen in 2L bioreactor given much higher hydrogen production compare to production in serum bottle. This fermentation was run in batch mode with initial pH 7 and control at 5.5. The maximum hydrogen produce was 4304 mL H-2/ L POME from acid-heat treatment.

Keywords

Author Keywords: Palm Oil Mill Effluent (POME); Pre-Treatment; Biohydrogen; Batch Mode
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