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Optimization of culture conditions for biohydrogen production from sago wastewater by Enterobacter aerogenes using Response Surface Methodology (Article)

Ulhiza, T.A., Mohamad Puad, N.I., Azmi, A.S.

Bioprocess and Molecular Engineering Research Unit (BPMERU), Department of Biotechnology Engineering, Kulliyyah of Engineering, International Islamic University Malaysia, P.O. Box 10, Kuala Lumpur, 50728, Malaysia

Abstract

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Sago wastewater (SWW) causes pollution to the environment due to its high organic content. Annually, about 2.5 million tons of SWW is produced in Malaysia. In this study, the potential of SWW as a substrate for biohydrogen production by Enterobacter aerogenes (E. aerogenes) was evaluated. Response Surface Methodology (RSM) was employed to find the optimum conditions. From preliminary optimization, it was found that the most significant factors were yeast extract, temperature, and inoculum size. According to Face Centered Central Composite Design (FCCCD), the maximum hydrogen concentration and yield were 630.67 $\mu\text{mol/L}$ and 7.42 mmol H_2/mol glucose, respectively, which is obtained from the sample supplemented with 4.8 g/L yeast extract concentration, 5% inoculum, and incubated at the temperature of 31 $^\circ\text{C}$. Cumulative hydrogen production curve fitted by the modified Gompertz equation suggested that H_{max} , R_{max} , and λ from this study were 15.10 mL, 2.18 mL/h, and 9.84 h, respectively. © 2018 Hydrogen Energy Publications LLC

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