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# **Biosurfactant-enhanced hydrogen production from organic fraction of municipal solid waste using co-culture of *E. coli* and *Enterobacter aerogenes***

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## **Abstract**

The effect of biosurfactants (surfactin and saponin) on the hydrogen production from organic fraction of municipal solid waste (OFMSW) was investigated using co-culture of facultative anaerobes *Enterobacter aerogenes* and *E. coli*. The biosurfactants were applied in the concentration ranges of 0.5, 1.0, 1.5, 2.0, 2.5, 3.0, 3.5 and 5.0% each. Cumulative hydrogen production (P), maximum hydrogen production rate (R<sub>max</sub>) and lag phases ( $\lambda$ ) were analyzed using modified Gompertz model. Results revealed that both the biosurfactants were effective in hydrogen production enhancement. The maximum cumulative hydrogen production of 743.5±14.4ml and 675.6±12.1ml and volumetric hydrogen production of 2.12L<sub>H<sub>2</sub></sub>/L<sub>substrate</sub> and 1.93L<sub>H<sub>2</sub></sub>/L<sub>substrate</sub> was recorded at 3.5% surfactin and 3.0% saponin respectively. Corresponding highest hydrogen yields were 79.2mlH<sub>2</sub>/gCarbo<sub>initial</sub> and 72.0mlH<sub>2</sub>/gCarbo<sub>initial</sub> respectively. Lag phase decreased from 12.5±2.0hr at control to a minimum of 9.0±2.8hr and 9.5±2.1hr at 3.5%

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