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Abstract

Hydrogen Sulfide Production Using Sulphate-Reducing Bacteria From Marine Sediments

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Abstract: Hydrogen sulfide (H₂S) produced by sulfate-reducing bacteria (SRB) is an attractive alternative to generate renewable energy. SRB are quite accessible as they are ubiquitous in marine sediments nevertheless its potential to produce H₂S at laboratory conditions has not been thoroughly assessed. Three different sediments (S1, S2 and S3) were used as inoculum in Postgate's B medium to evaluate its H₂S production capacity. We found that H₂S production reached the stationary phase more rapidly in S1 cultures, followed by S3 and S2, with a final concentration of 140, 220 and 366 ppm, respectively. S1, S2 and S3 achieved 59, 100 and 84% of theoretical conversion of sulfate to sulfide and a sulfate reduction rate of 0.67, 0.69 and 0.34 moles of sulfate per mole of lactate. Theoretical sulfate reduction rates are of 0.5 and 1.5 for incomplete and complete oxidation. Therefore a mixture of both types of SRB is expected in S1 and S2. Finally, the sulfide production rate was 0.4, 0.7 and 0.3 moles of sulfide per mole of lactate consumed for S1, S2 and S3, correspondingly. According to results, S2 cultures showed the best performance for H₂S production, suitable for renewable energy generation.

Keywords: sulfate reducing bacteria, hydrogen sulfide, renewable energy

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