Continuous dark fermentative hydrogen production under halophilic conditions
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1. Introduction

A large amount of saline effluents are generated worldwide from many industrial sectors including food processing, petroleum and leather industries. Wastewaters rich in both organic matter and salt are difficult to treat through conventional biological routes, since microbial inhibition is known to occur at high salt content. Nevertheless, biological hydrogen production using halophilic microbial consortia was recently shown in batch as a promising process to treat and valorize saline wastewaters [1].

The objective of this study is:
- to perform continuous dark fermentative hydrogen production in saline conditions (NaCl 35g/L) using natural halophilic microbial consortia;
- to compare the effect of two pH (6 and 7) on hydrogen production performances and microbial communities at mesophilic temperature.


2. Experimental and procedures

- **NaCl**
  - 35 g/L

- **Saline Sediment**
  - S/x = 8

- CSTR reactor
  - Glucose 10 g/L
  - Working Volume 2L
  - HRT 12 hours
  - Temperature 37°C
  - Agitation 300 rpm
  - pH (controlled) 6 or 7

3. Results and discussion

Effect of the pH on H₂ production and microbial community:

- **H₂ production performances**
- **H₂ content in the biogas**

- **Metabolic products**
  - The two reactors showed similar yield, but differences in productivity and H₂% in the biogas (the highest H₂ production rate of 2.1LH₂·d⁻¹ was attained at pH 6, while the highest H₂ concentration in the biogas of 83% at pH 7.

- The pH also affects the distribution of the metabolic product and the efficiency in glucose consumption.

4. Conclusion

(1) Is it possible to produce Hydrogen in continuous in saline conditions (NaCl 35g/L) using natural halophilic microbial consortia.
(2) The pH operates a strong selective pressure leading to the development of different microbial communities from the same inoculum source (identification under progress).

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