

BIOHYDROGEN PRODUCTION FROM GLYCEROL CRUDE OF WILD STRAINS *Bacillus amyloliquefaciens* and *Enterobacter ludwigii*

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Abstract

One of the biggest challenges for the next years it's to develop alternatives for sustainable energy production. The biodiesel is positioning itself as an option for the substitution of fossil fuel. His production is by transesterification between a fat and a monoalcohol, releasing glycerol which corresponds to 10% of the reaction volume. Large increments in the production of biodiesel will result glycerol. Studies have shown that anaerobic bacteria and fermentative bacteria are capable of producing biohydrogen, a high-energy fuel that does not generate polluting gases during its burn. Seen the importance of increasing the residual glycerol value, this study aimed to isolate and characterize bacteria from the oil refining industry reactor capable to produce biohydrogen from glycerol. The microorganisms were isolated in medium with residual glycerol as the only carbon source, and after were identified by sequencing 16S rRNA genes as *Bacillus amyloliquefaciens* e *Enterobacter ludwigii*. The fermentations took place using the microorganisms separately under anaerobic conditions for 48 hours, pH 7, 37°C in medium containing glycerol as a source of carbon. The hydrogen gas production was measured by the inverted bottle gas meter methodology, and confirmed with gas chromatography. Positive control was done using the commercial line of *Enterobacter aerogenes* ATCC13048. The isolate *B. amyloliquefaciens* showed higher production of biohydrogen, 0.50 ±0.2 mol H₂/mol income compared to *E. ludwigii* (0.35±0.1 mol H₂/mol de glycerol) e *E. aerogenes* (0.31±1 mol H₂/mol de glycerol). The biohydrogen production by *B. amyloliquefaciens* has been recently reported in the literature. The results income in this study showed to be superior then others reported in the literature before. Based on these results, was confirmed that the residual glycerol can be used in the production of biohydrogen. The natural microorganisms present in effluent has biotechnology potential for the production of biohydrogen gas as fuel and/or source of clean and renewable energy.

Keywords: biodiesel, crude glycerol, biohydrogen, microorganisms

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