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CHEESE WHEY WASTE AS RAW MATERIAL FOR THE BIO-HYDROGEN PRODUCTION BY *ESCHERICHIA COLI* WDHL: IMPORTANCE OF AMINO ACIDS AVAILABILITY

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Abstract

Cheese whey (CW) is the by-product from cheese production and represents an 85-90% of the total volume of processed milk. Only a minor proportion is used in the food industry and for animal feeding. The rest is a matter of concern because of the risk of being a pollutant if it is not disposed in a proper way. However, CW could be an inexpensive potential raw material for bio-hydrogen production by fermentative processes, since its high content of lactose and lactalbumin. The goal of this work was to produce bio-hydrogen from CW by *Escherichia coli* WDHL, which was genetically improved for this proposal. Since, *E. coli* does not assimilate complex proteins, the effect of an enzymatic proteolysis and addition of external amino acids were also evaluated. The experiments were performed in 110 mL serological bottles and 1-L bioreactors using HP medium with 20 g/l CW. The effect of 1000 U/l pancreatin and addition of tryptone 2.75 g/l as external amino acids source were evaluated. Gas production was measured using a liquid-replacement device and the bio-hydrogen was measured by gas chromatography. The results showed that both strategies improved the bio-hydrogen production. The use of pancreatin yielded 75% bio-hydrogen higher than the cultures control. Whereas, the bio-hydrogen production increased up 350% using tryptone. The results indicate that cheese whey is an attractive raw material for the bio-hydrogen production, but an external amino acids source is needed.

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