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BIO-HYDROGEN PRODUCTION BY *Escherichia coli* WDHL AND *BACILLUS SP.* USING WHEAT STRAW HYDROLYSATE AS SUBSTRATE

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Abstract

Biological production through dark fermentation is one approach to generate renewable hydrogen since it utilizes a wide range of carbon sources, such as industrial and agricultural wastes. The wheat straw is source of carbohydrate by enzymatic, thermal and chemical hydrolysis. The goal of this work was to produce bio-hydrogen by *Bacillus sp.* isolated from an anaerobic sludge and *Escherichia coli* WDHL using wheat straw hydrolysate (WSH) as substrate. The hydrolysis was performed using sulfuric acid 0.72% (v/v) during 1 h at 121°C. Carbohydrate content was determined by the DNS method for reducer sugars (RS) and using an HPLC. Fermentations were performed in 110 mL serological bottles using HP medium plus WSH at 20 g/l RS. Gas production was measured using a liquid-replacement device and bio-hydrogen was measured by gas chromatography. The results showed that both microorganisms consumed the fermentable carbohydrates, however 50% of RS remained at the end of the cultures. The hydrogen production occurred in the first 8 h of culture and *E. coli* WHDL produced 3.2-fold bio-hydrogen higher than *Bacillus sp.* The wheat straw hydrolysate is an attractive raw-material source of carbohydrate fermentable for the bio-hydrogen production.

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