



Circular Bioeconomy for Sustainable Development: Biohydrogen Production From Different Lignocellulosic Wastes

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ABSTRACT

The production of bio-hydrogen on a large scale came into thought after the rapid depletion of fossil fuels. It has been known for more than 70 years that algae can make bio-hydrogen under illumination. The substrates used in the present study were lignocellulosic wastes (agricultural wastes), sewage wastes and livestock wastes. Bioreactor used was stirred tank reactor, pH acidic, temperature for microalgae was 20 to 30 degrees Celsius. Operation mode was continuous. Methods used were direct biophotolysis, dark fermenter and gassification. The evolution of hydrogen was induced in the cells when pre-incubation in the dark was performed on the cells. Hydrogen production is due to the hydrogenase enzyme expressed during the period of incubation. The co-digestion of cassava wastewater along with buffalo dung for biohydrogen production gave a maximum hydrogen production rate. This method is considered to be an effective process for producing hydrogen without the generation of oxygen. Organic components are decomposed under the presence of light by anaerobic or photosynthetic bacteria via the nitrogenase-catalyzed reaction.

KEY WORDS: CIRCULAR BIOECONOMY, SUSTAINABLE DEVELOPMENT, WASTE RECYCLING

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