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Relevant topic: Food and Green Biotechnology

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Title:

Influence of pH and stirring on the hydrogen production by a pure *Clostridium* strain

Abstract:

Our dependence on fossil fuels as our primary energy source is one of the significant causes of global warming, environmental degradation, and health problems. Hydrogen (H₂) is a promising gas for the future because its combustion does not produce CO₂. Actually, hydrogen is produced by chemical and physical methods like steam reforming and partial oxidation of fossil fuels, which release huge amounts of greenhouse gas. Biological hydrogen production by fermentation using waste or wastewater is a promising process for economical and sustainable energy generation. Indeed dark fermentation does not produce greenhouse gas and allows a better waste valorization. The biological production of hydrogen (biohydrogen) has been the subject of an appreciable amount of research in the past and is being actively researched today. The investigations carried out at CWBI involve selection and characterization of bacteria strains able to produce biohydrogen efficiently from a wide range of substrates. A particularly interesting strain isolated at the laboratory has been characterized as *Clostridium* sp. Our research has shown the importance of pH regulation. Indeed, maintaining the optimal pH enables an 2,5 fold increase in hydrogen production yield. The importance of stirring in the bioreactor has also highlighted. A smooth stirring (60rpm) allows to increase productivity of 50%. These results are confirmed by the study of metabolites as the concentration of acetate and butyrate, indicating the production of hydrogen, is increased in the fermentation broth.