



Development of biohydrogen production by photobiological, fermentation and electrochemical processes: A review



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ABSTRACT

Production of biohydrogen has the potential to be a renewable alternative to current technologies. There are varieties of technologies for biological hydrogen production mechanisms including biophotolysis, photo fermentation, dark fermentation and hybrid biohydrogen production by electrochemical processes. In these studies, a review on the recent developments of biohydrogen production is presented. First, the theoretical principles of biophotolysis by cyanobacteria and green micro algae, as well as direct and indirect of biophotolysis process on hydrogen production are described. Secondly, practical aspects and fundamental of biological hydrogen production processes by photo and dark fermentation are reviewed. This work also involved comparison of the maximum H₂ yield, bacterial strains, operating condition, suitable substrates, and mathematical models for fermentative hydrogen production. A new hybrid biological hydrogen production processes by using the electrochemical process is then proposed. This study can also be used to improve the basic and current knowledge about the performance of the biophotolysis, fermentative and electrochemical process in producing hydrogen gas as the alternate fuel.

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Contents

1. Introduction	2
2. Fundamentals of biological hydrogen production processes by biophotolysis	2
2.1. Biophotolysis of water by cyanobacteria and green micro algae	2
2.1.1. FeFe-hydrogenases	3
2.1.2. Cyanobacterial NiFe-bidirectional hydrogenases	4
2.2. Direct biophotolysis	4
2.3. Indirect biophotolysis	5
3. Fundamentals of biological hydrogen production processes by fermentation	6
3.1. Photo-fermentation	7
3.2. Dark-fermentation	8
3.3. Photo-dark fermentation	8
4. Hybrid biological hydrogen production by electrochemical processes	10
4.1. Microbial fuel cell	11
4.2. Microbial electrolysis cells	12
5. The unique and advantages of biohydrogen production processes	12
6. Conclusion and perspectives	12
Acknowledgments	13
References	13

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