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**Majid Hosseini***The University of Texas Rio Grande Valley, USA***Technical challenges of fermentative bio-hydrogen production from biomass**

A hydrogen production approach that shows great potential and may prove to be a key to establishing a hydrogen based economy is one that is centered on fermentation process technologies. The systems that rely upon fermentation utilize microorganisms (bacteria) that generate hydrogen during the decomposition of organic matter. Refined sugars, waste water streams and certain sources of raw biomass can all be used as organic matter in this process. Hydrogen can be generated directly from microbes in direct hydrogen fermentation from the decomposition of complex molecules via various pathways, where selected pathway byproducts of some are combined with enzymes. Certain challenges that face fermentation systems, such as how to increase bio-hydrogen production rates and how to maximize output without increasing the amount of organic matter used, must be addressed prior to the process becoming commercially viable. In this work, technical challenges of fermentative bio-hydrogen production from various biomass sources, optimization of critical process parameters and how cost effective biomass sources can be utilized, are discussed. Additionally, potential industrial applications, limitations and challenges for scale up, recent progress in bioreactor development alongside designing and optimizing systems will be covered. To conclude, challenges that are specific to the biomass used in fermentative bio-hydrogen production, thoughts on further development with examples that highlight the relevant processes and future outlook are presented.

Biography

Majid Hosseini has earned both his PhD and MS degrees in Chemical Engineering from The University of Akron, Ohio, United States. He has also completed his Bachelor's degree in Chemical Engineering at Sharif University of Technology, Tehran, Iran. His research interests, expertise and experiences are very diverse, ranging from biofuels and renewable energy to industrial biotechnology, bioprocess engineering and development, sustainability, bio/nanotechnology, intelligent polymers and coatings, micro/encapsulation and nanoparticles for biomedical applications. He has been actively engaged in various fields of biofuels & bioenergy, sustainability, polymers, bio/nanotechnology, and related technology development both in industry and academia. He has served as a Key Speaker at multiple national and international conferences and meetings. He is the Editor of a book published by Springer in 2016 entitled "*Industrial Applications for Intelligent Polymers and Coatings*", which is a comprehensive collaboration on intelligent polymers and coatings for industrial applications by worldwide researchers and specialists. Currently, he serves as the Editor of a handbook scheduled for publication by Elsevier in May 2017. He is a persistent reviewer of numerous leading international journals, has published high caliber research articles and book chapters and co-invented US and international patent application technologies. He has been a Member of several professional bodies in the USA including: The New York Academy of Sciences, American Institute of Chemical Engineers (AIChE), AIChE-Institute for Sustainability, AIChE-SBE (Society of Biological Engineering), Design Institute for Emergency Relief Systems (DIERS), International Society for Pharmaceutical Engineering (ISPE), AIChE-Sustainable Engineering Forum, AIChE-Pharmaceutical Discovery, Development and Manufacturing Forum and The National Society of Collegiate Scholars.

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