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**Majid Hosseini***The University of Texas Rio Grande Valley, USA***A biorefinery approach to genetic manipulation of microalgae for biofuels production**

An ideal platform as an energy source, algal biofuels could potentially aid in the increasing demand for fuel and may be instrumental in slowing down the process of global warming while subsequently enhancing energy security. Genetic engineering may play a role in creating more efficient microalgae biofuels and hence making it a viable component of the energy mix. Improving algae lipid production can be achieved through the inclusion of genetic modification. This alteration could not only yield better quality lipids far more suitable as fuel feedstock, but could also allow for the inclusion of lipids in non-traditional products such feed, food or industrial applications. There is also an opportunity to utilize genetic engineering to facilitate the downstream processing of algal biomass into fuels in an integrated biorefinery. Algae biotechnology has also witnessed the emergence of a field that focuses on introducing genes or metabolic pathways that yield economically important components not found in natural varieties. Examples of such products derived from genetically modified algae include recombinant proteins, fatty acid, hydrogen, ethanol, etc. However, genetic engineering does not come without uncertainties. In this work, the progress and challenges faced when implementing metabolic engineering and genetic manipulation in order to improve algal biomass as a platform for biofuel production will be discussed. A description of cutting edge algae transgenic research is provided. The latest developments in engineered microalgae species and biofuels production via carbon metabolism pathway modification are also discussed. Additionally, the role that genetic engineering may play to enhance algal lipid and biofuels production and increase its competitiveness through a biorefinery approach is 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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