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Microalgae for biodiesel and 3rd generation bioethanol: Prospects and research priorities

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Algae are gaining wide attention as an alternative renewable source of biomass for the production of biofuel, including biodiesel and bio-ethanol. The utilization of algal biomass is undoubtedly an eco-friendly approach towards sustainability although more research and development is needed for the efficient use of these easily cultivable microorganisms to generate biofuel. The paper reviews the current state-of-science with respect to microalgal biofuel production, with a specific focus upon the biodiesel and bio-ethanol production potential. An updated literature review reveals that different types of microalgae can be applied, although *Chlorella* sp. and *Chlorococcum* sp. are most appropriate for biofuel production and can also be used for bio-ethanol. The bio-ethanol productivity from green algae is higher than for red algae. The complete production process is analyzed from algae growth, to harvesting, and conversion into biodiesel and bio-ethanol. The use of microalgae in a hybrid objective, i.e., the treatment of wastewater and generation of raw material for biofuel, has drawn a lot of attention over the past years and is reviewed. Clearly, biofuel from microalgae, produced from natural resources (sunlight, water and O_2/CO_2) is widely considered to be the most sustainable option for biodiesel and associated bio-ethanol production, and priority research can enhance the further development.

Biography

Qian Kang completed her Chemical Engineering Bachelor's study at the Tianjin University in China (2008). She completed PhD studies at the Beijing University of Chemical Technology in China, where she was a member of the PhD research team of Prof. Tan and is currently Postdoc at the Catholic University of Leuven, within the team of Prof. Dewil and Prof. Baeyens. Her main PhD research focus was improving the energy consumption of the production of Bio-ethanol, especially in combination with membrane technology. Her immediate research actions focus upon energy and exergy analysis of the next generation of concentrated solar power plants (hybrid combined cycle). Within the framework of this renewable fuel, she has participated in different conferences (Beijing, Tianjin, Korea, London). She has (co-)authored 8 publications in international peer-reviewed journals.

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