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Bioethanol production from green microalgae: from theory to practice

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Increasing global energy demand and environmental concerns have led to a growing interest in the replacement of fossil fuels by renewable energies. Among the existing energy alternatives, biofuels have emerged as one of the most important sustainable fuel sources. Recent studies have shown that microalgae can be used as potential feedstock for biofuel production due to several advantages in comparison to other energy crops. These photosynthetic microorganisms are able to biosynthesize large amounts of lipids and carbohydrates during short periods of time that can be subsequently processed into biodiesel and bioethanol, respectively [1]. However, so far, most of research has focused on the use of microalgal biomass for biodiesel production rather than on its bioconversion into bioethanol. This issue could be related to several challenges that

still have not been solved, such as finding a cost-effective cell disruption method to ensure a complete hydrolysis of intracellular starch granules or determining process conditions to maximize product yield and to enable a high ethanol concentration at the end of fermentation, among others [2]. In this presentation, a general overview of the process of producing bioethanol from microalgal biomass will be given and recent achievements in this research field will be summarized. Future research directions and obstacles will also be discussed.

References

1. Nigam P.S., Singh A.: Production of liquid biofuels from renewable resources. *Progress in Energy and Combustion Science* **37** 52–68 (2011).
2. Markou G., Angelidaki I., Georgakakis D.: Microalgal carbohydrates: an overview of the factors influencing carbohydrates production, and of main bioconversion technologies for production of biofuels. *Applied Microbiology and Biotechnology* **96** 631–645 (2012).