BIOFUELS PRODUCTION BY *CHLORELLA SOROKINIANA* IN A BIOREFINERY PERSPECTIVE
(Poster Presentation)

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About the author:

Sara Raposo is a Biological Engineer with a PhD in Biotechnology Sciences (Portugal), integrated the Faculty of Science and Technology of the University of Algarve for lecturing and coordinating matters of the bachelor's and master's degree in Biotechnology, Marine and Coastal Management and the Masters in Biological Engineering, related to bioreactor technology, quality control, blue biotechnology and production of biofuels.

She integrates the Steering Committee of the Research Centre for Marine and Environmental Research (CIMA) and coordinate the Engineering and Environmental Biotechnology Laboratory. Coordinates the 2nd generation Biofuels production projects, using low-cost carbon sources as agro-industrial residues, and the application of bioreactor technology to the optimization of technological / operational conditions for the production of biological systems. Her research is focused in the biotechnology and blue energy, in microalgae biorefinery concept, with the technological development for the co-production of biofuels (biodiesel, bioethanol and biogas) and high value products, where microalgal biomass is fully used to obtain lipids (oils), carbohydrates and proteins.

Her research work has resulted in more than 80 scientific publications, distributed by scientific papers published in international journals, patents, international conference papers, articles in proceedings of international/national conferences.

Company info:

The University of Algarve is a public higher education institution located in the southern part of Portugal, with circa 8.046 students of which 1205 were enrolled in postgraduate programs. The University's core research and teaching areas are: science and technology, management and economy, earth and marine sciences, social sciences and more recently health. At present the University of Algarve offers 49 graduate and 74 postgraduate programs (48 MsC and 26 Phd). International, inter-personal and inter-institutional networks, and projects developed in cooperation with other universities are reflected in its teaching and research activities so as to foster innovation and update of learning contents, project incubation, curriculum development, scientific research and training. International projects are fully integrated into the life of the institution. In 2013, the University had 715 permanent teaching and research staff that developed a significant number of research projects (107 R&D only) for which contributed the work produced by 105 fellowship grant holders, which demonstrates a clear commitment towards R&D and innovation. At present, the University has well-established research centers in several fields such as marine sciences, bio-medicine, electronics, chemistry, arts and communication and social sciences.

Abstract:

Microalgae have recently been considered as a promising third-generation feedstock for biofuels production. Generally, microalgae are used for biodiesel production because of their high lipid content(Lee et al., 2015). To reduce the cost of biofuels production, the biorefinery concept should be applied, so that all cellular components of the microalgae are converted into biofuels and various valuable chemicals (Kermanshahi-pour et al., 2014). Carbohydrate composition of *Chlorella sorokiniana* (axenic and non-axenic form) was characterized following acidic and enzymatic hydrolysis. Monitoring intracellular starch as a function of cultivation time at varying nitrate concentrations showed an 88.93% increase on cellular starch when growth occurs under nitrate depleted conditions. *Chlorella sorokiniana* residual biomass, after lipid extraction, was subjected to saccharifications by acid and enzymatic hydrolysis. Carotenoid content was also evaluated, as additional valuable chemicals. The carotenoids productivities are 80.69 and 4.61 mg/L.day for non-axenic and axenic *Chlorella sorokiniana*, respectively. Preliminary results showed a glucose yield of 0.086 g/g algae for enzymatic hydrolysis and 0.18 g/g algae for acid hydrolysis. These findings indicate the feasibility of using carbohydrate-producing microalgae as feedstock for fermentative bioethanol production.

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Keywords:

Microalgae, Biorefinery, biofuels, hydrolysis, starch

References:

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