

# MICROALGAE GROWTH IN DIFFERENT TROPHIC CONDITIONS

## ( Poster Presentation)

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About the author:

Ana Constantino holds an Integrated master in Biological Engineering obtained at the University of Algarve (2011). She is currently working as researcher fellow in Algedred project. This is a joint project between universities and private companies in south of Portugal and Spain. Previously she worked in bioethanol production research project using agroindustrial wastes. Her research interests include microalgae, biofuels, wastes valorization. With four original papers, one patent, several poster communications and one international oral communication in her curriculum, this is the first participation in a microalgae international meeting.

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 are photosynthetic microorganisms that have the capacity to grow under conditions of autotrophy, using light and assimilating carbon dioxide; heterotrophy in which they use only organic compounds to grow in the absence of light; and in mixotrophy, being this condition a mixture of the two previous ones, being able to have preferences for one of the ways of obtaining energy by the microalgae (Patel et al., 2017).

In this study, the optimization of the nutritional conditions in terms of sulfur and phosphorus composition of *Chlorella sorokiniana* microalgae under mixotrophic conditions was optimized. It is known that these elements have a strong influence on the metabolism of microalgae, potentiating the production of biomass and metabolites of interest. Phosphorus is an essential nutrient in photosynthesis and its concentration in the medium significantly affects microalgae growth (Chu et al., 2013; Kim et al., 2012). Phosphorus plays an important role in lipid production when nitrogen is limiting.

Sulfur is a macronutrient important for the growth of microalgae and is present in the process of cell division, protein metabolism and is a structural element of proteins, vitamins and amino acids (Golub & Voyevoda, 2013).

Changing sulphur concentration from 0.59 to 1 mM, increased biomass and carotenoid maximum productivities 20 and 13 %, respectively.

Increase of phosphorus concentration from 0.54 to 3 mM, resulted in 6 and 16 % more biomass and carotenoid maximum productivities, respectively. In order to maximize the good productivities already achieved, it is necessary to optimize other nutrients, such as copper, iron and zinc.

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Keywords: *Chlorella sorokiniana*, sulfur, phosphorus, biomass, carotenoid

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