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Use of combined strategy of light intensities and wavelength to enhance the biomass and lipids production on the microalga *Acutodesmus obliquus*

Edisson Tello Camacho^a, Ximena Hurtado-Varela Eng^a, Claudia L. Garzón-Castro^a and John Cortés-Romero^b

^aUniversidad de La Sabana, Colombia

^bUniversidad Nacional de Colombia, Colombia

The quality of light, such as wavelength and the intensity affect the performance of the algal growth and lipids production. Moreover, these variables affect both the quantity and the lipid profile. To study the interrelation among these variables, *Acutodesmus obliquus* (*Scenedesmus obliquus* UTEX 393) was cultivated in Bold 3N medium modified with 75% nitrogen at 25°C, pH 6.8, 125 rpm, and a photoperiod of 18/6h. The illumination was provided by a light-emitting diode surface mount device extensions (LED SMD) emitting red ($\lambda=620-750\text{nm}$), yellow ($\lambda=570-590\text{nm}$), green ($\lambda=495-570\text{nm}$) and violet ($\lambda=380-450\text{nm}$) lights. Additionally, each culture was illuminated at different light intensities ($I_1=40\mu\text{E}\cdot\text{m}^{-2}\cdot\text{s}^{-1}$, $I_2=65\mu\text{E}\cdot\text{m}^{-2}\cdot\text{s}^{-1}$ and $I_3=90\mu\text{E}\cdot\text{m}^{-2}\cdot\text{s}^{-1}$). The extraction method was microwave assisted (MW) using hexane: chloroform: methanol in proportions 1:2:3. All samples were analyzed with gas chromatography coupled to mass spectrometry (GC-MS). The results showed that the biomass production is directly proportional to the light intensity under the parameters established, e.g. at $90\mu\text{E}\cdot\text{m}^{-2}\cdot\text{s}^{-1}$ violet, yellow and red light showed the major biomass production, violet light produced minor amount of lipids when there was a major light intensity and *A. obliquus*, under the parameters established, is a good producer of palmitate, linolenate and linoleate methyl ester.

Biography

Edisson Tello Camacho is a Chemist. He received his master's degree in Chemical Science from the National University of Colombia with an emphasis on natural products, bioprospecting, and organic synthesis. In 2012 and 2013, he developed a research internship in the synthesis of natural products at the University of Nottingham, United Kingdom. Currently, he is Assistant Professor at the Department of Chemical Engineering at Universidad de La Sabana, Colombia and supports the Bioscience PhD program at the same university. He is also the Leader of the Bioprospecting Research Group at Universidad de La Sabana, where he focuses his research on marine natural products chemistry, searching for cytotoxic and antimicrobial compounds and working in biotechnology. Finally, he has been awarded with the Early Career Chemist award from the ACS in 2015, a laureate PhD thesis in 2013 and Meritorious Magister Thesis in 2008.

edisson.tello@unisabana.edu.co

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