Using Dunaliella salina Microalgae to Reduce Anthropic CO2 Levels in the Atmosphere and Applying Its Biomass to Produce Surfactants

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Due to anthropic actions, greenhouse gases, especially CO2, are released into the atmosphere, causing air pollution and increasing Earth's temperature. Despite being a developing country signatory to the Kyoto Protocol, Brazil emitted the net value of 1.5 million tons of CO2 equivalent in 2015, an increase of about 10% compared to the 2012 value, when it achieved its lowest emission index. According to World Meteorological Organization bulletin published in 2017, the concentration of CO2 reached the 403.3 ppm range in 2016, a huge increase compared to the estimated value of 280 ppm in the pre-industrial era. This highlights the need for studies for reducing the emission of CO2 in the atmosphere. In this way, the objective of the project was to use the photosynthetic capacity of the microalgae species Dunaliella salina for the fixation of anthropic CO2 and to use its generated biomass for the synthesis of surfactant. The initial stage of the work consisted in the study of the life cycle of the microalgae through the counting of cells by optical microscopy, using Neubauer chamber, and analysis of absorbance using UV-VIS spectrophotometer. Sequentially, the analysis of the efficiency of the absorption of carbon dioxide by microalgae was carried out using a CO2 indicator solution and pH measurements. In addition, tests were carried out in order to determine the most efficient procedure for the utilization of its biomass, from obtaining the usable fatty acid for the synthesis of surfactants. We obtained results that indicates that Dunaliella salina microalgae's metabolism can be used to absorb anthropic CO2 and that its generated biomass may be used in the synthesis of surfactants. Both mechanisms may be applied in a sustainable alternative for environmental remediation.