FROM OIL REFINERY TO MICROALGAL BIOREFINERY

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The objective of this work objective is to develop an integrated system for carbon dioxide biotransformation in oil refineries. Liquid and gaseous wastes from oil refining were considered for *Aphanothece microscopica Nägeli* cultivation in a bubble column photobioreactor. Growth kinetics, carbon dioxide removal and oxygen release rates, carbon footprint and biodiesel production were studied. The obtained results showed the potential use of refinery wastes on microalgae-based systems. At optimized culture conditions a maximum specific growth rate of 1.4day^{-1} and a maximum carbon dioxide elimination capacity of 22.9mg/L.min were obtained. Each bioconverted CO_2 mass unit resulted in an approximately value of 0.75 released O_2 mass unit. Carbon footprint analyses indicated that a small carbon dioxide fraction was fixed on biomass form. Volatile organic compounds were the main routes of carbon dioxide biotransformation in the photobioreactor in such conditions. For biodiesel production, it was possible to obtain 0.08g_{lipid}/L.day. Therefore, the developed microalgal is a promising emerging biorefinery platform to generate valuable chemical building blocks.

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