Poster

Revalorization of tidal waste in biofuel production

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ABSTRACT

Motivation: The increase of algal blooms due to eutrophication and climate change are leading to uncontrolled beach cast depositions. This biomass accumulation on the coasts deteriorates water quality and causes economic issues [1].

Tidal waste exhibits a variable composition with a significant amount of carbohydrates. Biorefinery consists of extracting and using all the components of a material. In the case of agricultural waste, the carbohydrates resulting from cellulose extraction are used to produce renewable fuels, such as bioethanol. However, algae-based biorefineries face challenges, needing an integrated biorefinery approach [2]. Integrated biorefineries yield value-added products alongside the primary product, offer economic advantages and enhance process profitability [3].

The aim of this work is to study the effectiveness and performance of bioethanol production under an integrated biorefinery approach. For this purpose, the chemical composition of the liquid fraction obtained after low environmental impact chemical extraction methods was analysed.

Methods: High-Performance Liquid Chromatography (HPLC) was employed to determine the concentration of dissolved products, specifically sugars (xylose, arabinose, and glucose). A Shodex SH1011 column with 5mM H_2SO_4 mobile phase, flow rate of 0.6 ml/min at 55°C, and refractive index detector at 50°C were utilized.

Results: The results suggest that the studied sugars are present in sufficient concentrations for extraction via clean technologies, allowing their valorization into alcohols suitable for beverages, due to their characteristic organoleptic properties, or for fuels.

Conclusions: The obtained results are promising, though further complementary studies are required for their application at an industrial scale.

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