VALORIZATION OF MONOMERIC COMPOUNDS ORIGINATING FROM SYNTHETIC POLYMERS BY THE HETEROTROPHIC MICROALGAE CRYPTHECODINIUM COHNII

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ABSTRACT

The main scope of this study was to evaluate the utilization of monomeric compounds resulting from synthetic polymers degradation, for the production of polyunsaturated omega-3 fatty acids, which are recognized as important nutraceuticals with notable effects on human/animal physiology, promoting both brain and heart health. The chosen monomers for examination were the degradation products of polyethylene terephthalate (PET) and polylactic acid (PLA). More specifically, terephthalic acid, ethylene glycol and lactic acid were used as sole carbon sources for the growth of the heterotrophic marine microalgae *Crypthecodinium cohnii.* This microalgal species is able to grow on various carbon sources and has the ability to accumulate polyunsaturated omega-3 fatty acids, particularly docosahexaenoic acid (DHA)[1,2]. The growth, the carbon source consumption and the lipid accumulation by *C. cohnii* cells were evaluated during batch cultivation of the microalgae under optimal conditions. Growth was monitored daily through optical density measurements and microscopic examination of the cultures. The consumption of each carbon source was determined by HPLC, while lipid content was measured via GC after extraction and esterification of the fatty acids into methyl esters. The results demonstrate the potential of valorizing the degradation products of widely used plastics for the production of valuable nutraceuticals through microbial fermentation.

KEYWORDS: microalgae, omega-3 fatty acids, lactic acid, terephthalic acid, ethylene glycol

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