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PHYCOREMEDIATION OF 17A-ETHINYLESTRADIOL BY IMMOBILIZED MICROALGAE CHLORELLA VULGARIS

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Abstract
Emerging micropollutants are increasingly present in domestic effluents. However, as these are not sufficiently removed by conventional effluent treatment technologies, they are usually found in low concentrations in aquatic matrices (ng/L), which can cause numerous disruptive effects on exposed organisms, including humans. Among these, the synthetic hormone 17α-ethinylestradiol (EE2) stands out, widely used in the pharmaceutical industry, mainly in contraceptives and hormone replacement therapies. Therefore, the use of selected microalgae species has been studied and applied in the treatment of effluents as potentially effective in phycoremediation (removal or biodegradation) of target contaminants, such as synthetic female hormones. Thus, the present study aimed to evaluate the phycoremediation capacity of the microalgae *Chlorella vulgaris*, immobilized in sodium alginate capsules, in the removal/biodegradation of the synthetic female hormone 17α-ethinylestradiol (EE2). Initially, the encapsulation of the microalgae with sodium alginate was carried out to evaluate the ability of the microalgae to remain alive and to be slowly released into the liquid medium after the encapsulation process. After the encapsulation process, the growth of microalgae cells was monitored over 4 months by counting cells in a Neubauer chamber and an increase in the number of cells was verified, meaning that the microalgae remained alive and there was an increase in the number of cells. In the second step, phycoremediation bioassays were performed, where the encapsulated microalgae were then exposed to 50μg/L of EE2 in mineral water for 96h. In parallel, control bioassays with free microalgae in mineral water (negative control) and another with only EE2 in mineral water (positive control) were conducted. Bioassays were monitored by cell count and EE2 concentration by liquid chromatography. The results are being analyzed and will be presented in the full article, where an efficiency between 60 and 70% of reduction in the concentration of EE2 in water is expected.

Keywords: Sodium alginate capsules, Synthetic female hormone, Microalgae encapsulation.

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