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EXPERIMENTAL STUDY OF THE ELECTROCOAGULATION PROCESS: APPLICATION TO THE TREATMENT OF OLIVE MILL WASTEWATER FROM AL-HOCEIMA CITY, MOROCCO

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Abstract

Olive Mill production generates a by-product known as olive Mill mill wastewater (OMW), characterized by its high content of phenolic compounds and organic materials, presenting significant environmental hazards if discharged untreated. To address this, Design-Expert 10.0 software was employed in this study to fine-tune the operational conditions, reducing the need for extensive experimentation. The Response Surface Methodology (RSM) was utilized to evaluate the impact of various operational parameters: initial pH, current density, and operation time on the efficacy of removing contaminants such as Chemical Oxygen Demand (COD), Total Suspended Solids (TSS), polyphenols, and coloration. Operating parameters were set within specific ranges: time (0 – 30 min), pH (4.5 - 10), and current density (0 – 40 mA/cm²). The RSM analysis revealed that optimal reduction rates could be achieved at a pH of 6.4 and a current density of 21 mA/cm² over a duration of 20 minutes, resulting in reductions of 57% in COD, 67% in TSS, 54% in polyphenols, and 80% in coloration.

Key words: electrocoagulation, OMWW, reduction efficiency, statistical analysis

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