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TREATMENT OF PRETREATED OLIVE MILL WASTEWATER USING FENTON PROCESS IN THE PRESENCE OF UV AND US

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Abstract

In this study, the treatment of olive mill wastewater (OMW), which is physicochemically pre-treated by acid cracking (AC) and lime precipitation (LP), was evaluated by a combination of Fenton oxidation, ultraviolet (UV), and ultrasound (US) processes. The results obtained were evaluated in terms of the removal efficiencies of chemical oxygen demand (COD), total organic carbon (TOC), oil-grease, and UV254 parameters. The COD removal efficiencies of precipitated OMW (p-OMW) after AC+Fenton+UV, LP+Fenton+UV, AC+Fenton+US, and LP+Fenton+US processes were found as 70, 78, 77, and 90%, respectively. Aromatic compounds which are formed as a result of phenol oxidation are not significantly affected by UV application while they were partially affected by US application. In the experimental studies of UV and US, compliance with pseudo-first-order reaction kinetics was determined. In the experimental studies of AC+Fenton+UV, LP+Fenton+UV, AC+Fenton+US, and LP+Fenton+UV, LP+Fenton+UV, AC+Fenton+US, and LP+Fenton+US, compliance with the pseudo-first-order kinetic model was founded. The reaction rate constants (k) were determined as 0.0026, 0.0024, 0.0014 and 0.0041 1/min, respectively. As a result of this study, the highest reaction rate and COD removal rate were obtained with the application of LP+Fenton+US.

Key words: acid cracking, Fenton, lime precipitation, olive mill wastewater, ultrasound, ultraviolet

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