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"Gheorghe Asachi" Technical University of Iasi, Romania

OLIVE MILL WASTEWATER (OMW) TREATMENT BY HYBRID PROCESSES OF ELECTROCOAGULATION/CATALYTIC OZONATION AND BIODEGRADATION

Mohammad Reza Khani[1, 2], Hakimeh Mahdizadeh[3], Karthik Kannan[4], Laleh R. Kalankesh[5], Bahram Kamarehei[6], Mohammad Mehdi Baneshi[7], Yousef Dadban Shahamat[8*]

[1]Water Purification Research Center, Tehran Medical Sciences, Islamic Azad University, Tehran, Iran.
[2]Department of Environmental Health Engineering, Faculty of Health, Tehran Medical Sciences, Islamic Azad University, Tehran, Iran
[3]Department of Environmental Health, School of Public Health, Kerman University of Medical Sciences, Kerman, Iran
[4]Center for Advanced Materials, Qatar University, 2713 Doha, Qatar
[5]Department of Environmental Health Science, Health Sciences Research Center, School of Public Health, Mazandaran University of Medical Sciences, Sari, Ira
[6]Department of Environment Health, School of Health, Lorestan University of Medical Sciences, Khoramabad, Iran
[7]Social Determinant of Health Research Center, Yasuj University of Medical Science, Yasuj, Iran
[8]Environmental Health Research Center, Department of Environmental Health Engineering, Faculty of Health, Golestan University of Medical Sciences, Gorgan. Iran

Abstract

The olive oil extraction industry is one of the most polluting wastewaters from the food industry, which is considered an important economic activity in the world. The environmental effects of olive wastewater are related to chemical and organic loading, which is resistant to biodegradation processes. The purpose of this study was to determine the efficiency of combined electrocoagulation, catalytic ozonation, to reduce organic load and improve the biodegradability of olive oil sewage. The present study was experimental on a laboratory scale and was done at a batch reactor on actual olive wastewater. The electrocoagulation process was performed using Fe electrodes at a current density of 0.73, 0.5, 0.05A/dm^2. The optimal conditions for the electrocoagulation process were obtained at a flow rate of 0.5 A/dm^2 for 45 min reaction time, so that the removal efficiency of TOC, COD, and turbidity was 75, 80 and 94%, respectively. Then the treated wastewater under these optimal conditions entered the catalytic ozonation process (COP) reactor. In the COP process, the TOC and COD concentrations reached 105 and 210 mg/L after 90 min (44% and 56% removal). Eventually, the effluent was introduced into the biological reactor and the removal efficiency of COD and TOC were investigated. So, the amount of TOC and COD decreased from 105 and 210 mg/L to 22.3 mg/L and 37 mg/L, respectively. As a result, the overall efficiency of the EC/COP/SBR system in removing COD and TOC was 98.4% and 97.2%, respectively. The combination of these processes is very effective in comparison with other processes for the treatment of olive sewage.

Key words: biodegradation, catalytic ozonation, electrocoagulation, OMWW, wastewater

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* Author to whom all correspondence should be addressed: e-mail: Dr.udadban@goums.ac.ir