OPTIMIZATION OF PHENOLIC COMPOUNDS ABATEMENT IN OLIVE MILL WASTEWATER BY FENTON’S LIKE TREATMENT WITH H$_2$O$_2$/Cu$^{2+}$ UNDER MICROWAVE USING EXPERIMENTAL DESIGN

Hamida Iboukhoulef$^1$, Abdeltif Amrane$^{2,3*}$, Hocine Kadi$^1$

$^1$Laboratoire de Chimie Appliquée et Génie Chimique, Université M. Mameri, Tizi-Ouzou, Algérie
$^2$Université de Rennes 1, Ecole Nationale Supérieure de Chimie de Rennes, CNRS, UMR 6226, Avenue du Général Leclerc, CS 50837, 35708 Rennes Cedex 7, France
$^3$Université européenne de Bretagne

Abstract

This work describes the application of Fenton’s like system (H$_2$O$_2$/Cu$^{2+}$) assisted with microwaves to the removal of phenolic compounds from olive mill wastewater (OMWs) under microwave. The effect of various operating conditions, namely copper ion concentrations ($X_1$), hydrogen peroxide ($X_2$), time of irradiation ($X_3$) and microwave power ($X_4$) were evaluated by factorial design of experiments. Results showed that $X_1$, $X_2$, $X_3$ and $X_4$ had significant effects on the response followed by the interactions $X_1X_2$, $X_1X_3$, $X_2X_4$ and $X_1X_2X_3$. The highest degradation of phenolic compounds was found for 500 mg/L copper dose, a power of 340 W, 12 M H$_2$O$_2$ and 8 min irradiation time. FTIR analysis confirmed that microwave degradation of polyphenols by means of the Fenton-like system Cu (II)/H$_2$O$_2$ could be an efficient solution for the treatment of olive mill wastewater.

Key words: experimental design, H$_2$O$_2$/Cu$^{2+}$, olive mill wastewater treatment, polyphenols, microwave

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