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"Gheorghe Asachi" Technical University of Iasi, Romania

COPPER REMOVAL FROM SYNTHETIC ELECTROPLATING WASTEWATER APPLYING ANIONIC SURFACTANTS DERIVED FROM VEGETABLE OILS

Alfredo José Ferreira da Silva[1*], Paula Fabiane Pinheiro do Nascimento[1], Eduardo Lins de Barros Neto[1], Lindemberg de Jesus Nogueira Duarte[2], Ricardo Paulo Fonseca Melo[3], Francisco Wendell Bezerra Lopes[4]

[1]Department of Chemical Engineering, Federal University of Rio Grande do Norte, Senador Salgado Filho Avenue, 59.072-970, Brazil
[2]Department of Petroleum Engineering, Federal University of Rio Grande do Norte (UFRN), Senador Salgado Filho Avenue, 59.072-970, Brazil
[3]Department of Chemical Engineering, Federal University of the Semiarid (UFERSA), Francisco Mota Avenue, 59.525-900, Brazil
[4]Department of Chemical and Biotechnological Engineering, Université de Sherbrooke, 819 821-8000, Canada

Abstract

The aim of this study was to promote copper extraction from synthetic electroplating wastewater using ionic micellar flocculation with anionic surfactants derived from vegetable oils (soybean, coconut and sunflower). Obtaining the synthetic wastewater was based on the wash water composition of the acidic copper of an electroplating company: pH = 9 and copper solution concentration of 280 ppm at room temperature. For each surfactant derived from vegetable oils, the following variables were used in the 23 and 32 experimental factorial design: surfactant concentration, pH and anionic polymer concentration. The high copper extraction capacity obtained with the sinthesized surffactants (SCO, SSBO and SSO) may be justified by the strong electrostatitic attraction between the surfactant anion and the positively charged Cu+2 ion. The Cu+2 extraction was 100% under the following conditions: pH = 9 and surfactant concentration of 1.25 g/L and 3.75 g/L, without the anionic polymer. The factorial design demonstrated that pH is the only significant variable in copper extraction. In acidic pH, copper extraction with the SSO surfactant was not favored, regardless of surfactant concentration and polymer addition. An increase in anionic surfactant concentration (SSBO and SCO) caused an increase in copper extraction. The SCO surfactant exhibited the highest saponification index (248 – 265 mg KOH/g) and the greatest interaction with Cu+2 ions, justifying its higher removal capacity.

Key words: anionic surfactant, copper, experimental design, electroplating wastewater, ionic micellar flocculation

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[*] Author to whom all correspondence should be addressed: e-mail: paula_fabiane@hotmail.com; Phone: +55 84 9916 66815