



Liquid and Supercritical CO₂ Extraction of Cu and Zn from Aqueous Solution used Dithiocarbamate as Chelating Agent

Jeton Halili^{1*}, Altin Mele², Tahir Arbnesi¹

¹University of Prishtina, Faculty of Mathematical and Natural Sciences, Department of Chemistry, Prishtina, Kosovo; ²University of Tirana, Faculty of Natural Science, Department of Chemistry, Tirana, Albania

Received February 12, 2015; Accepted March 16, 2015

Abstract: The extraction with CO₂ of heavy metals Cu and Zn from aqueous samples was studied in the presence of Sodium Diethyldithiocarbamate as chelating agent. The extraction procedure was composed of static and dynamic operations. The effect of important parameters on extraction efficiency such as pressure, temperature, static and dynamic periods were investigated. The static extraction was carried out with liquid CO₂ at 72 bar and 30 °C, and with supercritical CO₂ at 200 bar and 50 °C. Dynamic extractions by supercritical CO₂ have been performed at 200 bars with 50 °C. After adding the CO₂ on the aqueous metal solution, the pressure and temperature were set and extraction was performed in three periodical times; 30 min, 60 min and 120 min at constant temperature and pressure. The pH of the solution was kept 6 using a phosphate-citrate buffer. After the extraction, the remaining aqueous solution in the extractor was analyzed for its metal content by Inductively Coupled Plasma (ICP-OES) and Atomic Absorption Spectrometry (AAS), determining the recovery of the metal by CO₂. The highest recoveries during static extraction were obtained for Cu 86.96% in supercritical conditions (T=50 °C, P=200bar), During dynamic extraction noticed increased of extraction in function of time for all two metals; Cu (90.1-93.64 %, Average RSD = 0.986, n = 3) and Zn (51.9-54.9 %, Average RSD = 1.966, n = 3)

Keywords: *Supercritical CO₂, heavy metals, extraction, ICP-OES, AAS*

*Corresponding: E-Mail: E-Mail: jeton.halili@uni-pr.edu; Tel +37744323427; Fax: +381 38 226 104