

Removal of Copper, Lead, and Zinc from Contaminated Water by Saltbush Biomass: Analysis of the Optimum Binding, Stripping, and Binding Mechanism

Abstract

Experiments performed on the Cu(II), Pb(II), and Zn(II) binding by saltbush biomass (*Atriplex canescens*) showed that the metal binding increased as pH increased from 2.0 to 5.0. The highest amounts of Cu, Pb, and Zn bound by the native biomass varied from 48–89%, 89–94%, and 65–73%, respectively. The hydrolyzed biomass bound similar amount of Pb and 50% more Cu and Zn than the native. The esterified biomass had a lower binding capacity than native; however, esterified flowers bound 45% more Cu at pH 2.0 than native flowers. The optimum binding time was 10 min or less. More than 60% of the bound Cu was recovered using 0.1 mM HCl, while more than 90% of Pb was recovered with either HCl or sodium citrate at 0.1 mM. For Zn, 0.1 mM sodium citrate allowed the recovery of 75%. Results indicated that carboxyl groups participate in the Cu, Pb, and Zn binding.