Abstract

This study was conducted to evaluate the biosorption of copper by isolated bacteria from the San Pedro River located in the state of Sonora, México. Escherichia coli and Burkholderia cepacia were selected and isolated from 123 bacterial stocks taken during three sampling campaigns collected at different seasons of the year. These bacteria were utilized to conduct batch biosorption tests, which achieved 73 % of copper biosorption in 75 minutes. In addition by utilizing zeolite as bacterial support a 75 % of copper biosorption was obtained in the same period. The continuous biosorption tests were completed in 28 days in a zeolite packed up flow reactor (UAPZR). The inoculation was performed with a mix of 10 selected stocks. In addition, the bacteria were developed in an acid environment that was recycled until 1 g per liter of biomass was produced. At this time a copper solution containing 50 mg of Cu(II) per liter at a flow of 2.5 mL/min, was added to the reactor and its conditions set to an air flow of 36 mL/m, hydraulic retention time of 0.87 days, temperature of 30 °C and pH between 3 and 4. The biosorption efficiency of the UAPZR was 97 % in the first day of operation and reached saturation on the eleventh day. It is concluded that the active biomass utilized was able to heavy metals biosorption, such as copper, and demonstrates that the zeolite acts only as biomass support.

Keywords

Biosorption, copper, reactor, aerobe, zeolite.