عنوان مقاله:

Biosorption capability of Copper Acetate by Shinella zoogloeoid Bacteria

محل انتشار:

بیست و چهارمین کنگره بین المللی میکروب شناسی ایران (سال: 1402)

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BACKGROUND AND OBJECTIVESOne of the applications of biosorption processes is the immobilization of microbial cells for the removal of toxic pollutants from industrial wastewater. Shinella zoogloeoid bacteria can degrade certain organic pollutants and also serve as a potential biosorbent for some heavy metals. Biosorption is defined as the passive uptake of metals by biomass, offering a cost-effective solution for biological purification. The aim of this study is to investigate and enhance the biosorption of copper acetate by Shinella zoogloeoid bacteria by altering some parameters such as pH, temperature, and incubation time.MATERIALS AND METHODSIn this study, the bacterial strain Shinella zoogloeoid DSM۲۸۷ was utilized. Bacteria were cultured under non-heavy metal conditions to ensure an adequate supply of the bacterial species. The bacteria were then exposed to copper acetate with various parameters, including incubation time, pH, temperatures, and copper concentrations. Minimum inhibitory concentration (MIC) was determined to assess the bacteria's tolerance to various copper acetate concentrations. Subsequently, the copper uptake by bacteria was investigated under different conditions, including initial copper concentration, incubation time, pH, and temperature. The measurement of copper acetate content in each sample was performed using inductively coupled plasma mass spectrometry (ICP-MS).RESULTS AND DISCUSSIONThe study results indicated that the MIC for copper acetate was found to be ۷۰۰ micrograms. Moreover, the average biosorption of copper acetate by the bacteria was higher at pH ۸ and a temperature of ۳۰ ℃. Additionally, this process was time-dependent, with a higher uptake observed after ۴۸ hours compared to ۲۴ hours.

کلمات کلیدی:

Optimization, Shinella zoogloeoid, Copper, Biosorption