



Biosorption properties of extracellular polymeric substances towards Zn(II) and Cu(II)

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ABSTRACT

The aim of this paper was to assess the biosorption properties of extracellular polymeric substances (G-EPS, P-EPS and W-EPS) extracted from three different activated sludges called AS-G, AS-P and AS-W. The compositions of the EPSs were determined. Sludge grown in lab had more EPS than those from a Sewage Treatment Plant, and that sludge fed on glucose had more EPS than if fed on peptone. The biosorption capacities of the EPSs with two metals Cu and Zn were examined successively. The maximal biosorption capacity of EPS is increased in the following order: G-EPS > W-EPS > P-EPS. All EPSs showed stronger binding properties for Zn than Cu, and this adsorption process was described well by Langmuir and Freundlich models, respectively. The excellent fit between pseudo second-order equations and adsorption process indicates that the chemisorption may be the rate limiting step. FTIR analyses revealed that the main chemical groups involved in the interactions between metals were apparently alcohol, carboxyl and amino. These groups were part of the EPS structural polymers, polysaccharides, proteins and hydrocarbon-like products.

Keywords: Activated sludge; Extracellular polymeric substances; Zn; Cu; Equilibrium isotherm; Kinetics; FTIR

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