COMPARISON BETWEEN THE BIOSORPTION PERFORMANCE OF THREE DIFFERENT BIOFILMS SUPPORTED ON GAC FOR THE REMOVAL OF CR (VI)

C. Quintelas, B. Fernandes, J. Castro, T. Tavares

Centro de Engenharia Biológica, Universidade do Minho, 4710-351 Braga, Portugal

This study aims the investigation of the behaviour of three different biofilms supported on granular activated carbon (GAC) in terms of the removal of chromium (VI). The effect of the initial concentration of metal was tested, the polysaccharide and polymeric net were quantified and the application of these systems to a real effluent was made. The support used for the biofilm formation was GAC from MERCK. The microorganisms used were three different bacteria: *Bacillus circulans*, *E. coli* and *Streptococcus equisimilis* (Spanish Type Culture Collection). Minicolumns (internal diameter = 2 cm, ht = 30 cm) were used for open systems studies, partially filled with GAC (15 g) covered with the three different biofilms. The metal solutions were passed through the column with a flow rate of 5 ml/min (residence time of 19 min). Samples (5 ml) were taken, centrifuged and analyzed for metals using atomic absorption spectrophotometry, AAS. The production of polysaccharides is higher for *Bacillus circulans* follow by *Streptococcus equisimilis* and *E. coli* (9.19 $mg/g_{biosorbent}$, 7.24 $mg/g_{biosorbent}$, 4.77 $mg/g_{biosorbent}$). These results reveled a very good adhesion of the bacteria to the GAC. The results showed metal uptake values of 5.82 $mg/g_{biosorbent}$, 5.35 $mg/g_{biosorbent}$ and 4.61 $mg/g_{biosorbent}$, respectively for *Streptococcus equisimilis*, *Bacillus circulans* and *E.coli* and for the the initial concentration of 100 mg/l. Studies made with the industrial effluent showed values of Cr uptake of 0.10 $mg/g_{biosorbent}$, 0.093 $mg/g_{biosorbent}$ and 0.090 $mg/g_{biosorbent}$, respectively for *Streptococcus equisimilis*, *E. coli* and *Bacillus circulans* for an initial concentration of 4.2 mg/l. These results showed that the biofilms tested are very promising for the removal of Cr (VI) in industrial wastewater.