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REMOVAL OF Pb(II) AND Cu(II) FROM AQUEOUS SOLUTIONS BY *Chlamydomonas reinhardtii*: INFRARED AND THERMAL ANALYSIS

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Abstract

The removal efficiency of algal biomass *Chlamydomonas reinhardtii* for Pb and Cu metal ions was evaluated in single and binary metal systems. Biosorption experiments were performed in solutions containing 0.2 g L^{-1} algal biomass at 30°C and pH 6. Initial metal ion concentrations ranged from 10^{-7} M to 10^{-6} M. Thermal analysis of the biosorbent indicated that the surface of algal cells are rich in functional groups containing C, H, N, and S. The presence of ionisable functional groups responsible for biosorption of metal ions on algal cells was confirmed by FT-IR analysis. Biosorption of lead seems to be more sensitive toward modification in carboxyl groups than amino groups, while copper showed the opposite trend. Under the studied conditions, the removal efficiency of algal cells for Cu is higher than for Pb in single monometallic systems. Biosorption of copper and lead seems to occur at independent binding sites on the surface of algal biomass. Pb ions are adsorbed on specific sites with high affinity independent of Cu, whereas, two types of active sites are involved in the biosorption of Cu. There are high affinity specific sites independent of Pb and low affinity sites dependent on the presence of Pb. The potential of algal biomass as biosorbent has been established by the available data, while more research and development of algal biosorption process is needed for scaling-up.

Key words: biosorption, *Chlamydomonas reinhardtii*, heavy metals, FTIR, thermal analysis

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