

Bioremediation of Cr (VI) by acclimated mixed culture: Kinetic study

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Numerous industrial applications raised chromium to a very important economic element. At the same time, with the development of its uses, the adverse effects of chromium compounds in human health were being investigated. Both acute and chronic toxicity of chromium are mainly caused by hexavalent compounds. The present study deals with the removal of hexavalent chromium compound using bioremediation by an acclimated mixed culture developed from activated sludge. The acclimatization of culture was carried out for a period of 6 days by decreasing the amount of glucose from 1000 mg/l to 0 mg/l with a decrement of 200 mg/l every day and increasing Cr (VI) concentration accordingly by the same amount. At the end of the period, the biomass concentration obtained for final amount of pure Cr (VI) was 0.0187 g/50 ml of solution. The effect of one of the major operating parameters, contact time on bioremediation of Cr (VI) by acclimated mixed culture was also studied in a batch mode. This study had been conducted for an initial Cr (VI) concentration ranging from 20-80 mg/L and pH ranging from 2-10. Increase in initial Cr (VI) concentration from 20 mg/L to 80 mg/L showed increase in Cr (VI) uptake. Experimental investigation also showed that percent removal of Cr (VI) exceeding 94% at the initial concentration of 80 mg/L of Cr (VI) and pH 7.

Keywords: Hexavalent chromium; Bioremediation; Acclimated mixed culture; Activated sludge; Acclimatization, CFU; Percent removal.

Biography

Subhajit Majumder, Lecturer of Chemical Engineering at Birla Institute of Technology and Science (BITS), Pilani, India, received his B.E. degree from University of Pune, India and M.E. degree from Chemical Engineering Department of BITS, Pilani in 2007. Mr. Majumder's main professional activity has been in the area of biological based separation techniques and various novel separation methods. He has co-authored theoretical and experimental technical papers pertaining to his field of research. He is a member of the American Chemical Society and Asia-Pacific Chemical, Biological & Environmental Engineering Society.

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