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Hexavalent chromium reduction by *Escherichia coli* in the presence of ferric iron

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ABSTRACT

The potential of Cr(VI) reduction by *Escherichia coli* in the presence of soluble Fe(III) was investigated to explore the chemo-biologically mediated reduction process under anaerobic condition. The reduction efficiency of Cr(VI) reached 95% within 24 h. The influences of experimental parameters, including initial pH, temperature, Fe(III) dosage, carbon source, and chelating agent, were also investigated. The highest efficiency of reduction was observed when pH was 5.8 and temperature was 32˚C. Amendments of culture medium with Fe(III) and citric-3Na enhanced Cr(VI) reduction, while the addition of EDTA-2Na inhibited the process. Analysis showed that soluble Fe(III) enhanced the reduction process by shuttling electrons from bio-reduced Fe(II) to Cr(VI) in a coupled biotic-abiotic cycle and hence, Cr(VI) was reduced to Cr(III) followed by deposition to sludge.

Keywords: Hexavalent chromium; Microbial reduction; Optimum reduction; Ferric iron

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