

Isolation, characterization and growth optimization of a chromate-reducing bacterium

ABSTRACT

The application of chromium in industries has introduced anthropogenic release of chromate which is very toxic and a soluble environmental contaminant. The contaminated sites and industrial wastewater containing chromate are treated based on reduction of Cr(VI) to Cr(III) which is insoluble and less toxic to environment. This can be achieved through utilization of Cr(VI)-reducing bacteria which serves more economical and environmental-friendly treatment as compared to conventional chemical treatment method. To fulfill this, a new chromate reducing bacterium was isolated from an agricultural site. This bacterium was identified as *Aeromonas encheleia* using Biolog analysis with 0.603 similarity index. Chromate reduction capability of the bacterium was optimized using Response Surface Methodology with optimum conditions occurring at 250 μ M Cr(VI), temperature 34 $^{\circ}$ C and pH 7.5 with 99% reduction was achieved. The bacterium showed high tolerance in LB media containing 3.0 mM of $K_2Cr_2O_7$, but only reduce 1.5 mM Cr(VI) within 24 hours. The presence of metals and metabolic inhibitors in the media did not give significant inhibitory effect on Cr(VI) removal except Hg, NaCN and Co with percentage inhibition 6.7, 80.5 and 90.8 respectively. Based on this study, *Aeromonas encheleia* could be a good candidate in bioremediation of contaminated site or industrial wastewater containing Cr(VI).

Keyword: *Aeromonas encheleia*; Bioremediation; Chromate Cr(VI); Response surface methodology (RSM)