

# Remediation of Cr(VI) Contaminated Soil and Water Using an Optimized Strain (*Anabaena cylindrica*) Immobilized in a Polymer Matrix

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Chromite mining has contributed intensely to pollution of soil and ground water by hexavalent chromium, a potential carcinogen and mutagen for plants and bacteria. In the present study, I report the use of an indigenous cyanobacteria *Anabaena cylindrica*, immobilised in a novel polymer matrix for Cr(VI) bioremediation in simulated model effluent for chromite mine run off and in soil remediation in a paddy field. *Anabaena cylindrica* are Cr(VI) resistant: we demonstrate that they grew well under illumination in shaking conditions in BG11 medium containing 0.5 to 2 ppm Cr(VI). The effect of Cr(VI) on filament length, heterocyst frequency, protein profile and enzymes was observed. Superoxide dismutase, Ascorbate peroxide assay showed two star significance at  $P=0.05$ . Removal of Cr(VI) was also conducted in mine effluents using pre-grown cells. *Anabaena* cells were immobilized in a natural polymer, guar gum, grafted with poly acrylic acid and this was used for checking growth of *Oryza sativa* (Rice, Khandagiri variety) using simulated mine effluents. It was observed that in comparison to free cells, growth of plants (inter-nodal distance(38.1%), plant height(27%), quantum yield(4.1%)), grain yield ( number of tillers per plant(57%), number of panicles(59%), panicle length(56.6%), grain yield per hectare(56.6%), 1000 seed weight(13%), total number of seeds(52.9%), number of seeds per panicle(31.2%), total seed weight(57%), harvesting index(66%) etc) were higher when immobilized biomass was used and the results showed two-star significance at  $F=0.05$ . Bioaccumulation of Cr(VI) by immobilised *Anabaena cylindrica* could be potentially applicable use of mine effluents as well as reclamation of mine overburden.