

Hexavalent Chromium (Cr(VI)) Removal Potential of Pure and Mixed Cultures of *Staphylococcus* spp. and *Bacillus* spp. in the Presence of Cd(II) and Cu(II)

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Hexavalent Chromium is a widely used heavy metal in textile, tannery, electroplating and wood preserving industries and discharged to the biosphere. Biological treatment is considered a cost-effective and eco-friendly method than available chemical and physical methods. Bacteria are proven Cr(VI) removers; hence, to obtain the maximum removal, the toxic effect of other heavy metals on the Cr(VI) removal efficiency of bacteria need to be investigated. Therefore, this study focused on analysing the efficiency of Cr(VI) removal by pure and mixed cultures of *Staphylococcus* spp. (2.93×10^7 CFU/mL) and *Bacillus* spp. (2.48×10^7 CFU/mL) in the presence of Cu(II) and Cd(II). Cultures were isolated and identified using standard morphological and biochemical bacterial identification protocols. Both strains were confirmed as Cr(VI) tolerant bacteria by dose-response analysis. All the tests were carried out with controls (with and without metals) in Tris minimal (modified) liquid medium in triplicates. Selected strains were exposed to their maximum metal removal concentrations in the presence of maximum allowable freshwater metal concentrations in Sri Lanka, 8.5 mg/L of Cr(VI), 0.1 mg/L of Cd(II) and 3.0 mg/L of Cu(II) in pure and binary mixed cultures. Removal of Cr(VI) was measured by 1,5-Diphenylcarbazide method, at 24 h time intervals up to 96 hours. According to the results, *Staphylococcus* spp. and *Bacillus* spp. have shown 15.05% and 100 % removal of Cr(VI) within 96 h, respectively, as in pure cultures, while mixed cultures have shown 100 % removal of Cr(VI) within 72 h in the presence of Cd(II) and Cu(II). This indicates that mixed bacterial consortium of *Staphylococcus* spp. and *Bacillus* spp. has an efficient Cr(VI) removal capacity than pure cultures in the presence of tested concentrations of Cd(II) and Cu(II), which will be useful in Cr(VI) bioremediation applications.

Keywords: Cr(VI), Cu(II), Cd (II), *Staphylococcus* spp., *Bacillus* spp.