## Comparison in the removal of chromium (III) from tannery effluent by using extracellular polymers extracted from bacteria and yeast cultures

Jothieswari M, Vigneshhwaran G, Swarnalatha S\*

Environmental Science Lab, CSIR-Central Leather Research Institute

\*Corresponding author

## ABSTRACT

Tannery effluent is among the most hazardous industrial pollutants due to its huge organic and inorganic load, which is highly toxic to human life and environment. Currently more than 90% of global leather production is mainly through chrome-tanning process. General Standards for discharge of total chromium in effluent is 2.0 mg/l and hexavalent Cr is 0.1 to 2 mg/l.At high concentrations chromium is toxic, mutagenic, carcinogenic, and teratogenic. Commonly applied treatment methods consist of involving various combinations of physical and chemical methods. These methods are efficient but not cost effective and generating large quantity of sludge which renders waste disposal problematic. Extracellular Polymers (ECP) of microbial origin are complex biopolymers which vary greatly in their chemical composition and they have a great potential in chelation of metal ions. In this present study, the isolation of bacteria and yeast species was carried out from the soil source that collected near to the wastewater discharge of tannery effluent. The isolated cultures were examined for chromium tolerant by well diffusion assay. The Extracellular Polymeric Substance was extracted from the bacteria and yeast by Heating/Centrifugation method. The biochemical characterization was performed to determine the carbohydrate, protein and lipid content of the extracted ECP. Optimization of various parameters such as pH, temperature, incubation time, carbon and nitrogen sources were done for both bacterial and yeast cultures and then the cultures were inoculated in their respective optimized medium to determine high yield ECP producing cultures. The study reveals that the bacterial culture produce maximum ECP yield of 22.18 g/L in the production medium which contains starch and yeast extract as carbon and nitrogen sources that incubated for 96 hours and grown under conditions at 30°Cand pH 6 respectively. Similarly, the Yeast culture utilizes glucose and yeast extract and incubated at 30°C, pH 6 for 96 hours and produce the yield of 23.08 g/L respectively. Thus, the Yeast ECP shows better adsorption than B2 culture after the adsorption time of 180 minutes.

Keywords: Chromium, Extracellular polymer, Bacterial ECP, Yeast ECP



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