ABSTRACT

The heavy metal contamination and toxicity cause by the industrial discharge poses a serious threat to the environment as well as groundwater. The current study focused on the level of toxicity in the tannery wastewater in Kasur and the isolation and characterization of Chromium Resistant Bacteria (CRB) within the waste effluent. The 16s rRNA analysis provided partial sequencing which was 100% matched the bacterium Cellulosimicrobium sp. with the accession number KX71077 and it was the only bacterium that tolerated 800mg/l chromium. At different concentration ranging between 50mg/l to 300mg/l the results showed that up to 50mg/l and 100mg/l, the extreme detoxification of around 95% and 89% were happened in between 24 hours and 72 hours respectively. As opposed to this, the reduction at higher concentrations of 200 and 300 mg/l was only 72% and 51% at 72 and 96 hours, respectively. The results were significant as $p<0.05$ showed signifies relationship between the reduction and chromium concentration. The Scanning Electron Microscope images showed bacterial cell morphology vulnerable to chromium, appears to be rougher with increased surface area of the cell that might be due to the detoxification of hexavalent chromium to trivalent form as compared to the unexposed cells. The bacterial growth was also hindered when exposed to above 100mg/l of chromium concentration. To conclude, the study adds more understanding of bioremediation of hexavalent chromium to trivalent chromium and the morphological changes caused to bacteria when exposed to chromium. It also gives insight of bacterial growth dynamic under different concentration of chromium. Furthermore, the work paves the way for a more sustainable and environmentally friendly strategy to treating tannery wastewater. More research is required to understand molecular changes caused to bacterial cell and also minimum inhibitory concentration to test the antimicrobial resistance property.