

## Simultaneous bioremediation of hexavalent chromium and pentachlorophenol from tannery waste water by immobilized *Brevibacterium casei*

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Tanneries discharge hexavalent chromium [Cr (VI)] and pentachlorophenol (PCP) together through their effluent into cultivable lands and nearby water-bodies beyond the permissible limit due to inefficient effluent treatment technology. They are carcinogenic and cause cellular toxicity to all life forms. A bacterial strain identified as *Brevibacterium casei* was isolated from tannery effluent and was tolerant to a maximum of 840 µg/ml Cr(VI) and 1000 µg/ml PCP concentration simultaneously. This strain concomitantly reduced 78% Cr(VI) to less toxic Cr(III) and degraded 82% PCP within 168 h at pH 8.0, 35°C temperature and 120 rpm aeration in MSM broth and also released 900 µg/ml chloride ion. PCP degradation was confirmed through GC-MS analysis. The bacterium exhibited remarkable ability to significantly reduce Cr(VI) and degrade PCP under wide growth conditions i.e. in presence of other metal ions, between 100-120 rpm and over broad pH (6.5-10.0) and temperature (30-40°C) range. Polyvinyl alcohol (PVA) immobilized *Brevibacterium casei* reduced a maximum of 93% Cr(VI) and degraded 89% PCP simultaneously in MSM broth supplemented with 750 µg/ml Cr(VI) and 510 µg/ml PCP concentration in 120 h and 144 h, respectively. Further, the immobilized cells were able to significantly reduce 72% Cr(VI) and degrade 69% PCP from treated tannery effluent in bioreactor at pH 8.0 in 150 h and 120 rpm impeller speed. The results suggest the possible use of this bacterium for simultaneous removal of Cr(VI) and PCP from tanneries and other industries.

### Biography

Tuhina Verma is Assistant Professor in Department of Microbiology of Dr. R. M. L. Avadh University, Faizabad, India. She has completed her Ph.D. from Indian Institute of Toxicological Research (CSIR), Lucknow and short post-doctoral course from MD Anderson Cancer Centre, Houston, Texas. She has published several research papers in journal of International repute. Dr. Verma also undertakes independent research as a Principal Investigator of funded research projects. She is the reviewer of more than five International journals and is the member of Association of Microbiologists of India and Society of Toxicology of India.

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