

Production and optimization of extracellular alkaline protease from halotolerant chromate resistant *Bacillus circulans* isolated from Tannery solid waste

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ABSTRACT

Halotolerant alkaline proteases are of great interest because of their high proteolytic activity and stability under alkaline and high saline environment. These enzymes have extensive applications in industries like laundry detergents, pharmaceutical, food, leather and feather processing and proteinaceous waste bioremediation. Keeping it in view, the study was aimed to isolate chromate resistant, haloalkaliphilic protease producing *Bacillus circulans* bacteria from the discharged tannery solid waste. A total of seven bacterial strains were isolated on selective milk agar plates (pH 8.0-9.0) from tannery solid waste on the basis of different colony morphology and higher tolerance capacity for chromate and NaCl. These strains exhibited variable alkaline protease activity and were tolerant to different concentration of both chromate (200-1300 µg/ml) and NaCl (1-9%). Out of seven, one strain TVD-5 was interestingly tolerant to high concentration of Cr(VI) (1300 µg/ml) and NaCl (8.0%) and exhibited vibrant clear zone diameter between (13-30 mm) on 1.0 per cent skim milk agar medium at pH 9.0 after 28 h incubation. This strain produced maximum protease of 390 Units/ ml during early stationary phase after 36 h of growth. The enzyme exhibited its optimal activity at pH 9.0, temperature 35°C and 8.0 per cent salinity, whereas, significantly active and stable in broad pH (7.5-11.0) and temperature (25-45°C) range and at NaCl concentrations ranging from 7.0 to 13.0 per cent. This bacterium may potentially be useful for simultaneous bioremediation of Cr(VI) containing wastes in the environment. Also, the proteases of this study may have many applications in different industries and environmental bioremediation.

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