

HEXAVALENT CHROMIUM REDUCTION IN TANNERY SOIL BY CHROMATE REDUCTASE EXTRACTED FROM BACILLUS SUBTILLIS

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Abstract

Nearly 75% of the tanneries in Eritrea are engaged in the chrome tanning processes. Most of them discharge untreated wastewater into the environment. In such aqueous waste, Cr (VI) is present as either dichromate ($\text{Cr}_2\text{O}_7^{2-}$) in acidic environments or as chromate (CrO_4^-) in alkaline environments. Microorganisms may reduce Cr (VI) to Cr (III) intracellularly or by making the extra-cellular environment. Under anaerobic soil conditions with high electron pressure, anaerobic microorganisms may play little direct role in the chemical reduction of Cr (VI) by Fe (II) or sulfides. Recent researchers suggest that Cr-resistant microorganisms are present in all soils even in those with no history of Cr-contamination. The enzyme Chromate reductase extracted from *Bacillus Subtillis*, a common soil bacterium, reduced Cr (VI) under aerobic conditions and appeared to detoxify the Cr (VI). This was observed to reduce Cr (VI) up to 80 mg/l from a sample of 440mg/l, with enzyme concentration of 0.3ml, pH 7 and temperature 30°C.

Keywords: Hexavalent Chromium, Tannery soil, Chromate reductase, *Bacillus Subtillis*.