

## MINIMIZING CHROME WASTES APPLYING DIRECT RECYCLING OF PICKLING-TANNING LIQUORS IN LEATHER PROCESSING

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### ABSTRACT

Among the environmental problems faced by Bolivian tanneries that use conventional tanning processes is the disposal of significant amounts of wastewater contaminated with trivalent chromium salts. Even though this versatile heavy metal plays an important role in the metabolic pathways of both plants and animals, at low concentrations, its oxidized derivative, Cr(VI), is extremely toxic. As a way of preventing contamination, the operational characteristics and conditions of direct recycling of pickling-tanning liquors were investigated, both at laboratory scale and a medium scale tannery plant. The recycling process can be controlled through the measurement of very simple parameters in spent pickling-tanning liquors: liquor density, ionic strength related with density, pH and chromium concentrations. The process can save important amounts of industrial chemicals, 9 - 44% and around 77% water. The savings in the amounts of chromium salts result in more than a 70% decrease of the Cr(III) mass, when direct recycling is used instead of the normal tanning process. The finished leather quality does not deteriorate up to 10 recycles. These results show that the application of direct recycling of pickling-tanning liquors is technically and environmentally feasible and can be adopted by similar tanneries existing in Bolivia.

**Keywords:** Cr(III) Recovery, Pickling-Tanning Process, Direct Recycling.