

## **PRODUCTION OF HIGH PURITY CHROMIUM OXIDE GREEN FROM TANNERY WASTE**

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### **Abstract**

A study was undertaken to develop and test the process for the recovery of high purity chromium oxide green from chromium waste. The process developed consists of a combination of the following processes: leaching, ion exchange, coagulation, chelation and calcination. Based on the research findings, strong acid cation resin (Purolite 160) and weak acid cation exchange resin (Lewatit NCP 80) were selected for extraction of aluminium (III) ions and chromium (III) ions respectively. The optimal conditions for extraction of chromium (III) with ion exchange resins from chromium leachate solution were established taking into account the composition and the parameters of the chromium solution, the resin manufacturer's defined operating conditions and the empirical dependencies established in previous studies on model solutions of chromium (III). The effects of pH, compositions and the temperature on the extraction of chromium (III) were also examined. The yield of chromium (III) from tannery chromium hydroxide solid waste was about 96-98% after 35 min of phase contact with sulphuric acid solution. Chromium hydroxide with Cr<sub>2</sub>O<sub>3</sub> content of 88% was achieved by extracting chromium (III) with weak acid cation resin. The ferric and calcium ions present in the treated chromium hydroxide product were then removed by soaking the hydroxide cake in 0.1 to 0.2M ethyldiaminetetraacetic acid (EDTA) solution. The final product, chromium oxide green, with a Cr<sub>2</sub>O<sub>3</sub> content of at least 95.14% was achieved with the described process.

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**Keywords:** tannery chromium waste, chromium waste, chromium (III) extraction, weak acidic cation exchange resins, chromium extraction by ion exchange, CNP-80 elution, chromium oxide.