

## Electrochemical Treatment and Chemical Analyses of Tannery Wastewater Using Sacrificial Aluminum Electrode, Ethiopia

**Authors :** Dessie Tibebe, Muluken Asmare, Marye Mulugeta, Yezbie Kassa, Zerubabel Moges, Dereje Yenealem, Tarekegn Fentie, Agmas Amare

**Abstract :** The performance of electrocoagulation (EC) using Aluminium electrodes for the treatment of effluent-containing chromium metal using a fixed bed electrochemical batch reactor was studied. In the present work, the efficiency evaluation of EC in removing physicochemical and heavy metals from real industrial tannery wastewater in the Amhara region, collected from Bahirdar, Debre Brihan, and Haik, was investigated. The treated and untreated samples were determined by AAS and ICP OES spectrophotometers. The results indicated that selected heavy metals were removed in all experiments with high removal percentages. The optimal results were obtained regarding both cost and electrocoagulation efficiency with initial pH = 3, initial concentration = 40 mg/L, electrolysis time = 30 min, current density = 40 mA/cm<sup>2</sup>, and temperature = 25°C favored metal removal. The maximum removal percentages of selected metals obtained were 84.42% for Haik, 92.64% for Bahir Dar and 94.90% for Debre Brihan. The sacrificial electrode and sludge were characterized by FT-IR, SEM and XRD. After treatment, some metals like chromium will be used again as a tanning agent in leather processing to promote a circular economy.

**Keywords :** electrochemical, treatment, aluminum, tannery effluent

**Conference Title :** ICEEC 2024 : International Conference on Environmental and Ecological Chemistry

**Conference Location :** Rome, Italy

**Conference Dates :** January 15-16, 2024