Environmental Engineering and Management Journal xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
http://www.eemj.icpm.tuiasi.ro/; http://www.eemj.eu

"Gheorghe Asachi" Technical University of Iasi, Romania

HUMAN HEALTH RISK ASSESSMENT DUE TO HEAVY METAL CONTAMINATED SOIL IN A TANNERY WASTE DUMP SITE, KANPUR (INDIA)

Abhishek Dixit[1]*, Yashvardhan Singh Chauhan[2], Deepesh Singh[2]

[1]Department of Civil Engineering, Chandigarh University, Unnao (Uttar Pradesh), India
[2]Department of Civil Engineering, Harcourt Butler Technical University, Kanpur (Uttar Pradesh), India

Abstract

The present study calculates the danger to human health of soil contamination from illegal dumping of basic chromium sulphate in Rania, Kanpur Dehat, Uttar Pradesh, India, caused by chromium-rich tannery waste. Iron, zinc, and chromium levels in soils were greater (12.21 mg/kg). Health risk has been assessed for children and adults aged 05–59 years through ingestion, inhalation, and Skin exposure routes. According to the findings, adults' average daily exposure (ADE) and hazardous quotient (HQ) for ingestion were Fe (5.50E-04, 1.83E-03), Zn (8.91E-03, 2.97E-02), and Cr (6.21E+00, 2.07E+03). The ADE and HQ for ingestion in children were Fe (4.86E-04, 1.62E-03), Zn (7.87E-03, 2.62E-02), and Cr (5.49E-02, 1.83E+01). The main cause of both carcinogenic and non-carcinogenic risks was chromium, whose hazardous index was almost 3.5 times higher than the acceptable level. The study concludes that there are serious health hazards, especially for children, and suggests taking corrective action immediately to mitigate these risks.

Key words: chromium, health risk, soil contamination, tannery waste

Received: March, 2024; Revised final: February, 2025; Accepted: March, 2025

* Author to whom all correspondence should be addressed: e-mail: dixit.abhishek87@gmail.com; Phone: +91-9580469358