Are the local communities safe? Assessing the slag management practices in the ferro-chromium smelting industry and the risk of chromium (VI) in the reuse applications in Zimbabwe

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Abstract

Ferro-chromium smelting has contributed to the accumulation of vast amounts of slag in developing countries. The current study examines the slag management measures at Zimbabwe Alloys Chrome (ZAC) and determined possible chromium (VI) leaching into different environments. The research incorporated both the qualitative and quantitative data collection methods. The leading solid waste management practice was disposal to landfill, which is the least preferred option on the solid waste management hierarchy. All the sampled water sources around ZAC showed traces of chromium (VI) above acceptable standards. Chromium six levels also exceeded the environmental management act (EMA) regulations of 0.05 mg/l, the EPA standards of 0.01 mg/l, and OSHA limits of 0.01 mg/l under neutral, alkaline, and acidic laboratory environments. The findings imply a lack of sustainable waste management practices at ZAC that expose communities to chromium (VI). The study highlighted an urgent need for ZAC landfill remediation to protect the water bodies and communities exposed to the slag reuse applications.