

## Assessment of Chromium Concentration and Human Health Risk in the Steelpoort River Sub-Catchment of the Olifants River Basin, South Africa

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**Abstract :** Many freshwater ecosystems are facing immense pressure from anthropogenic activities, such as agricultural, industrial and mining. Trace metal pollution in freshwater ecosystems has become an issue of public health concern due to its toxicity and persistence in the environment. Trace elements pose a serious risk not only to the environment and aquatic biota but also humans. Chromium is one of such trace elements and its pollution in surface waters and groundwaters represents a serious environmental problem. In South Africa, agriculture, mining, industrial and domestic wastes are the main contributors to chromium discharge in rivers. The common forms of chromium are chromium (III) and chromium (VI). The latter is the most toxic because it can cause damage to human health. The aim of the study was to assess the contamination of chromium in the water and sediments of two rivers in the Steelpoort River sub-catchment of the Olifants River Basin, South Africa and human health risk. The concentration of Cr was analyzed using inductively coupled plasma-optical emission spectrometry (ICP-OES). The concentration of the metal was found to exceed the threshold limit, mainly in areas of high human activities. The hazard quotient through ingestion exposure did not exceed the threshold limit of 1 for adults and children and cancer risk for adults and children computed did not exceed the threshold limit of 10<sup>-4</sup>. Thus, there is no potential health risk from chromium through ingestion of drinking water for now. However, with increasing human activities, especially mining, the concentration could increase and become harmful to humans who depend on rivers for drinking water. It is recommended that proper management strategies should be taken to minimize the impact of chromium on the rivers and water from the rivers should properly be treated before domestic use.

**Keywords :** land use, health risk, metal pollution, water quality

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