

Cr isotopes as tracers for environmental contamination: a field study in the Kanpur area, India

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With 1.5 million people at risk all over the world, tannery operations are considered today as one of the world's worst pollution problems. Among all chemicals involved in the tanning process, the use of chromate salts as stabilizers is of particular concern. Chromium (Cr) in its trivalent form (Cr(III)) is not toxic, but many processes can lead to its much more harmful hexavalent form (Cr(VI)). Due to its solubility and its carcinogenic effects, Cr(VI) is indeed a major environmental hazard [1].

With its 150 tanneries, the Kanpur/Unnao sector in India generates a large amount of chromium-rich by-products, in the form of solid waste or contaminated effluents [2]. A previous study determined that Cr concentrations up to 115 mg.L⁻¹ can be found in the area [3]. Because these wastes are submitted to various biogeochemical processes potentially leading to redox, leaching, or adsorption, a better understanding of these processes is required. Samples solid waste, groundwater, river water and effluents have been collected in the Kanpur area. A new TIMS method has been developed at ENS Lyon for measuring Cr isotopes with high precision. The results of the field sample collection will be presented at the meeting with the goal of providing insights about the biogeochemical behavior of Cr in the environment.

[1] Pellerin C., Booker S. M., Environmental Health Perspectives 109: 2000.

[2] Khawaha A., R., Singh R., Tandon S. N., Environmental Monitoring and Assessment 68: 19–35, 2001.

[3] Matern K., Weigand H., Singh A., Mansfeld T., Environmental Science and Pollution Research 24 : 3582-3592, 2017.