

Evaluation of Trivalent and Hexavalent Chromium Retention on Ain Oussera Soil by the Batch Method and Radiotracer Technique.

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Description

Major toxicology studies have concluded that Cr (VI) is a highly toxic carcinogen to living organisms, and cause deaths if ingested in large doses. The trivalent form plays an important role in glucose and lipid metabolism for human and animal diets. Industrial activities present in the study area investigated in this paper, such as tanning, production of paints, and cement, are the main sources of chromium in the soil and air, causing chromium pollution. The aim of this study is to investigate the behavior of Cr (III) and Cr (VI) in soil samples from the Ain Oussera area, using the batch method and radiotracer technique. This assessment of chromium adsorption in the soil allows us to examine its impact. The pH effects of initial concentration, adsorbent dose and temperature were investigated. Particle size, X-ray diffraction and neutron activation analysis methods were used to characterize the soil samples. Results of the Freundlich, and Langmuir isotherm models were compared to the obtained experimental data. The thermodynamic parameters ΔH° , ΔS° and ΔG° for the adsorption were determined by using four temperatures, 10, 30, 40 and 60°C. The adsorption process was spontaneous and favoured at a low temperature. The maximum adsorption percentage reached for Cr (III) and Cr (VI) in soil was 90 and 24, respectively, with a spontaneous reaction ($\Delta H^\circ < 0$). These results show that hexavalent chromium seeps through soil layers, and reaches the groundwater easily.