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Health risks in rural populations due to heavy metals found in agricultural soils irrigated with wastewater in the Alto Balsas sub-basin in Tlaxcala and Puebla, Mexico

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ABSTRACT

The aim of this study was to determine the hazard ratio (HQ), the risk index (HI), and the cancer risk index (CRI) for populations of adults and children exposed to ingestion, dermal contact and inhalation of heavy metals in agricultural soil. For these, the contents of Cd, Pb, Ni, Cu, Co, Cr, Zn, and the metalloid As were determined in soils of four zones of the sub-basin of Alto Balsas, during two different periods of the year. The average content of metals in the soil was 1.24, 14.77, 14.80, 13.06, 5.50, 17.65, 22.89, and 5.32 mg kg⁻¹ for Cd, Pb, Ni, Cu, Co, Cr, Zn, and As, respectively. The highest risk in terms of HQ and HI was for adults, especially for men who are affected through the skin, with Cd and Cr being the most dangerous. CRI values were within the allowable range, without posing problems for adult and child populations.

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