

Chromium and nickel in green onion and lettuce irrigated with industrial effluents: accumulation, translocation and health risk assessment

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It is known, that about 8% of the total land area is irrigated by wastewater, and vegetables are among the main crops produced via wastewater irrigation throughout the world. Generally, industrial wastewaters are contaminated with an appreciable amount of trace and toxic elements, that can be accumulated in agricultural soils and crops and then transferred to the human body via the food chain leading to diseases. Therefore, this laboratory study evaluated the accumulation and translocation of Cr and Ni in the edible parts and roots of lettuce (*Lactuca sativa*) and green onion (*Allium fistulosum* L.) irrigated with industrial effluents and assessed their potential health risks via oral consumption.

The content of Cr (7.36–7.58 mg/kg dry weight) and Ni (7.28–10.85 mg/kg dry weight) determined in the edible parts of leafy vegetables varied within a narrow range. The values of bioaccumulation factor of Ni in lettuce decreased with increasing of metal concentrations in the industrial effluents. Conversely, the bioaccumulation factors of Cr for both leafy vegetables and Ni (for onion) were higher when irrigated with wastewater. The levels of Cr in the parts of lettuce and Ni in both vegetables and soil followed the order: soil \geq roots > edible part. The different order of Cr translocation was observed for onion: roots \geq soil > edible part. The obtained values of estimated daily intake of Ni via consumption the leafy vegetables were by two orders of magnitude lower than the safe daily dietary intake established for Ni (20 $\mu\text{g}/\text{kg}$ bw day) and similar to those reported for Cr (0.71-2.9 $\mu\text{g}/\text{kg}$ bw day).

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