

Toxicological Risk Analysis in Different Crops and Vegetables Exposed to High Fluoride-Contaminated Water

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Abstract : Despite few works reported about fluoride enrichment in the groundwater, no studies have done on exposure analysis for biological components in Patan district, Gujarat, Western India. Considering its vital importance, this study strives to quantify the bioaccumulation of fluoride in seven different crops and vegetables, viz. Spinach and Mustard leaves, Cauliflower, Wheat grains, Amaranth seed, Radish, and Garlic grown in the potentially fluoride contaminated area. Result shows that the order for fluoride accumulation among different analyzed plants are spinach (63.3 mg/kg) > mustard (48.9 mg/kg) > cauliflower (41.1 mg/kg) > radish (35.7 mg/kg) > garlic (33.2 mg/kg) > amaranth seed (26.7 mg/kg) > wheat (22.5 mg/kg). Fluoride concentration was highest in leafy vegetable, whereas the lowest was in wheat grains. Finally, estimated daily intake (EDI) and hazard index (HI) were calculated for local consumers of different age group, where it was found that young people (4-15 years) are at the highest risk of fluorosis. This study is relevant for better crop management, like substituting crops with woody plants, flowers, and people awareness.

Keywords : fluoride, bioaccumulation, health risk, water

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