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Uptake of Fluoride, Aluminum and Molybdenum by Some Vegetables from Irrigation Water

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ABSTRACT Water is the major source of fluoride (F) in fluorosis endemic areas although food materials also contribute considerable amount to total intake. Plants take up F from irrigating waters and this uptake is influenced by some inorganic constituents in water and soil. In the present study five commonly consumed vegetables [amaranth (*Amaranthus gangeticus*), spinach (*Coriandrum sativum*), cabbage, tomato and lady's finger] were grown applying irrigation water containing 10 ppm F. In addition amaranth and coriander were grown with aluminium (Al) and/or molybdenum (Mo) to study their effect on F bioavailability. Fluoride levels were higher in edible parts of all vegetables compared to controls irrigated with water containing 0.3 ppm F. Fluoride contents (mg/kg dry wt) with tap water and fluoridated water were 0.71 vs 1.70 for spinach, 3.88 vs 20.29 for amaranth, 0.12 vs 0.17 for cabbage, 0.14 vs 0.43 for lady's finger and 0.12 vs 0.2 for tomato ($P < 0.01$). The levels of calcium (Ca) and phosphorous (P) are high in amaranth although their causal relation to high fluoride bioavailability in this plant is not known. Molybdenum (Mo) and Al reduced fluoride intake by amaranth (Al showing marked effect) but not by coriander. Al + Mo reduced fluoride uptake by both plants. Molybdenum intake was reduced by F in coriander and by Al in amaranth. F + Al had much less effect on Mo uptake. Fluoride reduced Al uptake by amaranth and coriander. Mo or Mo + F had no effect on Al uptake by amaranth but reduced the uptake by coriander. Fluoride uptake was highest in amaranth and lowest in cabbage among the vegetables studied.