

Cadmium in Jamaica

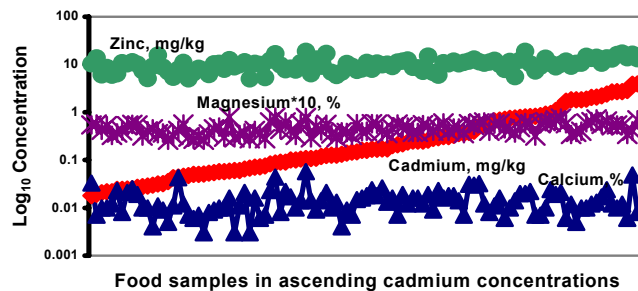
Atomic absorption spectrometry, neutron activation analysis, and x-ray fluorescence have been used to prepare geochemical maps of the Jamaican soils environment (Lalor, 1995). These have shown that the bauxitic soils, which constitute the ore for the country's largest industry and are also important in the island's food production, contain extraordinary amounts of naturally occurring cadmium. The island-wide average of 1357 soil samples is 30 mg kg⁻¹ and the highest concentration so far observed is 931 mg kg⁻¹ in a rural residential district (Lalor et al. 1998). The only other uncontaminated soils found to date with similar levels are bauxites originating in the nearby Dominican Republic (Grant et al., 2005).

Substantial levels of cadmium have been identified in many food crops growing on high cadmium soils (Howe et al. 2004).

Levels of cadmium in some Jamaican foods (mg kg⁻¹ fresh weight).

Elements	Range & Mean	Legumes	Vegetables; Leafy	Vegetables: Root	Other_Root_Crops
Cd	Range	0.018-1.2	0.02-1.7	0.02-1.4	0.002-0.95
	Mean	0.33	0.4	0.4	0.2

The cadmium uptake values differ significantly between crop types but are dominated by the soil cadmium concentrations; the concentrations of the essential elements so far examined appear to be generally satisfactory. The homeostasis mechanisms that help control elemental uptake from soils, are very much weaker for cadmium than for other elements and no soil cadmium concentration has yet been found at which the uptake in root crops is bounded.



The cadmium uptake by cattle grown on the high such soils is also significant: kidneys (range 0.01-104, median 2 mgkg⁻¹; and livers (range 0.01-21, median 1.7 mgkg⁻¹) (Lalor, 2006). A convenience sample of 39 autopsy cases in Jamaica, in the age group ≥ 40 years reported cadmium concentrations as follows: renal cortex: range 6.7-126 mg kg⁻¹, mean 43.8 mg kg⁻¹; liver: range 0.3-24.3 mg kg⁻¹, mean 5.3 mg kg⁻¹ (Lalor et al., 2004). There is therefore no doubt that in Jamaica, cadmium is

entering the food chain and humans but, as has been found in England (Morgan and Simms, 1998) and in New Zealand (MacKenzie-Parnell et al. 1988) no cases of cadmium poisoning have yet been recognized in Jamaica. The Jamaican life expectancy at birth for 2003 at 73 years ranks 53rd globally (www.nationmaster.com) and there seems to be no obvious relationship between death rates and the spatial distribution of cadmium that would rank the element as having a first – order effect on mortality..

The apparent weakness of an adverse effect despite the very high concentrations of bioavailable cadmium could be due to the presence of sufficient quantities of other elements for example Fe, Se, Zn, Ca, in the diet (Berglund et al., 1994; Chaney et al., 2001) ; Zn/Cd ratios are particularly important in ameliorating the absorption and possible ill effects of Cd on humans (Chaney et al., 2000). Diet and epidemiological studies are continuing.

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