

**Heavy Metal Concentrations in the Environment and in Selected Staple Foods  
Consumed Around Kisumu Region, Kenya.**

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## **ABSTRACT**

The objective of this study was to determine the level of mercury, lead, cadmium and arsenic in the environment and in selected staple foods consumed around Kisumu region of Kenya and to determine if those levels were within the maximum allowable limits by WHO. The heavy metal content of the samples was determined using AAS after wet ashing. The lead content in the water and soil ranged between 0.00 - 8.6  $\mu\text{g}/100\text{ ml}$  and 0.11 - 1.69  $\text{mg}/100\text{ g}$ , respectively. In the maize and beans it was 0.00 - 0.23  $\text{mg}/100\text{ g}$ , and in the fruits and vegetables it was 0.00 - 0.38  $\text{mg}/100\text{ g}$ , while in the fish it was 0.01 - 0.50  $\text{mg}/100\text{ g}$ . The mercury content in the water and soil ranged between 0.01 - 0.03  $\mu\text{g}/100\text{ ml}$  and 1.00 - 4.05  $\mu\text{g}/100\text{ g}$ , respectively. In the dry maize and beans it was 1.38 - 2.20  $\mu\text{g}/100\text{ g}$ , and in the fruits and vegetables was 0.00 - 3.41  $\mu\text{g}/100\text{ g}$ , while in the fish it was 1.36-3.80  $\mu\text{g}/100\text{ g}$ . The cadmium content in the water and soil ranged between 0.04 - 0.11  $\mu\text{g}/100\text{ ml}$  and 0.07-0.15  $\text{mg}/100\text{ g}$ , respectively. In maize and beans it was 0.07 - 0.15  $\text{mg}/100\text{ g}$ , while in the fruits and vegetables it was 0.00 - 0.14  $\text{mg}/100\text{ g}$ . In fish it was 0.09 - 0.16  $\text{mg}/100\text{ g}$ . The arsenic content in the water and soil ranged between 0.00 - 8.30  $\text{ng}/100\text{ ml}$  and 12.39 - 24.36  $\mu\text{g}/100\text{ g}$ , respectively. In the maize and beans it was 5.21 - 7.03  $\mu\text{g}/100\text{ g}$ , while in the fruits and vegetables it was 2.89 - 7.34  $\mu\text{g}/100\text{ g}$ . In fish it was 4.31 - 7.66  $\mu\text{g}/100\text{ g}$ . The results of this study show that the lead, mercury, cadmium and arsenic content in water and soil from Kisumu region were within the WHO maximum limits. However, there were significant differences in the heavy metals concentrations due to geographical location. There significant differences in heavy metal concentrations between species. It is recommended that further research be done to determine the effect of food preparation on the heavy metals content in the foods, monitor the levels of the heavy metals in human tissue and

also determine other sources of heavy metals contamination apart from soil and water and continuous monitoring of heavy metals since there may be seasonal variations in their levels.