

# Food Safety And Regulatory Measures

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## Metal accumulation in two crops across the Mbale waste dumpsite, Uganda

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**T**he environmental impacts and health risks from poor waste management is a global challenge. Improper waste management contaminates soil, food chains, surface and ground water. Harmful food and water contaminants are reported to cause 200 diseases and two million annual deaths. Globally, over 800 million people cultivate contaminated soils. Global food production and trade could bring all countries into a biological and chemical risk loop. We need to identify vulnerable areas and strongly regulate farming on contaminated environments to ensure that food is secure, safe and tradable. This study was conducted at Mbale dumpsite in Eastern Uganda (34010'30.0" and 1004'50.0"). The aim was to investigate metal occurrence and spatial variations in *Zea mays* and *Amaranthus cruentus* crops on the dumpsite. The dumpsite was sub-divided into Dump Centre (DC), Slope (S) and River Bank (RB). 108 *Zea mays* seeds, leaves and *Amaranthus cruentus* leaves, and flowers samples were collected, and analyzed for aluminum (Al), chromium (Cr), iron (Fe), manganese (Mn),

cobalt (Co), nickel (Ni), copper (Cu), zinc (Zn), arsenic (As), selenium (Se), cadmium (Cd), mercury (Hg), and lead (Pb) using ICP-MS. Data was statistically analyzed using SPSS. In both crops, Fe, Al, Zn, Mn and Cu were in high concentrations, whereas Pb, Cr, Co, Cd, As, Hg, Se and Ni occurred in trace amounts. Significant variations were in Al, Zn, Fe, Cr and Co across the dumpsite. Pb concentration was high in leaves and flowers but insignificantly varied across the site. The highest overall metals accumulation was at the dump center and in leafy crops. Pb, Cr, Al, and Zn concentrations in the two crops were above WHO/FAO consumer food safety limits. Metal accumulation in the two crops was specific, and depended on soil and metal properties, environmental factors, crop planting patterns, crop types and parts. Pb, Cr, Al and Zn concentrations in *Zea mays* and *Amaranthus cruentus* crops on Mbale dumpsite could pose risks to consumers.

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