Deficiency of macroelements such as calcium (Ca) and microelements like zinc (Zn) is widespread in sub-Saharan Africa, particularly among the poor, for which diets are strongly based on staple crops like maize and sorghum. Increasing diet diversity through African indigenous vegetables (AIV) might be an option to reduce hidden hunger caused by mineral deficiency. In addition to mineral deficiency, toxicity of heavy metals like cadmium (Cd) and lead (Pb) is another important health risk which is closely related to dietary intake of plant products. Vegetables may be contaminated by toxic elements through superficially adhering dust on edible surfaces or root uptake from soil and internal distribution to edible organs.
In this study, essential and toxic elements were measured in edible plant organs of vegetables sold on markets in Nairobi to assess potential health benefits and risks associated with consumption of AIV.
Fresh samples from AIV (*Solanum scabrum*, *Amaranthus cruentus*, *Vigna unguiculata*, *Cleome gynandra*, *Brassica carinata*) and a standard species commonly grown in Kenya (*Brassica oleracea acephala* group) were collected from ten open air and five supermarkets in Nairobi. Before mineral analysis, the edible parts of the vegetables were washed either with distilled water to remove minerals associated with externally adhering soil and dust, or 1% nitric acid to remove minerals associated with epidermal cell walls, or not washed at all. Essential (e.g., Ca, magnesium Mg, iron Fe, Zn) and toxic (e.g., Cd, Pb) mineral elements were measured.
The results showed that mineral element concentrations were similar in samples from open air and supermarkets, with the exception of Pb concentrations which were markedly higher in open air markets, indicating contamination by traffic. In 10% of all samples Cd concentrations exceeded 1 mg kg^{-1} dry mass indicating that vegetables may be an important source for dietary intake. Iron concentrations were very high. Washing with water or nitric acid strongly reduced Fe and Al concentrations, indicating that high Fe concentrations were mainly due to external contamination. Concentrations of Zn and Mg were very high in amaranth suggesting that this species is a particularly valuable source of these essential elements.