

A survey of metal contamination in small urban rivers around the city of Dar es Salaam (Tanzania) – prevailing levels in sediment, water and implications for bioaccumulation in invertebrates and fishes

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Rivers passing across major cities are subject to a significant amount of metal contamination from industrial, domestic and sometimes mining sources. Most of the contamination is a result from the lack of or poor treatment of wastes (Kihampa *et al.*, 2010). Like other developing countries cities, Dar es Salaam, the big city of Tanzania, faces a problem of river contamination passing across improper or untreated wastes. Most studies have been looking on the concentration of metals in sediments and water, leaving behind fishes and invertebrates that are important for health aspects. Therefore the objective of this study is the assessment of metal contamination in sediments, water and invertebrates and fish in four small urban rivers (Kizinga, Msimbazi, Tegeta and Nguva) in Tanzania and comparing them with those from four sites of Molsse Nete in Belgium. The aim is to determine their level in each compartment and potential threat to human health.

Samples were collected from three sampling sites along each river during summer holiday in Tanzania and four sampling points in Belgium in the winter season of October 2011. In Tanzania three fish species (*Tilapia mozambicus*, Cyprinidae and Cichilidae) were caught with mosquito mesh size net and dorsal tissue and tail cut. Five identified species of invertebrates (*Lumbricus*, *Thiara*, *Neritina*, Neritidae and Gomphidae) were caught. Both fish and invertebrates were stored in polypropylene tubes. Three replicates of water and 1mm upper layer of sediment using petri dish were collected from each sampling point of rivers involved and stored in polypropylene tubes and polyethylene bags respectively. Water was filtered before removing solid particles. In Belgium three fish species for this study were captured with a stupefying electric fishing device, collected and dorsal tissues, liver and tail fins put in polypropylene tubes. The invertebrates were also captured, identified and put in polypropylene tubes and epees. Sediments were collected with grab sampler. Water was also taken and put in polypropylene tubes for further laboratory analysis.

So far fishes and invertebrates were weighed, samples oven dried at 60°C and will be digested with nitric acid (HNO₃, 69%). Further metal analysis is ongoing in the laboratory. High Resolution Inductively Coupled Plasma Mass Spectrometer (HR-ICP-MS) will be used.

Samples will be compared using Non-multidimensional scaling (NMDS) and PCA. AOSIM will be used to test for significance difference. T-test will be used to test means of correlated metals. The test can be changed upon necessity.

References

Kihampa.C and W.J.S. Mwegoha. 2010. Heavy metal contamination in agricultural soils and water in Dar es Salaam city, Tanzania. Department of Environmental Science and Management, Ardhi University, PO Box 35176, Dar es Salaam, Tanzania.