

Chemical Speciation and Bioavailability of Some Essential Metal Ions In Different Fish Organs at Lake Chamo, Ethiopia

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Abstract : The enhanced concentrations of heavy metals, especially in sediments, may indicate human-induced perturbations rather than natural enrichment through geological weathering. Heavy metals are non-biodegradable, persist in the environment, and are concentrated up to the food chain, leading to enhanced levels in the liver and muscle tissues of fishes, aquatic bryophytes, and aquatic biota. Marine organisms, in general fish in particular, accumulate metals to concentrations many times higher than present in water or sediment as they can take up metals in their organs and concentrate at different levels. Thus, metals acquired through the food chain due to pollution are potential chemical hazards, threatening consumers. The Nile tilapia (*Oreochromis niloticus*), catfish (*Clarias garpinus*), and water samples were collected from five sampling sites, namely, inlet-1, inlet-2, center, outlet-1 and outlet-2 of Lake Chamo. The concentration of major and trace metals Na, K, Mg, Ca, Cr, Co, Ni, Mn and Cu in the two fish muscles, gill and liver, was determined using an atomic absorption spectrometer (AAS) and flame photometer (FP). Metal concentrations in the water have also been evaluated within the two consecutive seasons, winter (dry) and spring (wet). The results revealed that the concentration of those metals in Tilapia's (*O. niloticus*) muscle, gill, and liver were Na 44.5, 35.1, 28, Mg 2.8, 8.41, 4.61, K 43, 32, 30, Ca 1.5, 6.0, 5.5, Cr 0.91, 1.2, 3.5, Co 3.0, 2.89, 2.62, Ni 0.94, 1.99, 2.2, Mn 1.23, 1.51, 1.6 and Cu 1.1, 1.99, 3.5 mg kg⁻¹ respectively and in catfish's muscle, gill and liver Na 25, 39, 41.5, Mg 4.8, 2.87, 6, K 29, 38, 40, Ca 2.5, 8.10, 3.0, Cr 0.65, 3.5, 5.0, Co 2.62, 1.86, 1.73, Ni 1.10, 2.3, 3.1, Mn 1.54, 1.57, 1.59 and Cu 1.01, 1.10, 3.70 mg kg⁻¹ respectively. The highest accumulation of Na and K were observed for tilapia muscle and catfish gill, Mg and Ca got higher in tilapia gill and catfish liver, while Co is higher in muscle of the two fish. The Cr, Ni, Mn and Cu levels were higher in the livers of the two fish species. In conclusion, metal toxicity through food chain is the current dangerous issue for human and other animals. This needs deep focus to promote the health of living animals. The details of the work are going to be discussed at the conference.

Keywords : bioaccumulation, catfish, essential metals, Nile tilapia

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