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DETERMINATION OF SOME HEAVY METALS IN *OREOCHROMIS NILOTICUS, CLARIAS GARIEPINUS* AND *SYNODONTIS SPP* FROM THE COASTAL WATER OF ONDO STATE, NIGERIA

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Some heavy metals (Pb,Ni,Fe,Cu,Zn,Cd,Co,Mn,and Cr) were determined in *Oreochromis niloticus, Clarias gariepinus and Synodontis* spp obtained from the coastal water of Ondo State. All metals examined and detected in all fish samples. Iron, manganese and cadmium were found to be the most abundant metals in the fish samples with an average values of 35.8, 31.3, and 12.5 mg kg^{-1} respectively. Except for manganese, iron and cadmium, *Syndrontis spp* has the highest concentration for virtually all the metals under examination.

Key words: Heavy metals,Coastal water, *Oreochromis niloticus.*

Introduction

The concentration of heavy metals in aquatic environment and marine organisms have been of considerable interest because of their toxicity effects which are important in human beings (Von Schiruding *et al* 1991; Ipinmoroti *et al* 1997).

Some of the sources of heavy metals present into the aquatic environments includes oil spillage, sewage effluents, dredging activities, weathering of rocks and soils and also from several sources due to human activities (Marr and Creaser 1983; Gutanmamn *et al* 1988). The metal containing fertilizers due to agricultural revolution could lead to continued rise of the concentration of metal pollutants in fresh water reservoir due to water run-off (Ipinmoroti *et al* 1997).

Some of these minerals (Fe,Ca,Cu,etc) are essential components which are required in enzymatic biochemical activities in the body, some others like Cd, Pb, As and Hg are extremely dangerous to human health (Oehme 1978; Fagbemi and Oshodi 1991). Heavy metals poisoning particularly lead and Cd have been reported to give rise to quite a number of clinical syndrome for example, cadmium accumulation is associated with hypertension, osteomalacia and itai-itai disease (Oloyede *et al* 1970). Lead poisoning have been found to be associated with permenent brain damage behavioural disorders and impaired hearing (Mirian *et al* 1994).

The present work provides information on the levels of some heavy metals in three fish species from the coastal region of Ondo State, that is *Oreochromis niloticus, Clarias gariepinus and Synodontis spp.* Since no such work has been reported for this area, it is expected that the results obtained would form baseline data for future study.

Materials and Methods

Sampling. Three different types of fish used were bought for analysis in a random manner fishermen fishing along the coast. This is for the fact that coastal regions represents a flowing system. The scales were removed (where applicable) carefully washed, with distilled de-ionised water to remove any adhering contaminant and then drained under folds of filter paper. The fishes were then wrapped in aluminum foil and kept in the deep freezer at-18°C prior to analysis (Asaolu 1998).

Sample treatment. About 4.0g of the representative body tissue was taken from the homogenised body tissue of each fish sample and digested with a mixture of concentrated HNO_3 and 72% $HCLO_4$ in the ratio 5:3 in an air-tight bottle in a temperature controlled water bath at about 85°C for 3 h. On the completion of the digestion, the bottles were cooled and the contents were filtered into 100ml volumetric flask and this was made up to the mark with 0.5% HNO_3. The metals in the resulting solution were determined using Atomic Absorption Spectrophotometer (Varian model spectra AA-10) (Agenian and Chan 1982). The results from this analysis were the average of triplicate determinations.

Results and Discussion

Recovery studies from the extraction procedure for metal determination in the fish samples give average percentage recoveries as 96%. 90%, 91%, 93%, 95% and 96% for nickel, lead, chromium, zinc, copper and cadmium respectively. The accuracy of the AAS was constantly checked with known concentrations for each of the metals and results are within ± 5%.

Table 1
Metal concentration (mg kg^{-1} fresh weight in fish from Ondo State coastal water

Fish type	Pb	Ni	Fe	Cu	Zn	Cd	Co	Mn	Cr
Oreochromis niloticus	1.2	4.8	13.8	0.3	1.5	2.2	1.6	41.3	2.7
Synodontis spp	1.5	5.8	42.6	0.6	1.9	14.0	3.8	30.0	6.1
Clarias gariepinus	1.4	5.3	50.9	0.4	1.7	21.3	3.6	22.5	3.6
Mean	1.37	5.29	35.79	0.44	1.70	12.51	3.33	31.25	9.24
SD	0.13	0.48	19.48	0.19	0.17	9.61	1.60	9.44	1.67
CV%	9.0	9.0	54.0	43.0	10.0	77.0	48.0	30.0	40.0

SD, Standard Deviation; CV (%), Percentage Coefficient of Variation

The Table 1 below presents the concentration of some heavy metals (mg kg^{-1} fresh weight) in fishes from Ondo State coastal water.

From the Table 1, iron, manganese and cadmium were found to be the most abundant metal in the fish samples with an average values of 35.8,31.4, and 12.5 mg kg^{-1} respectively.

The high levels of iron and maganese in particular compared with other metals in the fish samples could be associated with the fact that these metals are naturally abundant in Nigeria soil and since no matter the source of the metals, the final repositories are the aquatic systems (Kakulu and Osibanjo 1988). However, high concentration of these two metals have earlier been reported to be 24.5 and 11.6mg L^{-1} for water and 169.7 and 87. 8 mg kg^{-1} respectively for sediment from the coastal water of Ondo State (Ipinmoroti *et al* 1997; Asaolu *et al* 1997). Similar observations had earlier been reported for some fish types sediment and water from Niger delta area and Lagos Lagoon respectively (Kakulu 1985; Kakulu and Osibanjo 1988; Okoye 1989).

Except for manganese, iron and cadmium, *Synodontis spp* has the highest concentration of virtually all the metals under examination (Table 1). The difference in the concentration of these metals in the fish samples can suggest to what degree a particular species picks up particulate matter from the surrounding water and sediment during feeding. It is a well known fact that bottom feeders are known to concentrate more metal levels than the surface feeder (Asaolu 1998).

Except for iron, cadmium and cobalt, there is a low variation in the concentration of virtually all the metals from one species to the other. This is attested to by the coefficient of variation that ranged between 9% and 77% (Table 1). This probably suggests that these fishes are concentrating the metals at almost the same rate. The concentration of some metals important in cadmium appears to pose threat to the coastal environment since some of the heavy metals have been reported to be highly toxic even at low concentration and has not been known for any function in biochemical processes (Oehme 1978; Impinmoroti *et al* 1997).

It is gratifying to note also that the fishes under examination equally contained reasonable levels of some beneficial metals most importantly iron and manganese. However, it is suggested that the coastal area be regularly monitored to avoid the consumption of contaminated fishes.

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