



Levels of Heavy Metals in Some Fish Samples in River Wupa Located in Jabi District of Abuja, Nigeria

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ABSTRACT

The study was a research on three fish samples; *Tilapia zilli*, *Sardina Pilchards* and *Chrysichtyys nigrodigatatus* organs. The concentration of seven heavy metals were probed in the fish organs; flesh and head by atomic absorption Spectrophotometry. The metals: zinc, lead, nickel, cobalt, iron, manganese, and cadmium were found to be significantly present in the samples. The result of this study showed that samples contain metals ranging $0.31 \pm 0.05 \mu\text{g/g}$ (Fe), $0.05 \pm 0.07 \mu\text{g/g}$ (Cr) and $0.12 \pm 0.05 \mu\text{g/g}$ (Co) for *Tilapia zilli*, flesh and *Sardina pilchards* and *Chrysichtyys nigrodigatatus* respectively. This study has shown that the samples generally have higher concentration of the metals during dry season than the rainy season. Consequently, the samples investigated were implicated to be polluted and continuous consumption might predispose consumers to health complications as metals could bioaccumulate.

Keywords: Fish, heavy metals, domestic waste and water

INTRODUCTION

There is an increased trend in pollution of our environment particularly, ecosystem with increase in technological advancement and population expulsion in our cities (Asaolu and Olaofe, 2004; Bin Li *et al.*, 2004). The introduction of foreign substances that alter the natural chemical components into our environment continue to pose treat to human existence as the stake holders do not enforce enabling legist illation where the laws do exist (FEPA, 1999; IOSHI, 1999). The master plans in our cities with respect to sewage pipes seriously tempered with and even residential buildings are not been adhered to and culprits left unprosecuted and Indeed finance have often been the challenge advance as one vital impediments that affect the entire pollution issues (SON, 2007; UNDP, 1998; USEPA, 1997; WHO, 2003). Nations that have today attended the peak of development take urban agriculture part of their policy trust. Basically, the used of wastewater for agricultural purpose in our cities globally is a current and future reality that has its aesthetic values (Shuwal, *et al.*, 1986; Suzuki, *et al.*, 1988; Woo *et al.*, 1993). China and Mexico are reported to cultivate 1.3 million and 3.44×10^5 hectares respectively make use of irrigated agriculture with domestic

wastewater (Mara and Cain cross, 1989; Adeniyi, Yusuf and Okedeyi, 2008; Mohammed and Abdullahi, 2010). The aim of this paper is generate data empirically, that will serve as a guide and working tool for consumers of aquatic lives from river Wupa, in Jabi district Abuja, Nigeria.

METHODOLOGY

Sample Collection and Preparation

Nine fish samples, three each were purchased from fisher men directly from the river between 21/03/13 – 23/05/ 2013. The samples were collected in three batches: 12/03/ 2012, 28 / 03/ 2013 and 23/05 2013.

Trioxonitrate (V) acid (HNO₃) Tetraoxochlorate (VII) acid HClO₄ . 2H₂O Fish Digestion

Fishes were brought into the laboratory; cut with knife such that tissues of three fishes of about the same size and the same species were sliced as samples: The flesh, and head. The samples were dried at 120°C to a constant weight in an oven. 0.50g of the samples were weighed

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on a watch glass and transferred into a conical flask and digested in 80 cm³ HNO₃ and 4 cm³ HClO₄ at 130°C using hot plate carefully and gradually until the entire sample dissolved. The sample was washed into 100cm³ volumetric flask and the resulting solution was made up to the mark with distilled water and portions of these solutions were taken for the required metal determination (Canli *et al.*, 1998)

Statistical Analysis

The statistical tools employed in this study were Microsoft excel and SPSS. The one-way Analysis of variance (ANOVA) was used supported by Duncan Post Hoc test to

corroborate the significant differences in concentrations of heavy metals in samples.

RESULTS AND DISCUSSION

Table : shows the ANOVA comparison of means of metal concentration in Kano and Minna fishes during rainy season ($F_{cal} = 25.611 > F_{crit} = 1.72$; $df = 15$, and 80 ; $P < 0.05$). Therefore the null hypothesis; H_0 : There is no significant difference in the concentrations of heavy metals in the fishes is rejected. Hence there is significant difference in the concentration of the metals in fishes samples. chromium, manganese, nickel, iron and cadmium.

ANOVA comparison of mean of metal concentration in fish's samples

	Sum of the squares	Degree of freedom (df)	Mean of the squares	F_{cal}	F_{crit}	Significant level
Between Groups	0.621	15	0.05032	25.611*	1.72	0.0001
Within Groups	0.110	80	0.001370			
Total	0.725	95				

*- Significant at 0.05 level

Conclusion

Based on limited experimental results from this study, the samples of fish organs were contaminated, however, the samples of flesh were implicated to be most polluted. This might be as a result of bioaccumulations in body with the structural lattices that are favourable to stock pile these metals some periods. The result from this study shows that samples follow the same trend with some reported earlier. Therefore consumption of these fishes could predispose the consumers health abnormalities.

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