

Contents of Heavy Metals of two Edible Fish *Pseudotolithus senegalensis* and *Arius heudeloti* from Three Different Geographical Locations of Lagos State

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The concentration of selected heavy metals Cadmium (Cd), Chromium (Cr), Lead (Pb), and Zinc (Zn) were determined in two different species of fish, Pseudotolithus senegalensis (Croakers) and Arius heudeloti (Marine Cat-Fish) in three different geographical locations, Ikorodu, Epe and Badagry, areas of Lagos State. The dry-ashing digestion method was used for the digestion, while the concentration of each metal was determined by Atomic Absorption Spectrophotometer. The result indicated that Zn showed the highest mean levels (ppm) of 25.01, 25.85, 26.78 and 26.96 at .05 level of significance relative to Pb, Cd, and Cr respectively. The concentrations of Zn and Pb notwithstanding still falls below the PTWI (permissible tolerable weekly intake) recommended by FAO (WHO, 1984), thus, does not constitute any hazard to man. Additionally, the concentration of the metals analysed are low compared with international monitoring Agencies data. Badagry has the highest concentration of these metals.

INTRODUCTION

The Lagos Lagoon is the largest of the four Lagoon systems of the Gulf of Guinea Coast. It is a shallow expanse of water with restricted circulation in a micro tidal environment. This aquatic resource of multiple usage receives inputs of domestic sewage, industrial waste waters, sawdust and particulate wood wastes, petroleum hydrocarbon, cooling water from a thermal power station and emissions from automobile exhaust. Micro pollutants examined in the water, sediment and biota have included organic waste, trace heavy metals and chlorinated hydrocarbons.

Water pollutants are categorized as emitted from point or non point sources, Point sources are distinct and confined, and include accidental spills from industrial sites that empty into streams or rivers. Non-point sources, such as run off, are diffused and intermittent and are influenced by factors such as land use, climate, hydrology, topography, native vegetation and geology, Common urban non point sources include Urban run off from streets or fields, such run off contains all sorts of pollutants from heavy metals to chemical and sediments. Rural sources of non point pollutants are generally associated with agriculture, mining or forestry. Non point sources are difficult to monitor and control (Botkin et-al, 1998). The hazard presented by a particular water pollutant depends on several factors including the concentration or toxicity of the pollutants in the environment and the degree of exposure to people or other organisms. (Pye et-al-1983).

According to a world bank's report published in 1993 over 80% of the industries worldwide discharge solid, liquid and gaseous effluents directly into the environment without Prior treatment.

Recent works suggest that toxic materials threaten the ocean bottom as well as the entire marine ecosystem. The base of the marine food chain consists of the planktonic life abundant in the upper 3mm of the ocean water. The young of certain fish and shell fish also reside in the upper few millimeters of the ocean also tend to concentrate pollutants such as toxic chemicals and heavy metals. One study reported that the concentration of heavy metals including zinc, lead, and copper in the upper 3mm (or micro layer) are from 10, to 1000 times higher than in the deepest waters, i.e surface film enrichment.(chemical

oceanography, 2nd edition) There is fear that disproportionate pollution of the micro layer will have especially serious effects on marine organisms (leussen-1989). Marine pollution can also have major impacts on people and society. Contaminated marine organisms may transmit toxic elements or diseases to people who eat them (Council on environmental quality, 1970).

Aim and objective of this research study:

The concern about the ecological consequences of discharges of effluents from the Nigerian Oil Industry and domestic sewage and particularly the environmental effects of heavy metal substances released from Oil manufacturing, Textile and mining industries has been widespread in recent years. The importance for public health / i.e. the quality of fish and fishery products) of heavy metals contamination in fish is critical and hence need to be monitored. The aim of this project therefore, is to determine the concentration of Cd, Cr, Pb and Zn as heavy trace metals in the following fish: short croaker –*Pseudotolithus senegalensis*, and marine catfish- *Arius heudeloti* consumed in Badagry, Epe and Ikorodu area of Lagos State.

The objective is that the result shall focus on the evaluation of environmental quality and consumer safety concerns.

MATERIALS AND METHOD

Sampling source: The samples i.e. *Pseudotolithus senegalensis* (short croaker) and *Arius heudeloti* (marine cat fish) were gotten from Imota river in Epe, majidun river in Ikorodu and Topo near Sangbeto river in Badagry, the samples were kept in a thermo box filled with ice-cubes and later frozen at -20°C in deep freezer.

Instrumental Analysis: The sample's were oven-dried at 105oC for 24hrs. The crude ash content was determined by dry ashing in a muffle furnace at 550°C. for 1¹/₂hrs and dissolved in aqua regia. The prepared samples were analyzed for the heavy metals by using an air-acetylene flame atomic Absorption spectrophotometer (AAS) (analyst 200 perkin Elmer).

RESULTS AND DISCUSSION

The results obtained were analyzed based on the stated objective of the research.

The concentration of the metals when analyzed in the fishes, indicated that Zn showed the highest mean levels (ppm) relative to three other metals analyzed. The concentration of Zn relative to Pb, Cd, and Cr is 25.01, 25.86, 26.74 at .05 level of significance, by implication, the concentration of Zn is significantly different when compared with other metals. This result can be deduced to conform to the expected. Since Zn forms part of trace metal required by the body for healthy functioning. Pb has a concentration of 0.84, 1.73 and 25.01 relative to Cd, Cr and Zn values of which are not significantly different at .05 level of significant. Cd shows a concentration of 0.84, 0.88 and 25.86 relative to Pb, Cr and Zn also not significant at .05 level of significant Cr shows value of 1.73, 0.88 and 26.74 relative to Pb, Cd and Zn also not significantly different at the .05 level. This result indicates that apart from Zn, there was no significant difference in the values obtained for other metals.

Total Mean concentration values obtained from the three different locations indicates Zn as the metal that shows highest concentration.

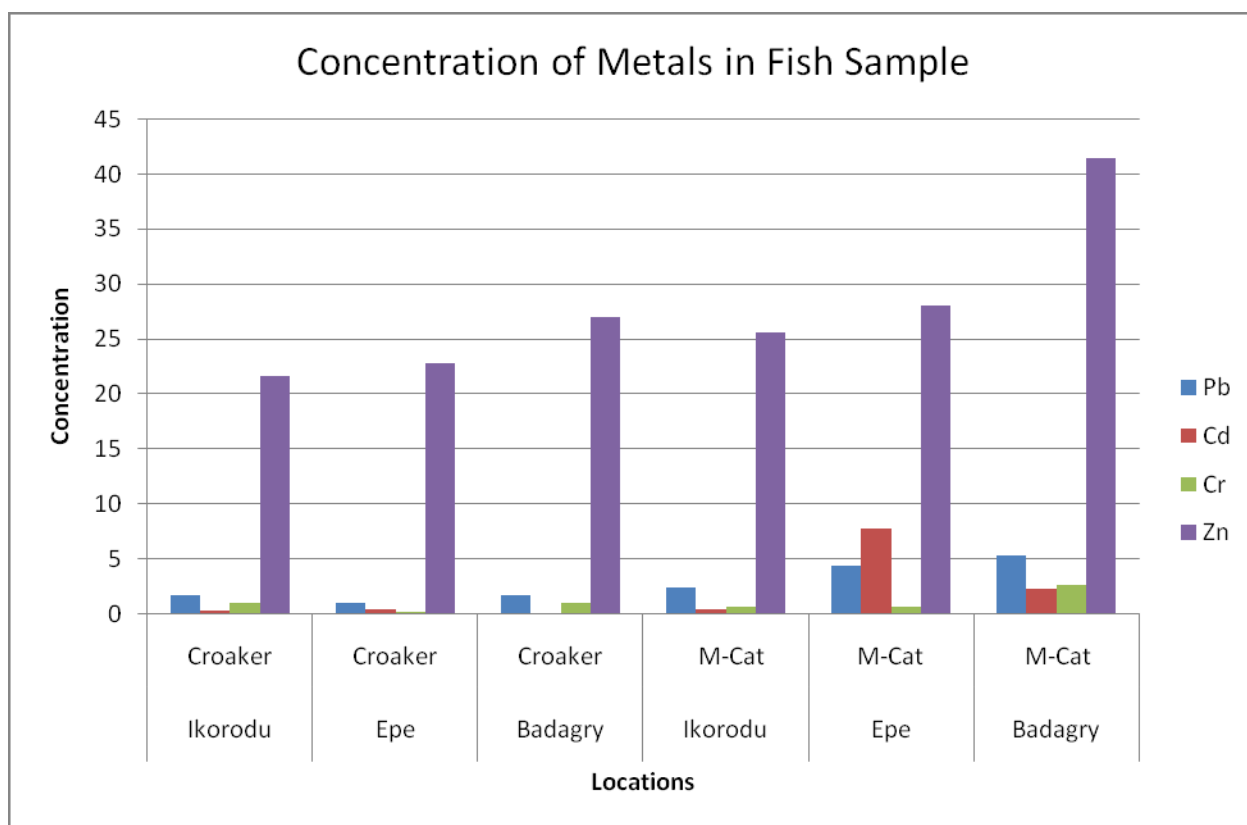
At Ikorodu, mean values obtained for both fishes are, Pb, 1.38, Cd, 0.42, Cr, 0.66, and Zn, 22.27, Epe shows values of Pb, 2.09, Cd, 0.39, Cr. 0.89, and Zn, 26.36, while Badagry indicates values of Pb. 4.94, Cd, 5.06, Cr, 1.68, and Zn, 34.81

The highest total mean value obtained for the metal concentration was from Badagry, presumably due to the high level of Zinc obtainable in the two species of fish found in the area. This could in effect be as a result of fishing technology adopted in making metallic implement used for fishing and the metal boats

used, since it is believed that both Badagry and Epe compete favorably for attention within the riverine area of Lagos.

Comparison between locations source indicates that there is significant difference in metal concentration obtained at Badagry and that of Ikorodu.

Ikorodu shows mean values of -1.25 and -5.44 relative to Epe and Badagry, relative to Ikorodu and Badagry, Epe shows no significance in mean values obtained at Ikorodu and Badagry at 1.25 and 4.19 respectively. Badagry relative to Ikorodu and Epe has mean values at 5.44 and -4.19 respectively with value of Ikorodu also being significantly different.



CONCLUSION

Using *Psuedotolithus senegalensis* and *Arius heudeloti* as biomonitoring agents, the contamination of Pb, Cd, Cr, and Zn, in the three locations of Lagos state was found not to be significant. Since most of these sea foods (fishes) accumulate heavy metals in the soft tissues and constitute important proteineous food in the coastal environment. This research is thus of relevance in predicting the metal contamination in the coastal communities. The heavy metal concentration in the fish used at the three locations could be attributed to anthropogenic metal sources affecting their environment.

The observation that Zn level from the three location are significantly higher suggests the link or water flow of the three different Locations, and that their rivers are contaminated. One would suggest that future

studies concentrate on the relative importance of water, sediments and food in accumulation of metals from the three locations of Lagos state.

The public health implication of the research seems to show no possibility of acute toxicity of heavy metals (Pb, Cd, Cr, and Zn) of edible fishes consumed. Nonetheless, continuous monitoring of biodata in these areas should continue while government should enforce existing pollution control laws, so that the metal concentrations do not get to critical levels that will threaten human health.

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