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EVALUATION OF MINERAL CONTENTS IN FISH SAMPLE, (CLARIAS GARIPIENUS,) FROM TOMBIA SWALI, OTUOKPOTI AND AMASOMA RIVER, IN BAYELSA STATE

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ABSTRACT

The mineral content in the fish sample (Clarias garipienus) was determined by using atomic absorption spectrophotometer. From the result, it was observed that the total mineral contents in Clarias garipienus are highly nutritional and proteineous in otuokpoti with (2396.19) followed by swali (2165.256) and amassoma (2128.646) and tombia (2078.3554) rivers respectively. The analysis is that the fish sample from all location contained adequate amount of mineral which is good for human nutrition

Keyword: *Clarias garipienus*, Bayelsa state, Spectrophotometric

1. INTRODUCTION

Fish is consumed by a large percentage of population in the world due to its high quality protein. It contains the most important nutritional components and serves as a source of energy for human beings (Abelti, 2017). Knowledge of the proximate composition of fishes is essential to estimate their energy value and to plan the most appropriate industrial and commercial processing (Fanuel, *et al.*, 2017). However, in different environmental conditions, the composition of the fish may differ in relation to the differences in water quality, feeding conditions, sex, and state of maturity and capture condition (Abelti, 2017). The lack of sufficient protein is one of the most widespread nutritional deficiencies in many tropical countries. Fish meat is also a rich source of minerals and the most abundant macroelements are calcium, phosphorus, magnesium, sodium, iron, potassium (Abdullahi, 2000). Fish absorb minerals not only from their diets but also from the surrounding water.

Minerals are inorganic chemical elements that the body needs for healthy growth and metabolism. They are also involved in making hormones and enzymes (Adewoyei, *et al.*, 2003). Minerals are just as important as vitamins, and work in conjunction with vitamins to perform many bodily functions such as bone formation, heart function and digestion. Minerals present in food can be essential, non-essential or toxic to human consumption (Job, *et al.*, 2015). Minerals are essential nutrients, they are components of many enzymes and metabolism, and contribute also to the growth of the fish (Glover and Hogstrand, 2002). The human body usually contains small amount of these minerals and the deficiency in these principal nutritional elements induces a lot of malfunctioning; as it reduces productivity and causes diseases. Besides being used as food, fish is also increasingly demanded for use as feed. However, information concerning the chemical composition of freshwater fishes in general is valuable to nutritionists concerned with readily available sources of low-fat foods, high-protein foods such as most freshwater fishes and to the food scientist who is interested in

developing them into high-protein foods, while ensuring the finest quality such as flavor, color, odor, texture, and safety obtainable with maximum nutritive value. It is also useful to the ecologists and environmentalists who are interested in determining the effects of changing biological conditions on the composition, survival, and population changes within fish species. The mineral elements which the body required are frequently classified as either macro-or micro-nutrients, depending on the amount of each that is need in diet, (Elagba, *et al.*, 2010). Calcium, phosphorus, potassium, sulfur, chlorine, sodium and magnesium are considered macronutrient elements. Iron, iodine, fluorine, zinc, copper, chromium, selenium, cobalt, manganese, molybdenum, vanadium, tin, silicon and nickel are often classified as micro-nutrient or trace element. The nutritional component of fishes was found to differ between species, sexes, sizes, seasons, and geographical localities. The objective of this study is to elucidate the mineral composition of four fishes; *Clarias garipienus*, obtained from *Tombia, swali, amasoma* and *Otuokpoti* River in Bayelsa State.

2. MATERIALS AND METHODS

2.1 Sample collection and processing.

The fish sample (clarias garipienus), was purchased in pairs from the different river side of (tombia, swali, amasoma and otuokpoti) respectively and taking to the laboratory before it was cleaned, washed with distilled water and dried in the oven at 70^{o}C until a constant weight was obtained. After oven drying, the muscle was separated, labelled appropriately and ground using a preclean proclin mortal and pestle. After this, 2.0g of the tissue from each fish sample was weighed into crucibles and ashed in a furnace for 18 hours at 550^{o}C after which it was set aside to cool. Concentration of (HNO_3) nitric acid (2.0ml) was used to digest the ashed samples into solution.

The ashed sample (0.2g) was weighed into the pre cleaned borosilicated 250ml capacity beaker for digestion. Nitric acid (30.0ml) was added into the weighed sample in the beaker. The sample with the digesting solvent was placed on the hot plate for digestion in

the fume cupboard. The beaker and its content after the digestion was allow cooling. Another 20.0ml of digesting solvent was added and further digestion carried out in a fume cupboard. The mixture was allowed to cool at before filling into 250ml volumetric capacity borosilicate container. The filtrate was made up to mark with deionised water.

The digested sample was subbed into pre – cleaned borosilicate glass container for atomic absorption spectrophotometer analysis.

2.2 Spectrophotometric analysis of fish samples: Standards of Iron, Copper, Manganese, Tin, Lead, Cobalt, Cadnium, Mercury, Vanadium, Nickel, Selenium, Calcium, Magnesium, Potassium and Sodium solution of 0.2, 0.4, 0.6, 0.8 and 1.0mg/l were made from the each of the metals solution of 1000mg/l stock solution of the analytes. The set of standard solutions and the filtrate of the digested samples were analysed by Atomic Absorption Spectrophotometer. The detection limit of the metals in the samples was 0.0001mg/l by means of the UNICAM 929 London, Atomic Absorption Spectrophotometer powered by the SOLAAR software Iron, Copper, Manganese, Tin, Lead, Cobalt, Cadmium, Mercury, Vanadium, Nickel, Selenium, Calcium, Magnesium, Potassium and sodium cathode lamps were used for the analysis of the respective mineral ions in the standards and the filtrate of the samples. Gas mixture was used in the generation of the flame while cold vapour pressure system was employed for mercury determination.

Mineral values of fish samples from Tombia River.

S/no	*Sample identity*	*Claria garipienus*
1	Copper	0.68
2	Manganese	0.0054
3	Iron	0.96
4	Calcium	45.08
5	Magnesium	71.9
6	Potassium	963.02
7	Sodium	128.47
8	Phosphorus	868.24

Mineral value of fish samples from Swalli River

s/no	*Sample identity*	*Clarias garipienus*
1	Copper	0.94
2	Manganese	0.006
3	Iron	0.94
4	Calcium	40.63
5	Magnesium	69.47
6	Potassium	1032.44
7	Sodium	137.66
8	Phosphorus	883.17

Mineral values of fish samples from Otuokpoti River (control).

S/no	*Sample identity*	*Claria garipienus*
1	Copper	13.7
2	Manganese	0.55
3	Iron	0.13
4	Calcium	196.1
5	Magnesium	74.93
6	Potassium	1070.04
7	Sodium	145.48
8	Phosphorus	895.26

Mineral values of fish samples from Amassoma River.

S/no	*Sample identity*	*Claria garipienus*
1	Copper	1.88
2	Manganese	0.006
3	Iron	0.91
4	Calcium	42.48
5	Magnesium	41.94
6	Potassium	1056.88
7	Sodium	120.16
8	Phosphorus	864.39

Experiments conducted and data obtained from the present study revealed that the evaluation of mineral contents in the sample from the various rivers respectively, can be explained in the table above.

With a clear observation of the elements in the sample *(clarias garipienus)* from the different rivers. *Tombia, swali, amasoma and otuokpoti*

COPPER, in river *tombia* has a significant value of 0.68, while river *otuokpoti* has a significant value, of 13.7 and river *swali* has a significant value of 0.94, and river *amasoma* with a significant value of 1.88.

MANGANESE, has a of 0.0054 in river *tombia* in the sample (*clarias garipienus*) while river *swali* and river *amasoma* shared a significant figure of 0.006, and river *otuokpoti* has a figure of 0.55 significantly

IRON, sample (*clarias garipienus*) has a significant value of 0.96 in river *tombia* and the same sample has a significant value of 2.13 in *otuokpoti* and also has a significant value of 0.944 in *swali,* and a value of 0.91 in *Amasoma* River significantly.

CALCUIM, river *tombia* has a signifant figure of 45.08, while river *otuokpoti* has a value of 196.1 significantly, and *Amasoma* River with a significant value of 42.48 and *Swali* River has a value of 40.63 significantly

MAGNESIUM, sample (*clarias garipienus*) has a lower value of 69.47 in *Swali* River, and 41.94 in river *amasoma* significantly and in river *tombia*, sample has a value of 71.9 and has a significant value of 74.93 in river *otuokpoti*

POTASSIUM, river *amasoma* has a significant value of 1056.88 and river *otuokpoti* has a value of 1070.04, while river *tombia* has a significant value of 963.02 and *Swali* River has a value of 1032.44 significantly.

SODIUM, in sample (*clarias garipienus*) has a significant increase of 145.48 in *Otuokpoti* River and a significant figure of 120.16 in *Amasoma* River, and in river *tombia,* a value of 128.47 significantly. And river *swali* has a significant value of 137.66,

PHOSPHORUS, sample has a significant value of 868.24 in *Tombia* River and a value of 895.26 in

Otuokpoti River significantly, and in *Swali* River it has a value of 883.17 significantly and a significant value of 864.39 in river *amasoma*

DISCUSSIONS

The mineral content in ***otuokpoti*** showed significant increase in ***copper element*** as compared to other river locations which showed significant difference due to a high temperature.

(Adeyeye et al 2009) Amino Acid Composition of Three Species of Fish: Clarias Gariepinus, Oreochromis Nitoticus and Cynoglossus Senegalensis.

Also, sample *(clarias garipienus)* has a significant increase in **manganese** in river *otuokpoti* while shared am minimum value of 0.006 respectively amongs river swali and amassoma. **Iron element** which helps to metabolize proteins and plays a role in the production of haemoglobin and red blood cell has significant increase in *(clarias garipienus)* in river otuokpoti but shared a significant moderate value in other river locations, due to the natural weather process in the environment. These changes may be caused by oil spillage and environmental temperature in both Rivers

(Kim and Mendis, 2006). The physiological role of dietary proteins is to provide substrates required for the synthesis of body proteins and other metabolically important elements.

Calcium element has a significant high value in river otuokpoti sample *(clarias garipienus)* compared to other rivers with minimum values respectively, due to domestic waste effluents in the river. And also in Magnesium **element** which Helps Increase Energy. Calms Nerves and Anxiety. In sample *(clarias garipienus)* it has more contents in otuokpoti river compared to other river locations respectively due to trace of abandoned boats and ships, and heavy metals in the river. And in Potassium **element,** sample *(clarias garipienus)* also has a significant increase, otuokpoti river respectively, while river tombia, amasoma and swali are moderate respectively due to intakes by fish in polluted aquatic environments.

(Amadon et al 2012) Evaluation of protein in nile tilapia, Clarias Gariepinus, syndontis budgetti, mormyropes delicious.

Sodium element which is very important for osmoregulation and fluid maintenance within the human body also showed a significant increase in sample *(clarias garipienus)* in Otuokpoti River, compared to river amassoma with minimum value of 120.16 due to weathering conditions.

And **Phosphorus element** also showed a significant moderate value in sample *(clarias garipienus)* in all river locations due to heavy metal concentration in fish sample. **Copper** which is a component of many enzymes and is needed to produce red and white blood cells. Is high in *swali* River with an increase of 13.7 compared to other river locations due to the drainage system in the environment? Mechanisms, and as such contribute to the growth of the fish.

4. CONCLUSION

The above result shows that the Mineral Elements gotten from the fish sample *(clarias garipienus).* From *tombia, swali, amasoma and otuokpoti*. River has been suggested to be useful component for healthy diet in humans. They contain the relatively high to moderate percentage minerals in fish. So it's advised to buy all your fish consumables from these locations for a reliable partnership.

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