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Analysis of the Proximate Composition of Several Fish Species from the Ogun River

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Abstract

The detrimental effects of man on the aquatic environment are constant. In the Ogun River, Nigeria, four fish species *Oreochromis niloticus*, *Malapterurus electricus, Parachanna obscura*, and *Chrysichthys nigrodigitatus* were chosen for this study to assess the proximate composition and concentration of certain heavy metals. Atomic absorption spectrometry was used to examine the fish species for Manganese (Mn), Lead (Pb), Nickel (Ni), Cadmium (Cd), and Zinc (Zn). The fish species were gathered from the Abeokuta axis of the river. Utilizing accepted techniques, the moisture, crude protein, ash, and fat contents of the four fish species were examined. The findings showed that the four fish species had different rates of metal buildup. Only *Oreochromis niloticus* and *Chrysichthys nigrodigitatus* showed Pb and Mn traces, respectively. The liver and gills accumulated more metals than the muscles, with the exception of a few instances when Pb and Ni were found in the muscles of *Oreochromis niloticus* and *Parachanna obscura*, respectively. In every instance, the metal concentrations exceeded what was considered acceptable by international standards. While fat was the least abundant nutrient in all fish species (0.88-1.89 percent), all fish had high moisture contents of between 75 and 80 percent. The variations in proximal values between fish species were not noteworthy.

Keywords: Environment; Axis; River; Liver

Introduction

The results of this study may indicate the level of heavy metal contamination in the Ogun River while also displaying the danger of eating fish from the river. Nigeria, a country in western Africa, has a substantial freshwater ecosystem, and fishing is the primary source of income for many people there. Due to its relative cost and/or the nutrients it provides, fish is in high demand as a food source, particularly by the local population. The demand for fish consumption still dominates aquaculture production, notwithstanding recent increases in the use of aquaculture to provide adequate fish production in response to rising population. Nigeria only produces about 40% of the estimated 2.66 million metric tonnes needed for domestic use, importing the remaining 60% to meet the need. Aquaculture must therefore be supplemented with fishing in natural waters that have a variety of numerous species. The fact that these water bodies are tainted with chemicals from farms, oil spills, and heavy metals from businesses, however, makes fishing in the wild a unique difficulty. The strong demand for fish is mostly driven by its nutritional worth, which is a product of its near composition, rather than just its taste. Fish protein is simple to digest. It also serves as a significant supply of both essential and optional amino acids. Compared to other protein sources, it has a higher level of cysteine in its amino acid profile [1].

Eicosa Pentaenoic Acid (EPA) and Docosa Hexaenoic Acid (DHA), two advantageous polyunsaturated fatty acids, have been found to be present in sufficient amounts in the tissues of fish. Some human ailments, such as cancer, heart disease, rheumatoid arthritis, and inflammation, have been claimed to be both preventable and curable by these polyunsaturated fatty acids. The preservation of acid-base equilibrium one of the roles played by minerals in the body; additionally, they support the production of hemoglobin. Additionally, minerals aid in bone formation, regulate water balance, and catalyze metabolic processes. In the aquatic ecology, heavy metal pollution is a significant factor. This is as a result of their toxicity, buildup, and capacity for bio-magnification throughout the food chain. The main sources of heavy metal contamination in natural aquatic systems are human-made activities such as manufacturing, household, and transportation. As a result of their position in the aquatic food chain, fish are easily able to absorb heavy metals into their bodies from any soil, water, or food. Even though some heavy metals are good for fish, their toxicity may outweigh any health benefits, and as a result, man may also be adversely affected farther up the food chain. The harmful consequences of heavy metals on humans are well documented in the literature, and they can include everything from liver and kidney damage to cardiovascular illnesses and, in severe cases, even death [2, 3].

The shinning colors of male haplochromine cichlids have received much consideration from developmental scholars. These colors caused early analysts to hypothesize that sexual selection may have played an critical part in African cichlid speciation, an thought that was afterward confirmed in a few lab and field considers. Undoubtedly, it has even been proposed that sexual choice through female choice is solely capable for the advancement of these color patterns, with small or no part permitted for the impacts of ecological and natural setting. And, in spite of the early attention paid to female choice, a few analysts found evidence that male intrasexual intuitive may play a role in the enhancement of color designs among haplochromine species. Pauers working with a few Lake Malawi species, performed a research facility think about in which they found [4].

Discussion

Guys were more forceful towards additionally colored opponents, whether or not they were of the same genus. Further, Seehausen and Schluter and Youthful found that the participation of communities of Lake Victoria and Lake Malawi species was managed by male

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coloration; in both lakes, communities of cichlids were more likely to be composed of species in which the guys were differently colored from one another. Despite this, the prove with respect to the relationship between color (or color design) and environment has been equivocal. For case, Goldschmidt illustrated that the estimate of butt-centric blade egg spots and, to a lesser degree, egg spot number, increment with diminishing light escalated in Lake Victorian haplochromines. McElroy and Deutsch took ghostly estimations from distributed pictures of Lake Malawi haplochromines and looked for patterns among coloration and environment. Whereas Mc Elroy found a few measurably noteworthy correlation. Furthermore, two more later, to a great extent field-based studies also drew differentiating conclusions with respect to the relationships among male matrimonial coloration and the unearthly environment. Seehausen found that at populaces [5].

Conclusion

Polychromatic Lake Victorian haplochromine in which there was a direct unearthly angle between shallow and profound environments, there was a particular slope of male coloration, with blue guys occupying the shallows and red guys living at more profound profundities. On the other hand, at populations in which there was a soak ghastly slope, the variation among matrimonial color sorts was quieted and no clear pattern was found. Interests, designs of female mate choice closely taken after these designs of male matrimonial color. Dalton found that among cichlid species within a single Lake Malawi area, there was no relationship between any angle of male coloration and any include of the environment, counting depth [6].

The African cichlid class Labeotropheus is one of the rock-dwelling haplochromine "mbuna" endemic to Lake Malawi. It contains two recognized species, *L. fuelleborni* and *L. trewavasae*. *L. fuelleborni* may be a deep bodied, shallow-dwelling green growth scrubber frequently found in association with large rocks, whereas L. trewavasae could be a slenderbodied, deeper-dwelling green growth scrubber that inclines toward the bottoms and sides of littler rocks. In spite of these differences in biology, the two species share a cosmopolitan distribution all through the lake, as well as varying male nuptial colors among populaces. Advance, while *L. fuelleborni* and *L. trewavasae* may be found at the same location, the guys of these species exceptionally seldom have similar nuptial colorations when found in sympatry. As with many other mbuna populaces, *Labeotropheus* populations are disconnected from each other by a combination of habitat discontinuities and behavioral components [7, 8].

The livers, muscles, and gills of these fish species were obtained for metal analysis after the frozen fish samples were allowed to defrost and were dissected. 1g of each of these body parts was dried, ground into a powder, and digested at 70˚C for 30 min with a 3:1 solution of strong nitric acid and hydrochloric acid while the mixture was left to sit on a water bath until a colour change was visible. The resultant solution was given time to cool before being filtered into a 50 mL flask and being filled with distilled water to the appropriate level. Using an atomic absorption spectrometer, the following metals, lead, cadmium, nickel, manganese, and zinc, were examined. The livers, muscles, and gills of these fish species were obtained for metal analysis after the frozen fish samples were allowed to defrost and were dissected. 1g of each of these body parts was dried, ground into a powder, and digested at 70˚C for 30 min with a 3:1 solution of strong nitric acid and hydrochloric acid while the mixture was left to sit on a water bath until a colour change was visible. The resultant solution was given time to cool before being filtered into a 50 mL flask and being filled with distilled water to the appropriate level. Using an atomic absorption spectrometer, the following metals, lead, cadmium, nickel, manganese, and zinc, were examined [9].

Each sample had a blank created allowing adjustments to be made in relation to the blank. The use of verified reference material ensured the accuracy of the analytical process (DORM-3). The results were translated to milligrammes per kilogramme of dried fish. All of the chemicals, including the HCl and H_2SO_4, were of analytical grade and had a 99.9% purity. Results were obtained for Cd, Ni, and Pb, Zn, and Mn with recovery percentages of 87.5 percent, 80.2 percent, 88.7 percent, 90.4 percent, and 86.8 percent, respectively [10].

Conflict of Interest

The authors declare no conflict of interest.

Acknowledgement

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