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AMINO ACID STUDY IN FISH SPECIE (MORMYROPS DELICIOSUS) FROM OTUOKPOTI, AMASSOMA, SWALI AND TOMBIA RIVER

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ABSTRACT

Amino acids and their metabolites are important regulators of key metabolic pathways that are necessary for maintenance, growth, feed intake, nutrient utilization, immunity, behavior as well as resistance to environmental stressor and pathogenic organisms in various fishes, and so fish in this context is an important and cheaper source of quality nutritive sources. The objective of this investigation was to determine the analysis of amino acid content in *Mormyrops deliciosus*. The amino acid composition was analyzed by Association of analytical chemist (AOAC) method and determined by gas chromatography. Results showed a significant difference in essential and non essential amino acids in *Mormyrops deliciosus* from four different rivers. It was revealed that *Mormyrops deliciosus* is a good source of essential amino acid.

Keywords: *Mormyrops deliciosus.* Gas chromatography. Amino acid. Essential amino acids.

1. INTRODUCTION

Amino acids are building block of protein and are important regulators of key metabolic pathways (Scot *et al*., 2006). They serve as a precursor for the synthesis of wide range biological important substances including neurotransmitters, nucleotides and peptide hormones (Lourenco *et al*., 2002).

All proteins found in the human body are built from a repertoire of twenty (20) amino acids. The first 20 amino acid to be discovered was asparagines in 1806 and the last of the twenty to be found is threonine which was not identified until 1938. They differ from each other in their side chains which vary in structure, size and electric charge and which influences the solubility of amino acid in water (Park, 2006); others are amino acids present in living organisms but not as constituents of proteins.

Amino acid play important role in cell signaling, act as regulators of gene expression, nutrient transport and metabolism in animals. Amino acids were traditionally classified as non essential (indispensable) and non essential amino acid (dispensable) (Trushenski *et al*., 2006). Essential amino acids are those acids that cannot be synthesized by the body and so must be required in our diet while non essential are synthesized in the body. By definition, all essential amino acids are adequately synthesized by aquatic animals (Wilson et al., 2002). Fishmeal is generally considered to be most ideal nutritive source for aquatic animals, despite its static global production, seasonal/geographical variability in quality and composition, and concern as a vector of contamination (Adeyeye, 2009).

This research was undertaken to generate information on the amino acid content in fish specie (*Mormyrops deliciosus*) from Otuokpoti, Amassoma, Swali and Tombia rivers, Bayelsa state, Nigeria.

2. MATERIALS AND METHODS

2.1 **Sample collection**

Freshly caught *Mormyrops deliciosus* was collected from Otuokpoti, Tombia, Swali, and Amassoma River and brought to the laboratory. The specie obtained from four different rivers was ready for amino acid profiling. The fish was cleaned, descaled, degutted, minced, crushed and stored until used.

2.2 **Sample analysis**

Modified Association of Analytical Chemists (AOAC) method 982.30, 2006 was followed in the extraction of the sample for the amino acid analysis. The dried and crushed sample was further dried to constant weight at room temperature. In this method 10.0g of sample was weighed into a 250ml conical flask. Fat content of the sample was extracted with soxhlet extractor equipped with thimble using 30ml of the petroleum spirit for extraction. The

sample was afterwards hydrolyzed three times for complete hydrolysis so as to achieve total of amino acid recovery. The crushed and defatted sample was soaked with 30ml of the 1M KOH and then incubated for 48hours at 11^0c in hermetically closed borosilicate glass container. After the alkaline hydrolysis, the hydrolysate was neutralized to a pH of 5.0. The solution was purified by cation exchange solid-phase extraction.

Ethylchloroformate was used for derivation of amino acids in purified solution. The derivastising reagent was removed by scavenging with nitrogen gas for proper mop up of the excess reagent. The amino acid was made up of 1ml in a vial for gas chromatography analysis. All data have been presented as mean ± standard deviation.

3. RESULTS AND DISCUSSION

Table 1: Amino acids values of *Mormyrops deliciosus* from Otuokpoti, Amassoma, Swali and Tombia Rivers in Bayelsa State.

Amino acids	Otuokpoti	Amassoma	Swali	Tombia
Glycine	5.89 ± 0.00^{d}	4.93 ± 0.00^{b}	5.10 ± 0.01^{c}	3.45 ± 0.01^{a}
Alanine	7.11 ± 0.01^{d}	5.29 ± 0.00^{b}	6.14 ± 0.02^{c}	3.44 ± 0.01^{a}
Serine	7.88 ± 0.01^{d}	5.29 ± 0.01^{a}	6.14 ± 0.02^{b}	6.25 ± 0.02^{c}
Proline	4.88 ± 0.01^{d}	3.93 ± 0.01^{c}	3.91 ± 0.01^{b}	3.32 ± 0.01^{a}
Valine	4.74 ± 0.01^{d}	3.06 ± 0.01^{c}	2.75 ± 0.01^{b}	2.62 ± 0.01^{a}
Threnonie	5.05 ± 0.01^{c}	4.89 ± 0.00^{b}	4.14 ± 0.02^{a}	4.16 ± 0.01^{a}
Isoleucine	5.53 ± 0.01^{d}	4.11 ± 0.01^{c}	3.21 ± 0.01^{a}	3.73 ± 0.01^{b}
Leucine	6.89 ± 0.00^{d}	5.22 ± 0.01^{c}	4.06 ± 0.01^{b}	3.82 ± 0.01^{a}
Aspartate	10.43 ± 0.01^{d}	6.34 ± 0.01^{a}	9.07 ± 0.01^{c}	8.51 ± 0.01^{b}
Lysine	10.02 ± 0.01^{d}	7.98 ± 0.01^{a}	9.43 ± 0.01^{c}	9.43 ± 0.01^{c}
Methionine	10.78 ± 0.01^{d}	8.36 ± 0.01^{a}	9.93 ± 0.02^{a}	8.54 ± 0.02^{b}
Glutamate	3.92 ± 0.01^{d}	2.36 ± 0.01^{c}	1.96 ± 0.01^{b}	1.76 ± 0.01^{a}
Phenylalanine	2.43 ± 0.01^{d}	1.44 ± 0.01^{b}	1.26 ± 0.01^{a}	1.53 ± 0.02^{c}
Histidine	8.47 ± 0.01^{d}	4.67 ± 0.01^{b}	3.45 ± 0.02^{a}	7.81 ± 0.01^{c}
Arginine	3.53 ± 0.01^{d}	2.08 ± 0.01^{a}	2.97 ± 0.02^{c}	2.34 ± 0.01^{b}
Tyrosine	8.47 ± 0.01^{d}	6.64 ± 0.01^{b}	4.88 ± 0.00^{a}	7.83 ± 0.01^{c}
Tryptophan	3.49 ± 0.01^{d}	2.35 ± 0.01^{b}	1.77 ± 0.01^{a}	2.41 ± 0.01^{c}
Cysteine	2.65 ± 0.01^{d}	1.31 ± 0.01^{c}	1.05 ± 0.01^{a}	1.14 ± 0.00^{b}

Mean with same superscript are statistically significant ($p<0.05$) at 100% confidence level

The mean ± SD of amino acid extract in *Mormyrops deliciosus* from Otuokpoti, Amassoma, Swali and Tombia rivers are reported above.

Amino acids (Glycine) indicates a significant difference ($P<0.05$). Alanine shows a significant difference ($P<0.05$). Serine indicate a significance difference ($P<0.05$) in the specie from all rivers when compared. Proline shows a significant difference ($p<0.05$); valine indicates a significant difference ($p<0.05$); threonine indicates a significant difference ($p<0.05$); isoleucine indicates a significant difference ($p<0.05$); leucine indicates a significant difference ($p<0.05$); aspartate indicates a significant difference ($p<0.05$); lysine indicates a significant difference ($p<0.05$); methionine indicates a significant difference ($p<0.05$); methionine indicates a significant difference ($p<0.05$); glutamate indicates a significant difference ($p<0.05$); phenyalanine indicates a significant difference ($p<0.05$); histidine indicates a significant difference ($p<0.05$); arginine indicates a significant difference ($p<0.05$); tyrosine indicates a significant difference ($p<0.05$); tryptophan indicates a significant difference ($p<0.05$); cysteine indicates a significant difference ($p<0.05$) in Amassoma, Swali and Tombia rivers when compared to amino acids from Otuokpoti river. The variation may be due to different diets in all rivers (Kim *et al*., 1992). These changes may be caused by oil spillage and environmental temperature in all rivers (Kim and Mendis, 2006).

From the table given, there was a significant difference ($P<0.05$) from the four different rivers in *M. delicious.* It was observed that variation changes in the four different rivers may be caused by the climatic change in the month of December in *M. deliciosus* reported by (Ayeloja *et al.,* 2013).

4. CONCLUSION

This study revealed the importance of *Mormyrops deliciosus* as a good nutritive source of essential amino acid. On the other hand the information will be useful to consumers in choosing fish based on their nutritional content rather than taste, appearance and other physical factors.

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