PJN
ISSN 1680-5194

PAKISTAN JOURNAL OF NUTRITION

ANSInet
308 Lasani Town, Sargodha Road, Faisalabad - Pakistan
Mob: +92 300 3008585, Fax: +92 41 8815544
E-mail: editorpjn@gmail.com

Pakistan Journal of Nutrition 11 (1): 14-15, 2012
ISSN 1680-5194

Chemical Analysis of Flesh and Some Body Parts of Different Fresh Fish in South West Nigeria

Olakunle Moses Makanjuola
Department of Food Technology, Federal Polytechnic, P.M.B. 50, Ilaro, Ogun State, Nigeria

Abstract: Fresh fish samples from major fish producing areas in South West, Nigeria were analyzed for their chemical composition in terms of their body parts and flesh. The three fresh fish samples; Mackerel, Croacker and Cat Fish were dissected into bone, flesh and skin parts under hygienic condition and analyzed for their proximate and mineral contents. Result obtained indicated that the bone and skin contrary to general believes contained higher distribution of nutrients like fat and protein as well as mineral content like calcium when compared to that of the flesh. The protein content was highly concentrated in the skin and least in the flesh. The skin contained 26.77%, 27.20% and 28.00% protein for cat, croacker and mackerel fish while the flesh contained 14.60%, 15.22% and 18.28% fish respectively. However, the mineral contents were uniformly distributed in the body parts except for calcium contents which are highly concentrated in the bone.

Key words: Mackerel, croacker, cat, proximate, bioelements

INTRODUCTION

Fish is a slippery, streamline aquatic animal that possesses fins and breath by the gills which is located on the head. Not all fish have the same shape. While some are elongated, some are shortened and at the same time, there are still some that are flattened.

The nutritional composition of fish depends largely on the feeding habit, locality, size, age and season. It is made up mainly of protein, carbohydrate, fat and oil, vitamins, minerals and water. Fish protein is regarded as the best protein. It also contains high moisture and owing to this, fish is readily susceptible to spoilage microorganism and this self destruction is due to the presence of enzyme in fish (Desrosier, 1977).

Fish and fish products provide as much as 17-63% protein intake of the large Nigerian populace (Abdulllahi, 2001). In the course of fish handling and processing by the fish mongers, the anatomical parts such as head, operculum, scales, fins, bones and gut tissue/viscera are usually discarded or processed into organic fertilizers or fish meals in animal feed formulations. A substantial amount of nutritional needs of human is lost to fish spoilage or the above process (Afolabi *et al*., 1984). Earlier, Abdullahi and Abolude (2000) reported the effect of season and geographical location on the nutrient status of some fresh water fish species.

There are two major classes of fish, which are fatty fish and the lean or white fish. The fatty fish are those that contains high amount of fats examples are mackerel (23.5%), sardine (18%), herring (22%) e.t.c. The lean fish or white fish are those with low amount of fat and these includes cod fish (0.99%), haddock (0.1-0.6%) e.t.c. Fish is a main source of protein in human diets. It's amount of protein being about the same as lean meat. This gives distinction between fish protein and meat protein. Fresh fish has a higher water content of about 80% and is being spoiled by bacteria. However, in dried fish, most of the spoilage is as a result of moulds and fungi (Ihekoronye and Ngoddy, 1998). This present aims at evaluating the chemical composition of flesh and some body parts of some fresh fish available in South West, Nigeria thereby increasing the usefulness of fish as a food commodity for man.

MATERIALS AND METHODS

Collection of sample: Fish producing areas were identified in Ogun State, namely; Abeokuta, Sango Ota and Ilaro. Fish samples were collected from these 3 different locations under refrigeration at 5°C and hygienic condition to maximize potential for sample contamination until required for analysis. The fresh fish samples were then dissected into different parts namely; bone, flesh and skin using sterilized knives and cutting board. Samples were washed under running tap water to remove blood stains.

Analysis: The moisture, ash, fat, protein and carbohydrate contents of the samples were determined using methods of AOAC (2000). Calcium, Potassium and Sodium were determined using Flame photometric method (Jenway Digital Flame Photometer: PFP7 model). Phosphorus was determined by Vanado-molybdate colorimetric method while other mineral elements such as iron, zinc, manganese, magnesium, iodine and copper were determined using Atomic Absorption Spectrophotometric method (BUCK 211 Model).

Table 1: Proximate composition of flesh and some body parts of fresh fish samples

	Cat fish			Croacker fish			Mackerel fish		
Components	Bone (%)	Flesh (%)	Skin (%)	Bone (%)	Flesh (%)	Skin (%)	Bone (%)	Flesh (%)	Skin (%)
Ash	4.74	1.54	0.66	4.70	1.71	0.69	4.78	2.79	0.70
Moisture	64.03	80.63	68.57	64.00	80.70	67.40	58.60	72.73	62.72
Protein	20.93	14.60	26.77	21.00	15.22	27.20	22.00	18.25	28.00
Fat	9.36	1.38	2.36	9.40	1.40	4.60	12.22	3.03	7.40
Carbohydrate	0.74	1.85	1.22	0.90	0.97	0.11	2.40	3.20	1.18

Table 2: Mineral composition of flesh and some body parts of fresh fish samples

	Cat fish			Croacker fish			Mackerel fish		
Minerals	Bone (%)	Flesh (%)	Skin (%)	Bone (%)	Flesh (%)	Skin (%)	Bone (%)	Flesh (%)	Skin (%)
Calcium	0.7	0.15	0.079	0.89	0.2	0.42	0.9	0.12	0.6
Phosphorus	2.54	0.16	0.02	2.9	0.18	0.09	3.01	1.11	0.09
Iron	0.0013	0.0053	0.0021	0.0015	0.0074	0.004	0.0025	0.0072	0.0043
Zinc	0.0058	0.0092	0.0037	0.005	0.0098	0.0036	0.006	0.0099	0.0058
Manganese	0.0006	0.0018	0.0009	0.0002	0.002	0.0009	0.0001	0.0005	0.0001
Magnesium	0.0013	0.0020	0.0018	0.0017	0.0035	0.001	0.002	0.0038	0.0017
Potassium	0.21	0.49	0.34	0.3	0.61	0.04	0.15	0.3	0.25
Sodium	0.18	0.37	0.23	0.29	0.42	0.22	0.12	0.2	0.06
Iodine	0.0040	0.0069	0.0053	0.0040	0.0071	0.0057	0.0046	0.0017	0.0060
Copper	0.0006	0.0018	0.0003	0.0009	0.0016	0.0005	0.0002	0.0010	0.0001

Note: Meter reading (MR) x slope x dilution factor will give the concentration in part per million (ppm or mg/kg)

$$\text{Therefore \% concentration} = \frac{\text{Meter reading (MR)} \times \text{Slope} \times \text{Dilution factor}}{10000}$$

For phosphorus:

$$\text{Phosphorus (\%)} = \frac{\text{Absorbance x Slope x Dilution faction}}{10000}$$

RESULTS AND DISCUSSION

The results of the chemical analyses (proximate and mineral composition) of flesh and some body parts of fresh fish samples are shown in Table 1 and 2 respectively.

Contrary to the general belief, the bone and skin contained higher distribution of proteins and fats as well as mineral content like calcium when compared to that of the flesh. The protein contents in the skins of cat, croacker and mackerel fish were 26.77%, 27.20% and 28.00% respectively while the flesh of the fish samples contained 14.60%, 15.22% and 18.28%. Fat contents were well distributed in bones of all the samples analyzed. 9.36%, 9.4% and 12.22% fat contents were contained in the bones of cat, croacker and mackerel fish while their flesh contained 1.38%, 1.40% and 3.03% respectively. The concentration of fats in the bone might be due to the presence of bone marrow. Ash content was higher in all the bones of the fish samples due to the presence of inorganic components. Ash content of 4.74%, 4.70% and 4.78% were obtained for cat, croacker and mackerel fish when compared with 0.66%, 0.69% and 0.70% obtained from the skin, indicating that the skin showed the least value. The moisture contents ranged between 58.60% and 80.70% for both body parts and flesh of all these samples. Fish generally are aquatic animals and their body composition comprises of about 75-80% water. The mineral contents were fairly distributed in both the flesh and body parts of all the samples except for calcium which are highly concentrated in the bones.

Conclusion: The results obtained from this work confirms that nutrients needed for body growth when different fishes are consumed are not only concentrated in the flesh alone, but also in other body parts like the bone and the skin. Hence, these body parts are recommended for consumption to fully obtain nutrients that are present in fish.

REFERENCES

Abdulllahi, S.A. and D.S. Abolude, 2000. Studies on the effect of season and geographical location on nutrient contents of two fish families. Nig. J. Exp. Appl. Biol., 1: 117-123.

Abdulllahi, S.A., 2001. Moisture, protein, energy contents and protein quality indices of three species of fish family Mormyriade. Nig. Food J., 19: 49-54.

Afolabi, O.A., A.O. Arawoma and I.O. Oke, 1984. Quality changes of Nigerian traditionally processed fresh-water fish species. Nutritive and organoleptic changes. J. Food Technol., 19: 333-340.

AOAC, 2000. Association of Official Analytical Chemists. Official Methods of Analysis 17th Edn., pp: 153-162.

Desrosier, N.W., 1977. Elements of Food Technology. Avi publishing Co. Ltd. Westpost; Connecticut. 2nd Edition:, 375-384.

Ihekoronye, I.A. and P.O. Ngoddy, 1998. Integrated Food Science and Technology for the Tropics. Macmillian ltd, London, pp: 338-342.