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Proximate Composition and Some Mineral Contents on Flesh of *Tetradon Fahaka* and *Synodotis Schell* Fish from River Nile

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ABSTRACT

Proximate composition (moisture, protein, fat, ash, fiber) and some minerals (iodine, zinc, and iron, copper) content in the flesh of two fish species, *Tetradon fahaka* and *Synodotis schell* were investigated. Statistical analysis using ANOVA showed significant differences in the values of the moisture and fat in the two fishes studied (P<0.05). In terms of percentages, moisture content was highest in *Synodotis schell* (72.1±0.3 %) and lowest in *Tetradon fahaka* (70.6±0.7 %). Fat content was found to be highest in *Tetradon fahaka* (2.1±0.8 %) and lowest in *Synodotis schell* (1.7±0.6 %), there were no significant differences in protein, ash and fiber content while minerals showed significant differences in the content of Iodine, Zinc and iron there was no significant differences in copper content. Iodine and iron were highest in *Synodotis schell* (0. 24 mg/kg) and (0.19mg/kg) respectively. While Zinc was highest in *Tetradon fahaka* (0. 3 ppm).

Keywords: *Tetradon fahaka*, *Synodotis schell*, Protein, Zinc

INTRODUCTION

Fish is stable diet, particularly in developing nations due to its high protein content and nutritional value of unsaturated fatty matter. It might only be available and affordable source of animal protein for slum housing in urban semi-urban areas. Fish is also widely accepted due to its high palatability, low cholesterol and tender flesh. However the feeding habit, sex, species, seasonal variation and other factors have a significant impact on the nutrient composition of specific fish species (Kefas, M., etal, 2014) [1].

Fishes are good sources of animal protein and other essential nutrients for body and health maintenance. Small indigenous fish species are a rich supply of minerals like calcium and phosphorus in addition to being a source of protein. (Amin *et al*., 2013) [2].

Essential nutrients are those chemical elements that are necessary for regular upkeep of humans. These elements (Zn, Fe, Cu, I) participate in several biochemical reactions; zinc is mostly found as a cofactor in enzyme reactions, iron forms part of the hemoglobin molecule which transport

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oxygen around the body. When the body is not adequately supplied with these nutrients primarily through nutrition an individual may develop diseases caused by mineral deficiency such as anemia, stunted growth and genetic problems. (Mogobe, O, *et al*, 2015) [3]. The human body requires nutrients to function properly and to stay healthy; these nutrients are obtained from foods. Water, protein, carbohydrates, fats, vitamins and minerals are some of the food nutrients. Fishes are known to provide protein, fat and vitamins which are of great benefit to human health. Fish protein is of high quality because it contains almost ideal proportion of essential amino acids. Fish protein is easily digestible, because it contains less collagen fiber than meat protein; allowing the body to make the most of its protein. Fish fats contain unsaturated fatty acids which are beneficial by lowering blood triglycerides. (Victoria, 2015) [4]. Proximate composition refers to the percentage composition of basic constituents within a fish body such as water, protein, lipids, carbohydrate and minerals. Traditionally, the chemical composition of the fish has been used to predict its nutritional value. (Moghaddam *et al*., 2007; Aberoumand, 2011) [5,6]. It varies greatly between species and also greatly influenced by the feeding habit, sex and seasonal variations (Islam *et al*., 2005) [7]. The study's objectives are to determine the proximate composition; (moisture, protein, fat, ash, fiber) and some mineral contents (iodine, iron, zinc, and copper) in *tetradon fahaka* and synodontis schell fish.

MATERIALS AND METHODS

Samples Collection and Preparation

Samples were collected from fishing landing site in Khartoum between February and March 2022. Two fish species (Synodontis schell) and (*Tetradon fahaka*) in different weight and length they were obtained fresh and transported to the laboratory and frozen (-180) until examination, which was, done within 24 hours. Sampling of flesh were taken from back area near the dorsal fin, Analysis of moisture, protein, fat, ash, fiber using standard methods according to the Association of Official Analytical Chemists AOAC 2005 (Ndome and Ogar, 2010) [8]. And minerals (iodine, iron, zinc and copper) were analyzed according to the Atomic Absorption Spectrometer (AAS). The data obtained were analyzed using ANOVA tests to determine the variability in the estimates of studied parameters.

RESULTS

In table 1, the study explicates that there is significant difference in moisture and fat content Which is 70.6±0.7 and 72.1±0.3 for moisture in *Tetradon fahaka* and *Synodotis schell* respectively.

Table 1: Explain proximate composition of *Tetradon fahaka* and *Synodotis schell* mean ±SD.

Fish species	Moisture%	protein%	Fat %	Ash%	Fiber%
Tetradon fahaka	70.6±0.7	22±0.3	2.1±0.8	4.9±0.7	0.42±0.1
Synodotis schell	72.1±0.3	22.7±0.6	1.7±0.6	4.8±0.6	0.44±0.9
Sig	*	NS	*	NS	NS

Sig: Significant difference, *: high significant difference, NS: Not significant

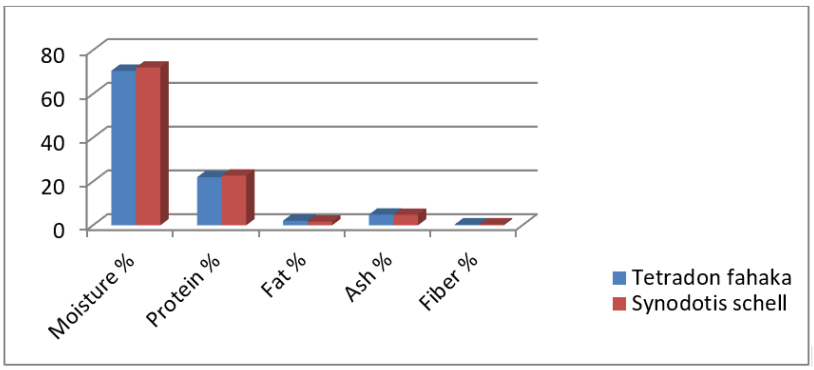

Figure 1: proximate composition of the fish *Tetradon fahaka* and *Synodotis schell*

In table 2, there is significant difference in iodine, zinc and iron between the two studied fish. on the other hand, there is no significant difference in copper content.

Table 2: Explain some mineral content (mg/kg) (Mean) in *Tetradon fahaka* and *Synodotis schell*

Fish species	Iodine	Zinc	Iron	Copper
Tetradon fahaka	0. 18	0. 3	0.16	0.02
Synodotis schell	0. 24	0. 2	0.19	0.02
Sig	*	*	*	NS

Sig: Significant difference, *: high significant difference, NS: Not significant

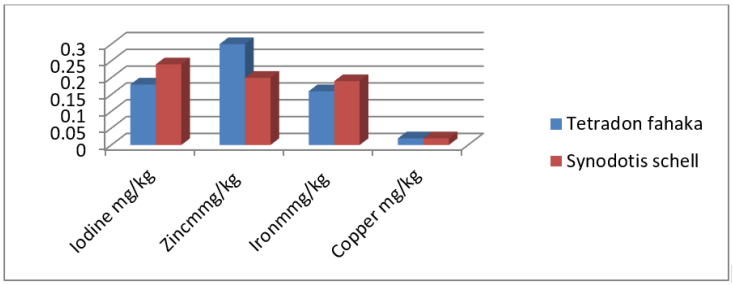

Figure 2: Some mineral content in fish *Tetradon fahaka* and *Synodotis schell*.

DISCUSSION

The nutritional profile is formed when the proximate components of the fish flesh combine to form a first indication of the fish's commercial standards that are required for good regulation (Marichamy *et al*., 2012) [9]. The study of moisture, protein, fat and ash contents of fish beneficial to the consumers, producers and scientists from a variety of perspectives. Besides recognizing the nutritional value of fish, thus a study also assists in comprehending its greater processing and preservation (Mridha *et al*., 2005) [10].

The results of the proximate composition expressed in g/100g edible portion, are presented in table 1 and figure 1, the moisture contents of the fish samples were 70.6±0.7% and 72.1±0.3 % for *Tetradon fahaka* and *Synodotis schell* respectively.

The values obtained in this study are higher than the values reported by (Boran and Karacam, 2011) [12] for shad (57 to 68%) and in the same range for horse mackerel (65 - 75%) from the Black Sea of Turkey. The protein contents of the fishes in this study are within the range of 22.00 to 22. 07 (g/100 g) (Table. 1 and Figure 2). These values indicate that they are high protein sources for consumers. These values are greater than values of other fishes. Palani *et al*. (2014) who's found that the protein content of fatty fishes that landed in the Thoothukudi Coast of India was 14% [13]. The high tissue protein content in the present study fish may result from the equally high protein content of their diets. Fish fat contains Omega-3 fatty acids which assist to lower the probability of evolving cardio-vascular illnesses in humans. Additionally, fish fat includes considerable amount of vitamins A and E and is one of the few natural sources of vitamin D. Fishes have fat content less than 5% are considered lean fish (Stansby, 1982; Ackman, 1989) [14]. In the present study the fish species had fat contents that lower than 5%, so they can be considered to be lean. The ash values found in this study are higher than the finding made by (Alfred, Ochkiya and Ndioma (1998) [15] who found (3.38) % ash content for *C. macrolepis*. Ash is known to be a significant nutrients source in fishes. The identified Ash content range stated that the investigated species are excellent minerals source (Hanna, 1985) [16]. Zinc serves a variety of functions in the body; it is a part of many metallo-enzymes, essential for gene expression and cellular metabolism. The FAO reported ranges of 0.23 - 2.1 mg/100 g and it's higher than the range for this research (0. 2 - 0.3mg/100 g) and Tao *et al*. (2012) [17] also obtained the same range of this study (0.64 - 0.81 mg/100 g) in cultured fish in China; French market fish gave a range of 0.13 - 2.5 mg/100 g (Guerin *et al*., 2011) [18]; some fish from Turkey gave a range of 0.57 - 1.3 mg/100 g (Alas *et al*., 2014) [19] B. Poechii record the highest Zinc content of 8.47 mg/100 g followed by B. Lateris (6.48 mg/100 g). These results are in agreement with results obtained by Kawarazuka and Bene (2011) [20], in studies carried out in Bangladesh and Cambodia which showed higher zinc concentration ranges for small Bangladesh fishes (1.1 - 4.0mg/100g). Iron is necessary for a variety of physiological roles in the body, and very beneficial for which is the transport of oxygen throughout the body. Iron deficiency result in anaemia, (Latham, 1997) [21].

The Fe concentration in Chanoga fish was 1.65 - 6.4 mg/100 g which is higher than the study finding. On the other side the results agree to some extent to the Study by Gokoglu *et al*. (2004) on fish from a French market recorded much lower concentration levels of iron (0.13 - 1.9 mg/100 g) [22]. According to the literature consulted for this paper, there is a significant regional variance in the amount of iron found in fish, Fish is typically the highest source of iodine in human diets, seaweed and iodized salt. Iodine concentration in various fish species has been the subject of numerous studies from various nations. There was significant variance in the iodine concentration of different fish species around the Norwegian coast, both between individuals of the same species and between fish species (Julshamn, 2001) [23]. Pakistan has also examined the iodine level in several freshwater and saltwater fish species and they found that freshwater fish had an iodine concentration that was 5 to 10 times higher than that of seawater. (Azmat, 2008) [24]. The accumulation of iodine in fish from various aquatic resources varies from species to species and also depends on the nature of the species, environmental factors or it may alter periodically, according to various data provided by researchers Larsen, 1997) [25]. In the present study, Cu values are in agreement with literature values and have not posed a threat to the health of humans.

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