Proximate Composition of *Malapterurus electricus* and *Gymnarchdae niloticus* Fish from Khartoum Fish Market

Haram Hassan Abbas Bakhiet*, Hamid IM, Ali RM, Abdulla M

Department of Fisheries and Wildlife Science College of Animal Production Science and Technology, Sudan University of Science and Technology P.O.BOX 204, Khartoum North, Sudan

ABSTRACT

Two fish species (*Malapterurus electricus* and *Gymnarchdae niloticus*) commomly accessible and consumed in Sudan were analyzed for proximate composition. The moisture, protein, fat and ash contents of the fishes were determined using the following method as described by the AOAC (2005). The average of moisture contents of the fishes varied from 67.6 to 70.5 (g/100g) for *Gymnarchdae niloticus* and *Malapterurus electricus* respectively. The protein contents of the fishes present the same order and ranged from 25.56 to 27, 60(g/100g). The two fish species were observed to have high fat content and thus could be defined as oily or fatty fishes. And had significant higher amounts of fat (6.6 and 6.05 g/100g for *Malapterurus electricus* and *Gymnarchdae niloticus* respectively) the mean values of the ash were 1.8 and 1.6 (g/100g) for *Malapterurus electricus* and *Gymnarchdae niloticus* respectively.

Keywords: Fat, Protein, *Malapterurus electricus*, *Gymnarchdae niloticus*.

INTRODUCTION

The human body requires nutrients to function properly and to maintain good health; such nutrients are obtained from foods. Food nutrients comprise water, carbohydrates, proteins, fats, vitamins and minerals amongst others. Many scientists have demonstrated that fish provide protein and fat that are beneficial to human health that including [1]. White meat demand is increasing all over the world as people become more aware of its great significance and nutritional value. White meat, particularly fish meat has received prominence in the human diet due to its flavor nutritional value and competitive price. Fish meat primarily consists of protein, vitamin, minerals, healthy fats and small amount carbohydrates making it a good and healthy diet that is easily digested by the human body [2]. The fisheries sector makes contributes significantly to human development and food and nutrition security around the world, providing vital nutrition to millions of people. Fish, as a rich food source for poor people can play a significant role in enhancing food security and nutritional status [3]. This research aimed to determine the proximate

*Corresponding Author

Haram Hassan Abbas Bakhiet

Department of Fisheries and Wildlife Science College of Animal Production Science and Technology, Sudan University of Science and Technology P.O.BOX 204, Khartoum North, Sudan

E-mail: haram_hassan@yahoo.com, Haram.hassan@sustch.edu

composition (Moisture, Dry matter, Ash, Protein and NFE) of the fish species *Malapterurus electricus* and *Gymnarchdae niloticus*.

MATERIALS AND METHODS

Fish samples with three replicates of *Malapterurus electricus* and *Gymnarchdae niloticus* with an average weight of 1000-1600g and length 52-61cm for *Gymnarchdae niloticus* and 500-700gm and 22-28cm in length for *Malapterurus electricus* were collected from the central fish market in Khartoum. Samples were transported in an insulated container under chilled condition prior to use. Then samples of fish muscle were taken from various body sites for proximate composition

analysis. Moisture content, crude protein, fat and ash were determined for wet samples according to standard methods of Association of Official Analytical Chemists [4].

Statistical analyses

The data were analyzed through analysis of variance by using software SPSS version 21. (ANOVA) test, the means were compared to see the differences.

RESULTS

Results of proximate composition of studied fish explicates that *Malapterurus electricus* fish has higher amount of moisture and protein whereas Gymnarchus niloticus has the higher values in dry matter.

Table 1. Shows the proximate composition of *Malapterurus electricus* and Gymnarchus niloticus fish (Mean±SD).

Studied fish species	Moisture	Dry matter	Ash	Protein	Fat
Malapterurus electricus	70.5 ± 0.5	29.5 ±0.5	1.8 ±0.4	27.60 ±07	6.6 ±0.6
Gymnarchus niloticus	67.6 ±0.9	33.03 ±0.9	1.6 ±0.2	25.56 ±0.2	6.05 ±0.3
Sig	**	**	NS	*	NS

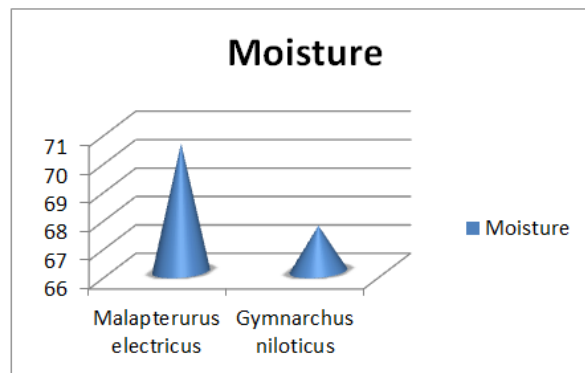Sig: Significant difference, *: high significant difference, NS: Not significant

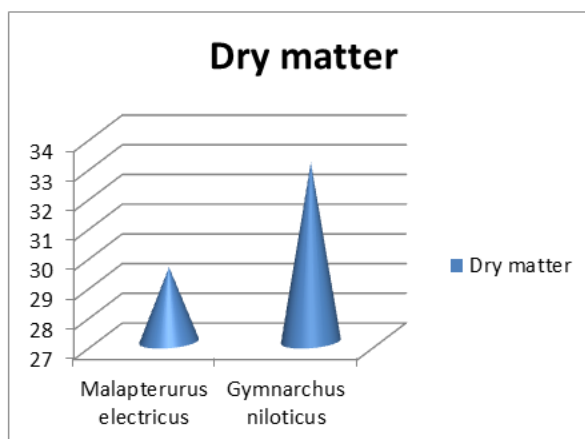**Figure 1.** Show moisture content in the studied fish species.

Figure 2. Shows dry matter in *Malapterurus electricus* and Gymnarchus niloticus.
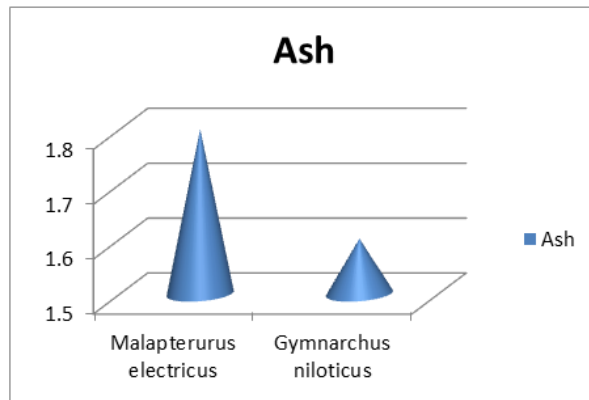
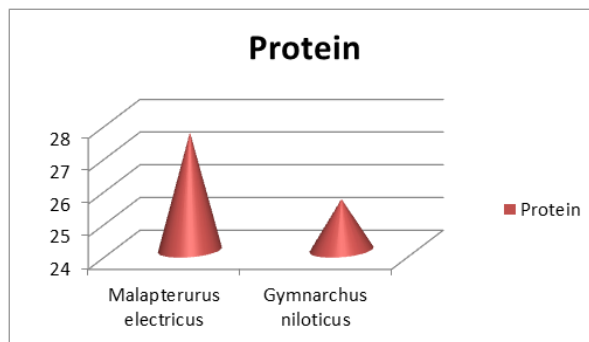**Figure 3.** Shows Ash in *Malapterurus electricus* and Gymnarchus niloticus.

Figure 4. Shows protein in *Malapterurus electricus* and Gymnarchus niloticus.
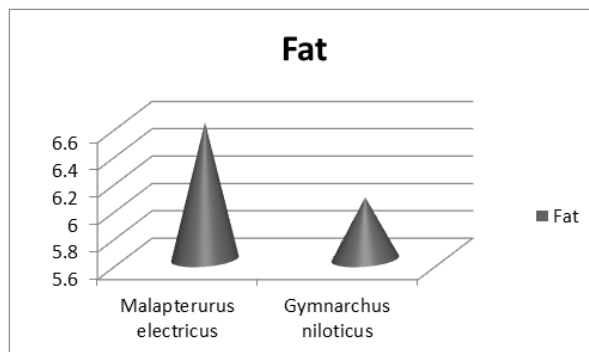

Figure 5. Shows Fat in *Malapterurus electricus* and Gymnarchus niloticus.

DISCUSSION

Fresh water fishes *Malapterurus electricus* and Gymnarchus niloticus are popular market fishes in rural and urban areas, and belong economically to the different traditional grades, according to consumer and fishermen preference in Sudan. The results of the proximate composition expressed in g/100g edible portion, are presented in table (1) and Figures 1, 2, 3, 4 and 5. The moisture contents of the fish samples are presented in Figure 1. The values obtained in this study are greater than the values reported by Boran and Karacam [5] for shad (57 to 68%) and in the same range for horse mackerel (65 - 75%) from the Black Sea of Turkey. Also moisture content was in the same range reported by Bakhiet et al. [6]. Protein is an essential functional and structural component of all living cells. According to the current findings fish is good source of animal protein and high protein diets should be consumed, all the fish species investigated belonged to a high-protein (25-27%) group. As a result, they are highly recommended as a good protein source. The values of protein obtained from this studied fish were higher than finding of Ryu B, et al. [7]. Who

found that the quantity of protein in fish muscle lies between (15% and 25%) and also grater that finding of Shekhar et al. [8] reported that the protein content in *C. catla* ranged from (18.4%)to(19.5%). Protein value in *S. richardsonii* and Tor was reported as (79.25%) and (74.75%), respectively, on a dry weight basis [9]. Fish species are generally grouped into four categories based to their fat contents: lean fish (<2%), low fat (2-4%), medium fat (4-8%) and high fat (>8%) [10]. Fat in the studied fish was lower than the fat contents in *C. carpio* (19.52%) and in *W. attu* (13.33%) Which were studied by Farhat J, et al. [11], the variations in fat levels in the fish tissues could have been caused by food [12]. Ash is a gauge of a foods minerals concentration, especially fish [12]. The values obtained for ash content in the present study are higher than the observation made by Alfred-Ochkiya and Ndioma [13] who recorded (3.38%) ash content for *C. macrolepis*. Ash is known to be a significant source of nutrients in fishes. The reported range of ash content indicated that the investigated species are a good source of minerals.

CONCLUSION

From the results of the study there were Significant difference in moisture ,dry matter and protein content of the studied fish species while there was no Significant difference in Ash and Fat content, The proximate composition of the two studied fish species indicated that they are very good nutritional value

REFERENCES

1. Job BE, Antai EE, Iniang-Etoh AP, Otogo GA, Ezekiel HS. (2015). Proximate Composition and Mineral Contents of Cultured and Wild Tilapia (Oreochromis niloticus) (Pisces: Cichlidae) (Linnaeus, 1758). Pakistan Journal of Nutrition. 14(4):195-200.

2. Marcu A, Nichita I, Nicula M, Marcu A, Kelciov B. (2010). Studies Regarding the Meat Quality of the specie Cyprinus carpio. Lucrări Stiinłifice Medicină Veterinara. XLIII:265-270.

3. Suganthi A, Venkatraman C, Chezhian Y. (2015). Proximate composition of different fish species collected from Muthupet mangroves. International Journal of Fisheries and Aquatic Studies. 2(6):420-423.

4. AOAC. (2005). Association of Official Analytical Chemistry (AOAC). Official Methods of Analysis, International, 18th edition. Horwitz, W, Latimer GW, (Eds). Gaithersburg, Maryland, USA.

5. Boran G, Karacam H. (2011). Seasonal Changes in Proximate Composition of Some Fish Species from the Black Sea. Turkish Journal of Fisheries Aquatic Sciences. 11(01):1-5.

6. Bakhiet HHA, Farah GFA. (2019). Proximate composition and Fillets yield of four fish species from River Nile State (Sudan). Journal of Agricultural Studies. 3:63-68.

7. Ryu B, Shin KH, Kim SK. (2021). Muscle protein hydrolysates and amino acid composition in fish. Marine Drugs. 19(7):377.

8. Shekhar C, Rao AP, Abidi AB. (2008). Season changes in flesh quality of freshwater fish Catla catla (Ham). Allahabad Farmer Journal. 63:1-6.

9. Kosygin L, Lilabati H, Viswanath W. (2001). Proximate composition of commercially important hill stream fishes of Manipur. Indian Journal of Fisheries. 48(1):111-114.

10. Ackman RG. (1989). Nutritional composition of fats in seafood's. Progress in Food and Nutrition Science. 13(3-4):161-289.

11. Jabeen F, Noureen A, Hussain SM, Chaudhry AS, Irfan M, Shakeel M, et al. (2015). Chemical and mineral composition of Cyprinus carpio, Labeo rohita and Wallago attu inhabiting river indus in Mianwali district. International Journal of Biosciences. 6(5):333-342.

12. Onyia LU, Milam C, Manu JM, Allison DS. (2010). Proximate and mineral composition in some freshwater fishes in Upper River BENUE, YOLA, NIGERIA. Continental Journal of Food Science and Technology. 4:1-6.

13. Omotosho OE, Oboh G, Iweala EEJ. (2011). Comparative effects of local coagulants on the nutritive value, invitro multi enzyme protein digestibility and sensory properties of Wara cheese. Int J Dairy Sci. 6(1):58-65.

14. Alfred-Ockiya JF, Ndioma FO. (1998). Biochemical Composition of Selected fin fishes. Alodl Journal of Pure and Applied Sciences. 4:199-202.