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PROXIMATE ANALYSIS OF SNAKEHEAD FISH, *Parachanna obscura*, Gunther 1861) OF THE CROSS RIVER, NIGERIA

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ABSTRACT

African snakehead, Parachanna obscura is being considered as an emerging aquaculture candidate in Nigeria. The species is very palatable and has a good fillet quality. Study was conducted on the proximate composition of the species from Cross River, Nigeria. Samples of snakehead were analyzed for protein, fat, moisture, crude fibre and ash contents. The protein content of the species ranged from 21.03-22.03 with mean value of 21.5%. The fat content ranged from 17.1-17.4% with a mean value of 17.2 %. Moisture content ranged from 51.1-52.0 % with a mean value of 51.7%. Ash and crude fibre contents were very low. The protein content of Parachanna obscura compares favourably with that of other members of the family channidae. The fat content is exceptionally high, making the species a good healing and recuperating agent for post-natal and post-operation patients. We strongly recommend the culture of Parachanna obscura in Nigeria and its meal for growing children.

INTRODUCTION

There is an increasing demand for fish production through aquaculture in Nigeria. One of the species being screened for aquaculture is African snakehead, *Parachanna obscura*. Snakeheads are of high commercial value because of the good taste and high quality flesh. They are valued for their medicinal properties when eaten and the flesh is claimed to be rejuvenating, particularly during recuperation from serious illness and as a post-natal diet (Mat Jais *et al* 1998). It is also recommended for post-operation patients. Snakeheads are considered to be more nutritive than Carp or Tilapias, in terms of a higher protein-to-fat ratio (Sharma and Simlot, 1971).

In the Cross River basin, *Parachanna obscura* is a highly valued food fish with a high commercial demand, hence it has great potentials for food security and income generation. Work done on the species so far include Victor and Akpocha (1992), on the biology of the species under a cultured condition; Bassey and Ajah (2010) worked on the effects of different feeding regimes on growth of the species under pond condition. Udo and Daniel (2006) worked on some aspects of the biology of the species in Enyong and found out that the species feed mainly on insects, fish and other invertebrates. Adebayo *et al* (2007) worked on the haematological profile of the species from some rivers in South west Nigeria. No report on the proximate composition of the fillet of snakehead. Such information is also needed to strengthen the quest for this species as a major source of protein and other nutritional requirements for healthy growth.

MATERIALS AND METHODS

Live samples of *Parachanna obscura* were caught from the Cross River at

Ayadehe Bridge Head, about 65km from Calabar along Calabar- Itu- Highway. This is the usual landing site for the species in the River system. The samples were transported live to the Analytical Laboratory of Biochemistry Department, University of Calabar, Calabar. The specimens were sacrificed with a sharp blow on the head using dissecting scissors. Weights and length of the specimens were taken using electronic balance and metre board to the nearest 0.1gm and 0.1 cm respectively.

Protein analysis:
Protein content was determined using the Kjeldahl method, AOAC 981.10 (AOAC, 1995). One gram of sample, one Kjeltec catalyst tablet and 10mL H_2S0_4 was put into Kjeldahl tube and digested for two hours at 420^o C. The product was then made basic with 30 per cent (w/v) NaOH before distillation into 0.1 M HCl and titration against 0.25 M NaOH. The factor used to convert nitrogen into crude protein was 6.25.

Moisture Content:
Moisture content was determined with a modified version of the AOAC 925.04 (AOAC,1995).Ten grams of sample was dried at 105 ^{o} C for 24 hours and the water content of the samples was gravimetrically determined.

Fat
Fat content was determined by using a Soxhlet extractor (Behrotest, Behr Labor Technik Gro bH, Dusseldorf, Germany). The water free sample was put into a pre-weight Soxhlet tube and petroleum ether was recycled through the sample for two hours. Remaining ether was evaporated and the sample was dried at 105^{o}C overnight. Fat content was then determined gravimetrically.

Ash content:
Ash content was analyzed using modified version of AOAC 938.08 (AOAC, 1995). The water and fat free sample was combusted at 500^{o}C for 12 hours and ash content was determined gravimetrically.

RESULTS
The result of the proximate analysis of *Parachanna obscura* is given in table 1. The protein content in snakehead seems to be inversely proportional to the size of the species with the biggest fish having the lowest protein value while the youngest fish of 25.0 cm had the highest value of 22.03%. The fat content is exceptionally high with an average of 17.3 %. Crude fibre was insignificant. The highest content as expected was moisture.

Table 1: The proximate composition of the fillet of *Parachanna obscura* from the Cross River (mg/100g dry matter)

S/N	Weight (g)	Length(cm)	Protein content	Fat	Moisture content	Ash	Crude Fibre
1	195	28	21.02±0.01	17.1±0.10	51.1±0.04	7.65±0.02	0.01±0.02
2	175	26	21.32±0.02	17.4±0.02	51.6±0.15	7.76±0.15	0.01±0.01
3	130	25	22.03±0.01	17.1±0.25	52±0.15	7.89±0.02	0.04±0.01

Table 2: A comparison of the proximate composition of *Parachanna obscura* with that of other fishes.

Species	Protein	Fat	Ash	moisture	Source
Salmo gairdneri	19.0	2.0	1.1	78	Kinsella *et al,* 1984)
Sarotherodon melanotheron	29.3	3.51	NA	NA	Baliu *et al*,2007
Channa striatus	23.0	11.9	1.8	NA	Zuraini, *et al* ,2006
Channa micropeltes	22.1	10.1	1.0	NA	,, ,,
Synodontis clarias	22.0	3.4	NA	NA	Baliu *et al*.2007
Snakehead murrel	18.6	0.4	1.3	80.4	Nurhasan, 2008
Parachanna obscura	21.5	17.3	7.76	51.1	This study

DISCUSSION

The protein content of *Parachanna obscura* is within the range found for other members of the family Channidae (*Channa striatus, Channa micropeltes* and snakehead murrel) Table 2. This lends credence to the reliability of this study. The high protein content of *Parachanna obscura* makes it a highly valued food fish and its aquaculture should be extensively explored to increase the protein intake of the populace in the face of rising cost of other sources of protein like meat and chicken. Indeed the protein content of the species is higher than that of the egg yolk reported by CFCD (2002) to be 15%.

A comparison of the proximate analysis of *Parachanna obscura* with that of other fishes shows that the species has a higher fat content than other fishes. Higher fat content seems a feature of the genus *Channa* since *Channa striatus* is reported to have a high fat content of up to 11.9 % (Zuraini *et al* 2006). It is the high content of lipids that makes *Channa striatus* very good healing agent for post-operation patients (Mat Jais *et al,* 1998). It follows therefore that *Parachanna obscura* with a higher fat content than *C. striatus* could still prove a better healing agent. Therefore a diet of *Parachanna obscura* is strongly recommended for post-natal and recuperating patients.

Ali, *et al* (2001) reported that protein content which is a vital constituent of living cells tends to vary relatively little in healthy fish unless drawn upon during particular demands of reproduction or during food deprivation periods. The health condition of the three specimens in this study is approximately 1.0 showing that they are under the same health condition. Thus the protein content only shows slight variation.

The apparent inverse relationship between the size of the species and protein content could imply that younger individuals of *Parachanna obscura* contain more protein than older ones. Bull (2009) working on the relationship between state of maturity and chemical composition, reported that immature whiting, *Gadus merlangus*, had higher protein content in their liver than the adults. Ama-Abasi and Akpan (2007) reported an inverse relationship between iron content and the size of *Sepia bertheloti* from the coastal waters of the Gulf of Guinea. That would mean that growing children should be fed with more of young *Parachanna*. However in view of the small sample size in this study further investigation on the relationship between size and protein content in *Parachanna* needs to be carried out with larger sample size.

The moisture content of *Parachanna* is lower than that of the other fishes shown in Table 2. In this case, it will take shorter time to smoke-dry the fish hence encouraging its preservation and added value for the marketability of the species.

CONCLUSION

Parachanna obscura is very rich in protein and fat content and promises to compete favourably with the current aquaculture species including *Heterobranchus longifilis, Clarias* species, *Tilapia, etc*. Indeed its high protein and fats contents make it a prized food fish whose culture should be encouraged.

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