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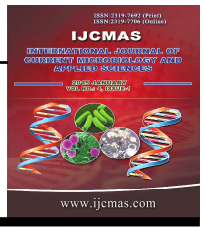

Original Research Article

Assessment of the nutritional value of wild and farmed *Clarias gariepinus*

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A B S T R A C T

Comparative analysis of the nutritional compositions of wild and farmed *Clarias gariepinus* species were carried out using standard methods. The wild species were sourced from Ndibe beach in Afikpo while, the farmed species were sourced from Ebonyi State University fish pond. The result of the proximate composition showed that both wild and farmed *Clarias gariepinus* contain adequate amount of protein, moisture, dry matter, lipids and fibre with a significant difference($p<0.05$) in dry matter ash and crude protein. Also, the results of the minerals and vitamins indicated that both farmed and wild *Clarias gariepinus* contain an appreciable amount of nitrogen, calcium, phosphorus, sodium, potassium, iron, zinc, selenium, copper for minerals, while Retinol, carotene, Riboflavin, vitamin C, Thiamin and Niacin are for vitamins, with a significant difference($p<0.05$) in only Zinc and Niacin. The presence of these chemical constituents showed that both farmed and wild *Clarias gariepinus* are good source of nutrients for human consumption.

Keywords

Clarias gariepinus, Nutrients, Chemical constituents, Wild and farmed

Introduction

Fishes are aquatic vertebrate animals, with streamlined muscular bodies and are "cold-blooded" [1, 2, 3 and 4]. Most fishes breathe using gills. Fish are abundant in most bodies of water and can be found in nearly all aquatic environments from high mountain streams to deepest ocean [5]. They can be divided into obligate and facultative air breathers. Obligate breathe air periodically or they suffocate, example African lung fish, while facultative breathe air if they need to, otherwise, they rely on their gills for oxygen; example cat fish [6, 7 and 8]. In respiration, most fish exchange gases using gills on either side of pharynx. Commercial and subsistence fishers hunt fish both in wild and farmed fisheries and in cages in the ocean. Fish as a good source of food have high nutritional value which improves human health [9]. Additionally, consumption of fish by humans has being recommended for its role in prevention of heart diseases [9 and 10]. Also, fish farming offers an alternative solution to the increasing demand for fish and its protein [11, 12 and 13]. This study was designed to

evaluate the nutritional contents of *Clarias gariepinus* farmed and wild fish.

Materials and Methods

Collection and Preparation of Samples

Fish samples of wild *Clarias gariepinus* were purchased from fishermen at Ndibe Beach Afikpo in Ebonyi State while farmed fish were purchased from the Department of Fisheries and Aqua culture fish pond in Ebonyi State University, Abakaliki. In the laboratory, all the bones and viscera were removed and discarded, other parts were oven dried at 105°C, cooled and blended into fine powder and stored in a plastic container prior to use. All the analysis were done at National Crop Research Centre Umudike, Abia State.

Proximate analysis:

The standard method of AOAC (1990) was used. This was used to determine the major components of food, which include moisture, lipids (fats), ash (mineral), protein, carbohydrate, fibre, dry matter and calorific values.

Measurement of selected minerals

Selected minerals: Calcium, Magnesium, Potassium, Sodium, Phosphorus, Nitrogen, Iron, Zinc, Selenium and Copper were determined using Atomic Absorption Spectrophotometer (AAS) based on Association of Official Analytical Chemist A.O.A.C., (2005).

Measurement of selected vitamins

Selected Vitamins: vitamin A, riboflavin, carotene, retinol, thiamin, and niacin were determined using atomic absorption spectrophotometer (AAS) based on association of official Analytical chemist A.O.A.C., (2005)

Results and Discussion

The results of proximate composition as presented in Table 1 showed that *Clarias gariepinus* have an appreciable level of calorific values and moisture content, dry matter and crude protein, crude fibre and lipids, ash contents in both wild and farmed samples. However, there was no significant difference between the wild and farmed species. This confirms *Clarias gariepinus* as a good source of these nutrients. The high percentage of protein shows that the wild and farmed *Clarias gariepinus* can be used as a sole source of protein. The mineral contents of *Clarias gariepinus* were also investigated in both wild and farmed samples. The result showed that Ca, Mg, K, Na, P, N, Fe Zn, Se and Cu were present in both samples. Iron was the most abundant mineral in *Clarias gariepinus* as shown in (Table 2). Nitrogen concentrations are necessary for digestion of food and growth; it also, plays an important role in pregnancy. The high value of calcium portrays that *Clarias gariepinus* plays a role in bone and strong teeth formation [12 , 14 and 15]. Lower sodium content of *Clarias gariepinus* might be an added advantage due to the direct relationship of sodium intake with hypertension on human [7]. The presence of Zinc in the samples could mean that *Clarias gariepinus* can play valuable roles in blood boosting and help in pregnancy for the normal growth of both fetus and mother [6]. The vitamin content of both wild and farmed *Clarias gariepinus* were also investigated, which showed appreciable levels of Vitamin A and Vitamin C. The presence of Vitamin A in both samples shows its potential in human health and its essential for vision, growth and reproduction [16]. The presence of vitamin C. in *Clarias gariepinus*, showed its ability in maintenance of normal connective tissue and for wound healing [16]. The Thiamin (B) concentration in the

samples showed its ability in energy metabolism and proper function of the nervous system [16].

The result of this study showed that *Clarias gariepinus* is a good source of vitamins and minerals**.**

Table.1 The proximate composition of wild and farmed *Clarias gariepinus*

Parameters	Wild (%)	Farmed (%)
Dry matter	24.35 ± 0.01[b]	27.95± 0.01 [a]
Moisture content	75.65 ± 0.01[a]	72.65 ± 0.01[b]
Ash	1.29 ± 1.15 [b]	1.05 ± 0.01 [a]
Crude protein	19.2 ± 0.01[b]	23.19 ± 0.01[a]
Lipid	1.34 ± 0.01 [a]	1.06 ± 0.01 [b]
Crude fibre	3.80 ± 0.01 [a]	4.94 ± 0.01 [b]
Calorific value	89.38 ± 0.01 [a]	102.18 ± 2.0 [b]
Carbohydrate	Not detected	Not detected

The result is presented as mean ± standard deviation of the triplicate determination of both wild and farmed *Clarias gariepinus*. Means of the same row with the same superscripts are not significantly different at 0.05% level.

Table.2 The mineral composition of wild and farmed *Clarias gariepinus*

Minerals	Wild(mg)	Farmed(mg)
Calcium	1.61 ± 0.01a	1.51 ± 0.01b
Magnesium	0.97 ± 0.01a	0.79 ± 0.01 b
Potassium	0.75 ± 0.00 a	0.68 ± 0.00 b
Sodium	0.45 ± 0.01a	0.25 ± 0.01b
Phosphorus	1.29 ± 0.01a	1.23 ± 0.01b
Nitrogen	3.08 ± 0.01b	3.71 ± 0.01a
Iron	13.58 ± 0.01a	13.55 ± 0.01b
Zinc	9.60 ± 0.01 b	11.67 ± 0.01a
Selenium	0.48 ± 0.00 a	0.38 ± 0.00 b
Copper	0.90 ± 0.01 a	0.08 ± 0.01b

The result is presented as mean ± standard deviation of triplicate determination of both wild and farmed *Clarias gariepinus*. Means of the same row having the same superscripts are not significantly different at 0.05% level.

Table.3 Selected vitamin composition of wild and farmed *Clarias gariepinus*

Vitamins	Wild (mg)	Farmed (mg)
Retinol	22. 05 ± 0.01b	30.07 ± 0.01a
Carotene	19.68 ± 0.02 b	30.20 ± 0.01a
Riboflavin	0.09 ± 0.00 b	0.15 ± 0.00 a
Vitamin C	12. 20 ± 0.01b	13.32 ± 0.01a
Thiamin	0.25 ± 0.01b	0.40 ± 0.01a
Niacin	0.05 ± 0.01a	0.02 ± 0.00 b

The result is presented as mean ± standard deviation of triplicate determination of both wild and farmed *Clarias gariepinus*. Means of the same row having the same superscripts are not significantly different at 0.05% level.

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