

# Studies Regarding the Meat Quality of the Specie Clarias Gariepinus

Adela Marcu<sup>1</sup>, Ileana Nichita<sup>2</sup>, Adrian Marcu<sup>3</sup>, Cornelia Vintilă<sup>1</sup>, Maria Nicula<sup>1</sup>, Dorel Dronca<sup>1</sup>, Cristian Roman<sup>4</sup>, Kelciov Bartolomeu<sup>3</sup>

<sup>1</sup>Faculty of Animal Sciences and Biotechnologies, 300645, Timisoara, C. Aradului, 119, Romania

<sup>2</sup>Faculty of Veterinary Medicine, 300645, Timisoara, C. Aradului, 119, Romania

<sup>3</sup>S.C.LuckyVet, 300222, Timisoara, Lorena, 98, Romania

<sup>4</sup>S.C.Nimb SRL, 307210, Giarmata, Romania

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## Abstract

The chemical composition of the meat is one of the most important characteristics. For the fish meat quality there are only few specific data comparatively with those that exist about animal meat. The results obtained from a study done on the meat quality of the fish specie *Clarias gariepinus* (African catfish) with a body weight of around 1200 – 1550g are presented in this paper. The obtained results emphasized a great quality of the *Clarias gariepinus* meat. The meat proteins content had a big value and it was indirectly proportional to the body weight. The meat hydration was higher in fishes with low body weight and indirectly proportional to the fat content. Taking in consideration the fat content of this meat, it can be concluded that the African catfish could be included in the half fat fish category. The meat calorificity calculated is growing proportionally to the body weight, being influenced by the fat content.

**Key words:** Caloric value, chemical composition, *Clarias gariepinus*.

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## 1. Introduction

In the last years all over the world even in Romania, the fish meat gained a very important place among the foods with animal origin due to its nutritive and taste qualities and the convenient price. Meat production with aquaculture origins had a quite big fluctuation in Romania in the last period during to the increase of import and the decline of internal production. [1] In the markets from our country there are a big number of imported fish species without information regarding its quality.

This reason was considered great opportunity to do some research regarding the meat quality of the fish specie *Clarias gariepinus* (African catfish). The African catfish is North African freshwater

specie of fish. It was introduced in numerous countries being considered an important source of food for humans. [2]

## 2. Materials and methods

The studied samples were represented by fish from the *Clarias gariepinus* specie that were bought from various markets.

The study was done on ten fishes with the body weight of between 1200-1550 grams.

The fillet muscles from each fish were used to determine, the chemical composition.

Because in our country there are not data in the specific literature regarding the quality meat of this specie, the caloric value was calculated.

The major, chemical components that were determined from the meat of this fish specie: the total proteins, the total lipids, the ash and the water content. The chemical components of the *Clarias gariepinus* meat was determined using

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\* Corresponding author: Adela Marcu,  
Tel:+40256277159, Fax +40256277110,  
Email:adelamarcu64@yahoo.com

the methods presented in the specific literature. [3,4]

The obtained results were statistically calculated and presented in percentage in tabular forms.

For the caloric value of this kind of meat the total protein and total lipid content was multiplied with the corresponding coefficients and the values were presented in calories. [5]

The proteins and lipids from the meat are liberated in oxidation reactions form in the human body the following quantities of calories:

1 gram of protein – 4.1 calories

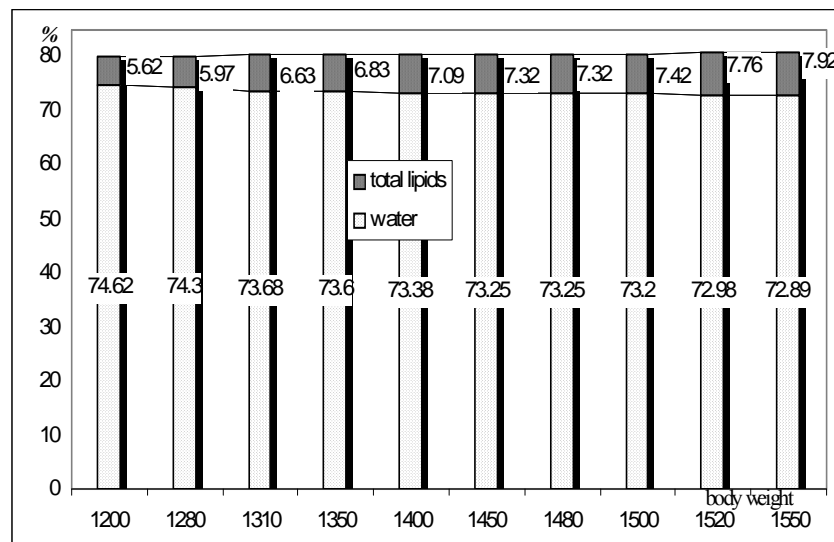
1 gram lipids - 9.3 calories

### 3. Results and discussions

The results obtained from the study of the chemical composition of the African catfish meat are presented in table 1.

**Table 1.** The chemical composition of the African catfish (*Clarias gariepinus*) meat depending on the body weight

Body weight (g)	Water (%)	Dry matter (%)	Total proteins (%)	Total lipids (%)	Ash (%)
1200	74.62	25.38	18.29	5.62	1.47
1280	74.30	25.70	18.25	5.97	1.48
1310	73.68	26.32	18.19	6.63	1.50
1350	73.60	26.40	18.12	6.83	1.45
1400	73.38	26.62	18.07	7.09	1.46
1450	73.25	26.75	17.98	7.32	1.45
1480	73.25	26.75	17.90	7.32	1.53
1500	73.20	26.80	17.88	7.42	1.50
1520	72.98	27.02	17.75	7.76	1.51
1550	72.89	27.11	17.66	7.92	1.53
x	<b>73.52</b>	<b>26.49</b>	<b>18.01</b>	<b>6.99</b>	<b>1.49</b>
Sx	<b>0.12</b>	<b>0.12</b>	<b>0.04</b>	<b>0.15</b>	<b>0.01</b>
s	<b>0.56</b>	<b>0.56</b>	<b>0.21</b>	<b>0.74</b>	<b>0.03</b>
V %	<b>0.76</b>	<b>2.11</b>	<b>1.18</b>	<b>10.61</b>	<b>2.05</b>



**Figure 1.** Water and total lipids content of African catfish (*Clarias gariepinus*) meat depending on the body weight

The analysis of the chemical composition of each of the ten African catfish examined concluded that the obtained results were situated

in the normal value for fish meat and the recorded differences were dependent on body weight.

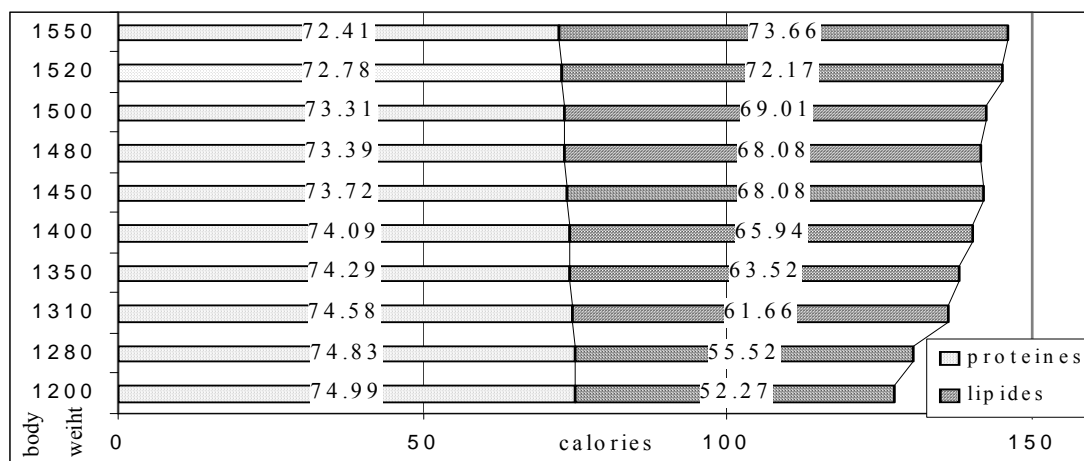
From the data presented in table 1 it results that the water content of the African catfish meat had an average value of around  $73.52\% \pm 0.12$  and the average value of the dry matter contents was  $26.49 \pm 0.12$ . From among the components of the dry matter, the total of proteins has the greatest value ( $x = 18.01 \pm 0.04$ ), followed by the total of lipids ( $x = 6.99 \pm 0.15$ ), and the ash ( $x = 1.49 \pm 0.01$ ), in comparison with other data presented in specific literature. [6,7,8]

The chemical composition of fish meat is very different dependent on specie, the breeding

conditions, and the biological and physiological aspects. For the fishes obtained in aquaculture these chemical composition differences are lower because in these systems the breeding factors are controlled. The chemical composition values of fish with body weight between around 1200 and 1300 grams presented in table 1 had big differences because the hydration of the meat is bigger. The dry matter is growing proportional to the body weight from 25.38 % to 27.11%, being influenced by the crowding of the lipid content in the fish.

**Table 2.** The caloric value of the African catfish (*Clarias gariepinus*) meat depending on the body weight

Body weight (g)	Total proteins (calories)	Total lipids (calories)	Total (calories)
1200	74.99	52.27	127.26
1280	74.84	55.52	130.36
1310	74.58	61.66	136.24
1350	74.29	63.52	137.81
1400	74.09	65.98	140.07
1450	73.72	68.08	141.80
1480	73.39	68.08	141.47
1500	73.31	69.01	142.32
1520	72.78	72.17	144.95
1550	72.41	73.66	146.07
<b>x</b>	<b>73.84</b>	<b>64.99</b>	<b>138.83</b>
<b>Sx</b>	<b>0.18</b>	<b>1.44</b>	<b>1.27</b>
<b>s</b>	<b>0.87</b>	<b>6.89</b>	<b>6.08</b>
<b>V %</b>	<b>1.18</b>	<b>10.61</b>	<b>4.38</b>



**Figure 2.** The caloric value of the African catfish (*Clarias gariepinus*) meat depending on the body weight

Between the fish meat lipid content and the proportion of water from the tissues there is a strong correlation and the rapport between these indicators depends on the age and the breeding state of the fish. (figure 1)

From the analysis of the lipid values of African catfish meat it was concluded that it could be included in the fish categories with a medium lipid content (4 – 8 %). [6]

The proteins, the most important element of the meat had big values  $x = 18.01 \pm 0.04$  and presented few variations depending on the body weight of the examined fish.

The calculated caloric value of the African catfish meat examined is presented in table 2 and figure 2.

The recorded differences are proportional to the body weight. These differences are due to the chemical composition. In the fish with a high body weight the total of lipids from the meat is increasing and the water content is decreasing. It must be emphasized that by burning one gram lipids results 9.3 calories and for one gram of proteins the calories quantities are half lower (4.1 calories from one gram protein).

#### 4. Conclusions

The chemical analysis of the African catfish meat emphasizes the big content of water and protein and a medium content of fat.

The total of lipids is growing proportionally to body weight and this influences positively the caloric value of the meat

The water content of the African catfish meat is in indirect correlation with the body weigh and in direct correlation with the lipid content.

#### References

1. Food and Agriculture Organization statistical database, 2008. Home page address: <http://faostat.fao.org>
2. Fishery and Aquaculture, 2007. Home page address: <http://faostat.fao.org>
3. Popescu, N., Popa, G., Stănescu, V., Determinări fizico-chimice de laborator pentru produsele de origine animală, Ed. Ceres, București, 1986, 28-86
4. Stas nr.5386, Pestele proaspăt, Colecție de standarde, București, 1986
5. Nedelescu, R., Abagiu, R., Nedelescu, N., Peștele și produsele din pește, Ed. Recon, București, 1974, 23-28
6. Rotaru, O., Mihaiu, M., Igiena veterinară a produselor alimentare, Vol. I, Inspekția cărnurilor, Ed. Risoprint, Cluj-Napoca, 2001, 155-168
7. Usturoi, M.G., Păsărin, B., Boișteanu, P., Fotea, L., Industrializarea peștelui, Ed. I.I. de la Brad, Iași, 2009, 8-18
8. Venugopal, R., Shahidi, F., Structure and composition of fish muscle, Food Rev. Int., 12 (2), 1996, 1775-1797