

## Proximate Composition of Head of Wild and Farmed *Catla catla*

Amana Nadeem<sup>a\*</sup>, Farhana Liaqat<sup>a</sup>, Bilal Hussain<sup>a</sup> and K. Iqbal<sup>b</sup>

<sup>a</sup>Department of Zoology, GC University, Faisalabad, Pakistan

<sup>b</sup>CEPS, PCSIR Laboratories Complex, Lahore - 54600, Pakistan

(received May 21, 2007; revised June 2, 2008; accepted June 8, 2008)

**Abstract.** In the study for finding out the proximate composition of head of wild and farmed *Catla catla*, the moisture contents were recorded as  $63.06 \pm 0.46\%$  and  $54.91 \pm 0.53\%$ , protein contents as  $14.77 \pm 0.37\%$  and  $19.92 \pm 0.44\%$ , lipids contents as  $7.56 \pm 0.46\%$  and  $11.90 \pm 0.25\%$ , ash contents as  $12.26 \pm 0.52\%$  and  $12.40 \pm 0.31\%$  and total nitrogen free extract as  $2.31 \pm 0.05\%$  and  $0.74 \pm 0.03\%$ , respectively. Thus farmed fish contained more lipid and protein contents as compared to that of wild fish.

**Keywords:** *Catla catla*, head composition, farmed fish

Aquaculture is a low energy expenditure and protein yielding in comparison to other agriculture sectors. Fish has long been recognized as high quality of food for human consumption.

Fish lipids have great nutritional significance owing to their protective role against the cardiovascular diseases as fish is rich in unsaturated fatty acids. Moreover, the lipids provide energy 9.3 cal/g twice than that of protein (McGraw Hill, 1977). Fish has attained great nutritional significance, in recent years, as the best source of proteins and healthy oils. Farmed *Labeo rohita* possesses higher nutritional as well as commercial value as compared to that of wild fish (Mahboob *et al.*, 2004).

During dressing of fish, head, fins, scales and skin are discarded which, with better management, can be put to better use with economic benefits (Choi and Regenstein, 2000). Fish skin and scales that are discarded as dressing losses are an important source of protein, lipids and minerals (Iqbal, 2002).

Fish collagen in general has more amino acid contents than mammalian collagen (Grossman and Bergman, 1992). Extraction of gelatin has been reported from cod (Gudmunsson and Hafsteinsson, 1997), Tilapia (Grossman and Bergman, 1992), shark skin, lung fish skin, carp skin (absent in the reference). Jamilah and Harvinder (2002) extracted gelatin from the skin of black and red Tilapia and determined the physiochemical characteristics. *Catla catla* (local common names: Taylee, Theila) is one of the major fresh water carps, native to the subcontinent Indo-Pak and neighboring countries of Bangladesh, Nepal and Myanmar. It is the 2<sup>nd</sup> most important species of the Rohu, consumed by the people, and an important contributor to the aquaculture production. According to (Choi and Regenstein, 2000) the discarded portions of fish

such as head, fins, skin, scales can be used for poultry feedings. Head is used as food in different parts of the world but mainly it is lost during dressing.

Present study is an effort towards determining the composition of the wild and farmed varieties of *Catla catla*. The study is based on 21 farmed and 21 wild *Catla catla* of three different weight categories, (450-800 g), (850-1200 g) and (1250-1600 g), procured from Fish Hatchery Satiana Road, Faisalabad and Head Trimu, respectively, which were transported live to Fisheries Research Laboratory, of GC University (Faisalabad Pakistan) for the analysis.

After washing and dissecting the selected heads were weighed on electrical balance. The samples were then minced and immediately oven dried ( $65-70\text{ }^{\circ}\text{C}$ ) for 24 h on less than 100 mg/Hg to determine moisture contents (loss in weight was calculated as moisture percentage). Total nitrogen was determined by the automatic analyzer made by Tecator of Sweden, based on Kjeldahl's method. Fat contents were determined by Soxhlet apparatus.

Fish head normally contains only traces of nitrogen free extract (carbohydrates) in the form of sugars, sugar phosphate and glycogen. Total carbohydrates (%) were estimated as nitrogen free extract by subtracting the total amount of proteins, lipids, ash and water.

Ash contents were calculated as percentage of the weight of the sample after ashing it at  $450\text{ }^{\circ}\text{C}$  for 12 h until while ash was obtained.

The results are summarised in Table 1. The moisture content in head of the wild *Catla catla* was recorded as  $63.06 \pm 0.46$  percent and in farmed fish, were as  $54.91 \pm 0.53$ . The wild variety had the highest moisture contents. Protein contents of wild and farmed *C. catla* were  $14.77 \pm 0.37\%$  and  $19.92 \pm 0.44\%$ ,

\*Author for correspondence; E-mail: amana\_jhang@yahoo.com

respectively. Statistical analysis showed that farmed *C. catla* gave the maximum protein contents. These results are in line with Srikanth *et al.* (1989) who reported that moisture contents were lowest and protein deposition, highest under the influence of fertilizer treatment in *Cyprinus carpio*. Decrease in protein contents with an increase in body weight are in agreement with the results of Al-Asgah (1992) who reported the crude protein contents had decreasing trend with the increase in weight and size of *Oreochromis niloticus*. Mahboob *et al.* (2004) also found higher protein content in the farmed *Labeo rohita* than that in the wild species.

**Table 1.** Proximate composition of the head of *C. catla*, wild and farmed varieties (%)

Parameter (Mean ± SE)	<i>Catla catla</i>	
	Wild fish	Farmed fish
Moisture	63.06±0.46	54.91±0.53
Protein	14.77±0.37	19.92±0.44
Lipids	7.56±0.46	11.90±0.25
Ash	12.26±0.52	12.40±0.31
Total nitrogen free extract	2.31±0.05	0.74±0.03

In the head of wild and farmed *C. catla*, lipids contents were measured as 7.56 ± 0.46% and 11.90 ± 0.25%, respectively. The marked difference in the protein and fat contents of wild fish seem to be due to scarcity of food and the resulting decreased growth. Fish showed progressive reduction in fat resources, yet before reaching a critical low level, proteins began to be utilized for energetic purposes and ultimately a reduction occurred in the protein contents with increased water contents. Hassan, 1996). The fish at first consume lipids from liver and starts to mobilize muscle proteins only when fat-derived-energy is nearly used up. After that, as protein is utilized, water moves in to take its place. Such a shift results in the increased water contents that are inversely correlated with protein and fat reserves of their meats (Shimma and Sato, 1985; Mahboob and Sheri, 1997).

Total ash contents in wild and farmed *C. catla* were 12.26 ± 0.52% and 12.40 ± 0.31%, respectively, with little difference between them. Total nitrogen free extract in head of wild and farmed *C. catla* were recorded as 2.31 ± 0.05% and 0.74 ±

0.03%, respectively, with maximum nitrogen free extract being recorded in head of the wild variety.

## References

- Al-Asgah, N.A. 1992. Variation in carcass composition of *Oreochromis niloticus* in relation to body weight and length. *Pak. J. Zool.* **24**: 47-51.
- Choi, S.S., Regenstein, J.M. 2000. Physicochemical and sensory characteristics of fish gelatin. *J. Food Sci.* **65**: 194-199.
- Grossman, S., Bergman, M. 1992. Process For The Production of Gelatin from Fish Skin. US Patent No. 5,093,474, 3<sup>rd</sup> March, 1992.
- Gudmundsson, M., Hafsteinsson, H. 1997. Gelatin from cod skin as affected by chemical treatments. *J. Food Sci.* **62**: 37-39, 47.
- Jamilah, B., Harvinder, K.G. 2002. Properties of gelatins from skins of fish black tilapia (*Oreochromis mossambicus*) and red tilapia (*Oreochromis nilotica*). *Food Chem.* **77**: 81-84.
- Hassan, M. 1996. Influence of Pond Fertilization with Broiler Droppings on the Growth Performance and Meat Quality of Major Carps. *Ph.D. Thesis*, pp. 1-195, GC University of Faisalabad, Pakistan.
- Iqbal, Z. 2002. Proximate Composition of Scales, Skin in Wild and Farmed *Catla catla* and *Labeo rohita*. *M.Sc. Thesis*, GC University of Faisalabad, Pakistan.
- McGraw Hill. 1977. *McGraw Hill Encyclopedia of Science and Technology*. 15<sup>th</sup> edition, 15 volume set, McGraw Hill Book Company Inc., New York, USA.
- Mahboob, S., Sheri, A.N. 1997. Relationship among ovary weight, liver weight and body weight in the grass carp *Ctenopharyngodon idella*. *J. Aqua. Trop.* **12**: 255-259.
- Mahboob, S., Liaquat, F., Liaquat, S., Hassan, M., Rafique, M. 2004. Proximate composition of meat and dressing losses of wild and farmed *Labeo rohita* (Rohu). *Pak. J. Zool.* **36**: 39-43.
- Shimma, H., Sato, R. 1985. Comparison of proximate composition among the five races of common carp, *Cyprinus carpio*. *Bull. Natl. Res. Inst. Aquacult.* **7**: 37-43.
- Srikanth, G.N., Nadeesha, M.C., Keshavanath, P., Varghese, T.J., Shetty, H.P.C., Basavaraja, N. 1989. On the applicability of mixed feeding schedule for common carp *Cyprinus carpio* Var. *Communis*. In: *Aquaculture in Asia*, E.A. Huisman, N. Zoonneveld and A.H. Boumans (eds.), pp. 254-261, Pudoc, Wageningen, The Netherlands.