Short Communication

Biochemical Composition of Koi (*Anabas testudineus*) Collected from Paddy Field of Mymensingh, Bangladesh

Mohajira Begum[a]* and Maruf Hossain Minar[b]

[a]Fish Technology Research Section, Institute of Food Science and Technology,
Bangladesh Council of Scientific and Industrial Research, Dhanmondi, Bangladesh
[b]Department of Fisheries Biology and Genetics, Bangladesh Agricultural University,
Mymensingh-2202, Bangladesh

Abstract. An experiment was undertaken to analyse proximate composition of Koi (*Anabas testudineus*), collected from a rice field from Mymensingh, Bangladesh. Fishes were grown as a second crop along with rice. Moisture, protein, lipid and ash percentage (%) were evaluated as 70.07±1.10, 16.97±0.82, 13.01±0.47, 0.95±12, respectively, in wet basis. When compared to previous reports, a lot of variation was observed in the case of lipid.

Keywords: proximate composition, *Anabas testudineus*, paddy field, lipid

The gross content of important chemical parameters (moisture, protein, lipid and ash) represents the proximate composition of fish. The fish body contains moisture (66-81%), protein (16-21%), fat (0.2-25%), mineral (1.2-1.5%) and carbohydrate (0-0.5%) in a wide range (Minar *et al*., 2012) but they may be influenced by food, space, temperature, salinity, physical activity etc., (Begum *et al*., 2012). Waterlogged paddy field can be used as habitat for small indigenous species (Ahmed *et al*., 2012). Dugan *et al*. (2006); Gurung and Wagle (2005) and Halwart and Gupta (2000), have studied different aspects of rice cum fish farming, its diversification, intensification, productivity, profitability and sustainability.

Studies regarding proximate composition of fish collected from local water are available (Mazumder *et al*., 2008; Naser *et al*., 2007), but reports of investigation on nutritional composition of freshwater species that are cultured in paddy field is still fragmentary. Therefore, in view of these facts, present study was designed to conduct the proximate composition of Koi (*Anabas testudineus*) collected from the paddy field of Mymensingh area, Bangladesh to find, whether it will be helpful to fulfill the nutrient demand of human.

Samples were collected from various paddy fields of Trishal, Mymensingh (Fig. 1) during August to November, 2012. The fishes were taken to the Fish Technology Research Section, Institute of Food Science and Technology, Bangladesh Council of Scientific and Industrial Research, Dhaka, for conducting experiment. Total

*Author for correspondence; E-mail: mohajira10@yahoo.com

30 fishes were used in this study. The size was ranged from 5.3-7.3 inch and weight was ranged from 50-90 g. Moisture and ash contents of the fish were determined by AOAC method (1990). The crude protein was conducted by Micro- Kjeldhal method (Pearson, 1999).
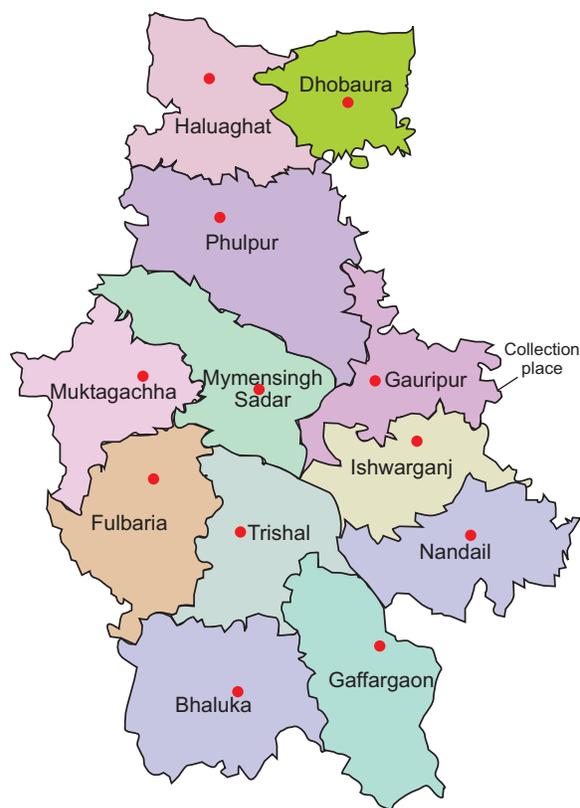
Fig. 1. Study area.

Fat content was determined by Bligh and Dryer method (1959). The data were analysed by using SPSS 11.5 and Microsoft Office Excel 2007.

Calculation of moisture:

$$\text{Moisture (\%)} = \frac{\text{weight loss}}{\text{original weight of the sample taken}} \times 100$$

Calculation of protein:

N_2 (%) = (titration reading-blank reading) × strength of acid × 100/5 × 100/weight of the sample.

For most routine purpose the % of protein in the sample is the calculated by multiplying the % of N_2 with an empirical factor 6.25 for the fish:

$$\text{Protein (\%)} = \text{\% of total } N_2 \times 6.25$$

Calculation of lipid:

$$\text{Fat (\%)} = \frac{\text{weight of the residue}}{\text{weight of the sample taken}} \times 100$$

Calculation of ash:

$$\text{Ash (\%)} = \frac{\text{weight of dry samples}}{\text{original weight of the sample taken}} \times 100$$

The result of the estimated parameters are given in Table 1. Variation of moisture, protein, lipid and ash content in the experimental fishes are shown in Fig. 2.

Moisture content. Moisture (%) levels (Table 1 and Fig. 2) in the analysed samples were ranged from 69.09 to 71.90 are similar to the findings of Kamal *et al.* (2007). Nargis (2006) found that the moisture content of Koi was 79.11±0.65% in males and 78.99% in females throughout the year. The dissimilarity of result may be due to time period i.e., previous study was conducted throughout the year but present study was conducted only for a short period. Another reason might be the collection place as the fish samples were collected from the paddy field directly. Besides the percentage may also vary according to size, sex and season of the year (Minar *et al.*, 2012).

Protein content. The estimated protein content (Table 1 and Fig. 2) was 16.97±0.82 (%), which is similar to the findings of CSRI (1962). It showed variation from the findings of Kamal *et al.* (2007) collected from Mouri river, Khulna. Nargis (2006) found that protein content was 10.24 ± 0.79% for males and 11.07 ± 0.31% for females. In both sexes the maximum values were obtained in January where the fish sample was collected from Rajshahi. This difference may be due to availability of different food found in the paddy field. Besides the

Table 1. Estimated percentage of the tested parameter (wet basis)

S. No.	Moisture	Protein	Lipid	Ash
		(%)		
1	69.09	17.18	13.05	0.72
2	71.90	16.85	12.75	1.09
3	68.09	18.85	13.39	0.90
4	70.45	17.46	12.80	0.97
5	69.90	16.25	13.13	1.09
6	71.00	16.20	12.90	0.98
7	69.46	17.30	13.65	0.80
8	70.07	17.05	12.01	1.03
9	71.11	16.23	13.57	0.94
10	69.65	16.35	12.89	1.02
Mean±SD	70.07±1.10	16.97±0.82	13.01±0.47	0.95±12
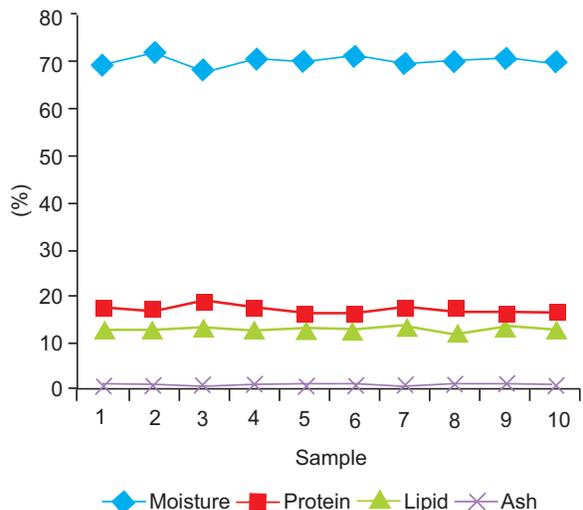
Fig. 2. Variation of moisture, protein, lipid and ash content in the experimental fishes.

value is close to the protein content (%) for *G. chapra, C. soborna, A. punctata, C. psendeutropius atherinoides, P. sarana,* (16.78, 17.31, 18.17, 16.69, and 16.73 respectively) (Begum and Minar, 2012).

Lipid content. The percentage of lipid obtained (Table 1 and Fig. 2) from the study is 13.01 ± 0.47 which was very much higher than the findings of Kamal *et al.* (2007), who found that the lipid contents of muscle of seven freshwater fishes from the River Mouri, Khulna, Bangladesh, was ranging between 3.45 and 7.90%. This result is very much different from present results. Besides, Hossain *et al.* (1999) reported the lipid contents

of some selected muscle of SIS (Kachki, mola etc.) fishes from Mymensingh District, Bangladesh ranging between 1.87 and 9.55%. This is an indication that, the fishes have probably been exposed to intense feeding with minimum activities in the paddy field (Ahmed *et al*., 2012). Another reason might be due to the larger size of the *A. testudineus* (Nargis, 2006).

Ash content. Normally ash may be defined as the residue that lacks water and volatile constituents containing carbon dioxide, oxides of nitrogen. In the present study, ash level (Table 1 and Fig. 2) in analysed samples was 0.95±12, whereas, Nargis (2006) found that ash content was found to vary from 1.32 to 2.15% with an average of 1.72±0.07% for males and 1.45 to 2.21% for females (1.78 ± 0.06%) *A. testudineus*. But Chowdhury (1981) found the values of ash very high, it may be due to habitat, season, sex and size. The main cause of change is due to amount and quality of food it eats along with its movement (Minar *et al*., 2012).

Result obtained from the present study may be useful in developing a nutritious, cost effective production of Koi fish alongwith the rice.

References

Ahmed, S., Rahman, A.F.M.A., Mustafa, M.G., Hossain, M.B., Nahar, N. 2012. Nutrient composition of indigenous and exotic fishes of rainfed waterlogged paddy fields in Lakshmipur, Bangladesh. *World Journal of Zoology*, **7:** 135-140.

AOAC, 1990. *Official Methods of Analysis of the Association of Official Agricultural Chemist*, K. Helritz (ed.), vol. **2,** pp. 685-1298, 15th edition, Association of Official Analytical Chemists, Arlington, Virginia, USA.

Begum, M., Minar, M.H. 2012. Comparative study about body composition of different sis, shell fish and ilish; commonly available in Bangladesh. *Trends in Fisheries Research*, **1:** 38-42.

Begum, M., Akhter, T., Minar, M.H. 2012. Analysis of the proximate composition of domesticated pangus (*Pangasius hypophthalamus*) in laboratory condition. *Journal of Environmental Science and Natural Resources*, **5:** 69-74.

Bligh, E.G., Dyer, W. 1959. Total lipid extraction and purification. *Canadian Journal of Biochemistry and Physiology*, **37:** 99-110.

Chowdhury, M.F. 1981. A Study on the Chemical Composition and Nutritive Quality of Some Freshwater Zeolfishes of Bangladesh. *M.Sc Thesis*, Bangladesh Agricultural University, Mymensingh, Bangladesh.

Dugan, P., Dey, M., Sugunan, V.V. 2006. Fisheries and water productivity in tropical river basins: enhancing food security and livelihoods by managing water for fish. *Agricultural Water Management*, **80:** 262-275.

Gurung, T.B., Wagle, S.K. 2005. Revisiting underlying ecological principles of rice-fish integrated farming for environmental, economical and social benefits. *Our Nature*, **3:** 1-12.

Halwart, M., Gupta, M.V. 2004. *Culture of Fish in Rice Fields*, 83 pp., FAO and the World Fish Center, Malaysia.

Hossain, M.A., Fsana, K.A., Azad, S.A.K.M. 1999. Nutritional value of some small indigenous fish species (SIS) of Bangladesh. *Bangladesh Journal of Fish*, **3:** 77-85.

Kamal, D., Khan, A.N., Rahman, M.A., Ahamed, F. 2007. Biochemical composition of some small indigenous fresh water fishes from the river mouri, Khulna, Bangladesh. *Pakistan Journal of Biological Sciences*, **10:** 1559-1561.

Mazumder, M.S.A., Rahman, M.M., Ahmed, A.T.A., Begum, M., Hossain, M.A. 2008. Proximate composition of some small indigenous fish species (SIS) in Bangladesh. *International Journal of Sustainable Crop Production*, **3:** 18-23.

Minar, M.H., Adhikary, R.K., Begum, M., Islam, M.R., Akter, T. 2012. Proximate composition of hilsa (*Tenualosa ilisha*) in laboratory condition. *Bangladesh Journal of Progressive Science and Technology*, **10:** 57-60.

Naser, M.N., Chowdhury, G.W., Begum, M.M., Haque, W. 2007. Proximate composition of prawn, *Macrobrachium rosenbergii* and shrimp, *Penaeus monodon*. *Dhaka University Journal of Biological Sciences*, **16:** 61-66.

Nargis, A. 2006. Seasonal variation in the chemical composition of body flesh of Koi fish *Anabas testudineus* (Bloch) (Anabantidae: Perciformes). *Bangladesh Journal of Scientific and Industrial Research*, **41:** 219-226.

Pearson, D. 1999. *Pearson's Composition and Analysis of Foods*, University of Reading, Reading, UK.