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The proximate composition of the muscle of a fresh water air breathing Cat fish, *Clarias batrachus* (Linn) during summer & winter months

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ABSTRACT

The proximate composition of the muscle of *Clarias batrachus* (Linn) during summer & winter months showed that the moisture, ash content, total protein, glycogen & fat content were slight more during winter than the summer months but the differences were not found statistically significant, whereas, non protein nitrogen & total volatile base nitrogen were significantly more ($P<0.05$) during summer than the winter seasons while α-amino nitrogen content was significantly more ($P<0.01$) in winter than summer months.

Key Words - *Clarias batrachus*, moisture, ash content, total protein, glycogen, fat content

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INTRODUCTION

From the nutritional point of view, most of the foods are incomplete & unbalanced. The deficiency of certain elements in food may cause certain diseases, while protein plays an important & significant role in nutrition, besides providing energy & structural materials for growth. As fish has very good number of protein & amino acids, its use in diet alone is capable to combat malnutrition especially in developing countries like India. It contains high quality protein comparable to any animal protein & rich in lysine which helps in regeneration of blood hemoglobin and also a good source of nicotinic acid, minerals, vitamins & iodine. The proteins are involved in muscular contraction during post mortem changes. It is better than plant proteins as protein efficiency ratio i.e., PR for Eggs, Fish, Cow milk & beef are 3.9, 3.5, 3.1 & 3.0 whereas, plant proteins, soyabean, rice & wheat are 2.3, 2.0 & 1.5 respectively. (Damodaran, 1966). The chemical composition of fish varies from species to species and individual to individual depended on sex, age, season, health & environments in which they live (Joseph *et al*., 1988; Kumar, 2002; Faruk, 2018 & Kumar *et al.,* 2020). Gopalan *et al.* (1980) have observed that carps contained higher protein than Cat fish. Considering the above facts, the present study has been done to evaluate the proximate composition of the muscle of a fresh water air breathing fish, *Clarias batrachus* (Linn) during summer and winter months.

MATERIALS & METHODS

Sufficient number of living & healthy fish, *Clarias batrachus* (Clariidae:Siluroide) of 136.5 ± 15.6 and 144.8 ± 13.4gm weight groups were collected from local fish farm during summer (April-June) & winter (Dec.-Feb.) months respectively. The fish is locally known as “Magur” and is in high demand due to nutritional value. The fish were carried in large bucket in living condition, where those were killed with a blow on hand & in immediately placed in ice boxes. The fish were carried in alternate days. In the laboratory, the fish were washed in 0.2% Aq. Potassium permanganate solution for 15 minutes

followed by 2-3 wash with ground water. For the proximate composition, the antero dorsal portions of the muscle of the fish were taken. The moisture fat total protein & non protein nitrogen in the muscle were determined by the methods of AOAC (2000), α-amino nitrogen content was estimated by the method of Pope & Stevens (1939), total volatile base nitrogen by the micro diffusion method of Conway (1947) & other parameters in ash content, glycogen & free fatty acid were determined following the methods described in Natelson (1971) & A.P.H.A (1990).

RESULTS

The proximate composition of the muscle of *Clarias batrachus* without considering the sex of the fish during summer & winter months has been recorded as follows:

The moisture content (in%) of the fish weighing 136.5 ± 15.6gm has been recorded to be 77.64 ± 0.27% during summer and 77.8 ± 29% in winter in the fish weighing 144.8 ± 13.4gm. Neither the weight of the fish nor the moisture contents were found statistically significant in both seasons.

The ash content during summer & winter have been recorded to be 1.22 ± 0.05 & 1.30 ± 0.04% respectively & the difference between two were not found statistically significant.

The total protein contents were recorded to be 19.08 ± 0.13 & 19.16 ± 0.11% during summer & winter respectively & the differences was not found statistically significant.

The glycogen contents were recorded to be 1.10 ± 0.03 & 1.14 ± 0.05% during summer & winter seasons respectively which was also not statistically significant.

The fat (Total lipid) contents have been recorded to be 0.42 ± 0.02 & 0.50 ± 0.04% during summer and winter season respectively. Though, it was slightly higher during winter than summer, but it was not found statistically significant.

The free fatty acid (% Oelic acid). The free fatty acid contents were recorded to be 3.70 ± 0.21 & 3.38 ± 0.18% during summer & winter seasons respectively. It was slightly but insignificantly higher during winter than summer seasons.

The non- protein nitrogen contents were recorded to be 222 ± 13 mg/l00gm during summer and 154 ± 10 mg/100gm during winter. It has been recorded significantly more ($P<0.05$) during summer than the winter seasons.

The α-amino nitrogen contents were recorded 28.95 ± 1.07 & 42.20 ± 1.05 mg/100gm during summer and winter seasons. It was recorded significantly more ($P<0.01$) during winter than summer season.

The total volatile base nitrogen content during summer & winter were recorded to be 18.10 ± 1.11 and 13.96 ± 0.91 mg/100gm respectively. It was recorded significantly more ($P<0.05$) during summer than the winter season.

DISCUSSION

The proximate composition of the muscles of Indian marine & fresh water fishes has been studied by several works. Joseph *et al*. (1988) in *Labeo rohita* have reported 76.45, 20.95, 0.62 & 0.95% moisture, protein fat ash contents respectively. Kumar (2002) in the same fish species has reported 77.10 ± 0.43% & 76.84 ± 0.39% moisture, 18.97 ± 0.12 & 19.14 ± 0.14% protein, 0.97 ± 0.05 & 1.06 ± 0.09% glycogen, 0.56 ± 0.02 & 0.60 ± 0.03% fat and 0.89 ± 0.07 & 0.92 ± 0.08%, ash contents during summer and winter seasons respectively in lower weight groups of fish and in higher weight groups these were 76.84 ± 0.38 & 76.05 ± 0.29% moisture, 19.87 ± 0.10 & 22.60 ± 0.17% protein; 0.99 ± 0.07 & 1.11 ± 0.10% glycogen; 0.59 ± 0.03 & 0.75 ± 0.04% fat and 0.91 ± 0.08 & 0.96 ± 0.06% ash contents during summer & winter seasons. He also found significantly higher value ($P<0.01$) of protein in both weight groups during winter than summer. While fat content was significantly ($P<0.05$) more during winter than summer seasons only in higher weight groups. Binsi *et al*. (2015) in *Ompok pabda* reported. 79.54%, 18.69%, 2.67 %, 0.32%, 0.83% & 7.18% moisture, Protein, fat, free fatty acid, ash & TNBN contents respectively. Faruk (2018) in *Cyprinus Carpio* observed 52.28 ± 0.23% moisture, 6.47 ±

0.04% protein, 12.27 ± 0.04% fat & 1.51 ± 0.02% ash contentes. Kumar *et al.* (2020) in *Channa stiatus* have recorded 77.00 ± 0.32, 77.38 ± 0.30 & 78.10 ± 0.27%, moisture; 1.46 ± 0.07, 1.24 ± 0.04 & 1.06 ± 0.05% ash; 19.45 ± 0.16, 19.30 ± 0.11 & 18.62 ± 0.14% protein; 1.12 ± 0.05, 1.04 ± 0.03 & 1.07 ± 0.04% glycogen; 0.60 ± 0.02, 0.54 ± 0.03 & 0.63 ± 0.02% fat; 3.45 ± 0.07, 3.96 ± 0.30 & 3.60 ± 0.25% free fatty acid; 41.74 ± 1.44, 48.90 ± 1.54 & 45.44 ± 1.61% Soluble salt nitrogen, 145 ± 12, 203 ± 14 & 191 ± 12mg/100gm non protein nitrogen; 42.92 ± 1.63, 29.76 ± 1.14 & 34.14 ± 1.46 mg/100gm. α-amino nitrogen and 8.46 ± 0.30, 10.24 ± 0.32 & 9.68 ± 0.27 mg/100gm total volatile base nitrogen during winter, summer & monsoon season respectively.

In the present study, 77.64 ± 0.27 & 77.78 ± 0.29% moisture, 1.22 ± 0.05 & 1.30 ± 0.04% ash content, 19.08 ± 0.13 & 19.16 ± 0.11% total protein, 1.10 ± 0.03 & 1.14 ± 0.05% glycogen; 0.42 ± 0.02 & 0.50 ± 0.04% fat; 3.70 ± 0.21 & 3.38 ± 0.18 mg/100gm free fatty acid; 222 ± 13 & 154 ± 10 mg/100gm non protein nitrogen; 28.95 ± 1.07 & 42.20 ± 1.05 mg/100gm α-amino nitrogen and 18.10 ± 1.11 & 13.96 ± 0.91 mg/100gm. total volatile base nitrogen have been recorded during summer & winter seasons. Though, the moisture, ash, total protein, glycogen & fat contents were slightly more during winter than summer seasons but the differences were insignificant. Whereas, non protein nitrogen & total volatile base nitrogen were significantly more ($P<0.05$) during summer than winter season while α-amino nitrogen content was significantly more ($P<0.01$) in winter than summer season.

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