



Seasonal variation in the protein content of muscle of *Gobius biocellatus* from Kayadhu river near Hingoli (M.S).

KEYWORDS

G.biocellatus, protein variations and muscle tissue.

Jaiswal N.R.

Department of Zoology, Yeshwant Mahavidyalaya Nanded, Maharashtra

ABSTRACT *Gobius biocellatus* is a teleost fish, one of the species of the genus *gobius* and it is distributed in fresh waters throughout the plains of India (Day, F. 1878). This study evaluated seasonal and monthly changes in protein content of muscle tissue and was studied over a period of twelve months from January 2003- December 2003. There is no definite pattern of seasonal variation in the protein content in male and female *G. biocellatus*. There is no marked trend of increase or decrease in protein content in relation to the seasons due to the breeding habit throughout the year of the fish. The present study is the first to describe the seasonal variation in the protein content of muscle of *G. biocellatus* from Kayadhu river near Hingoli.

Introduction:

On a global scale, fish and fish products are the most important source of protein in the human diet. This protein is relatively of high digestibility compared to other protein sources. It comprises of all the essential amino acids in desirable quantity for human consumption. It is recommended by cardiologists to use generous quantities of fish in food to obtain adequate protein without taking in excessive fatty acids and lipids (Dyerberg J.1986 and Kinsella J.E. 1991). Fish is one of the most important sources of animal protein available, and has been widely accepted as a good source of protein and other elements for the maintenance of a healthy body (Arannilewa S.T.et.al. 2005).

In general, the biochemical composition of the whole body indicates the fish quality. Therefore, proximate biochemical composition of a species helps to assess its nutritional and edible value in terms of energy units compared to other species. Variation of biochemical composition of fish flesh may also occur within same species depending upon the fishing ground, fishing season, age and sex of the individual and reproductive status. The spawning cycle and food supply are the main factors responsible for this variation (Love R.M.1980). Knowledge of biochemical composition of muscles of *G. biocellatus* is of great help in evaluating not only its nutritive value but also helps in quality assessment and optimum utilization of this natural recourse. This in turn can help in processing the fish into products and other byproducts without wastage or loss of constituents such as free amino acids, proteins and fats. Biochemical investigations on fish help to evaluate the impact of environment. The composition of several fish species varies from season to season due to its natural cycle, maturity stage, geographic location, etc. (Aro T. et.al.,2000 and Bandarra N.M. et.al., 2001).

The review of literature shows that the chemical composition of *G.biocellatus* has not been studied so far and hence the present investigation was undertaken to study the variations of their chemical compositions in relation to breeding cycle.

Material And Methods:

Sample collection: The fish were collected every month for a period of one year from January 2003 to December 2003 from Kayadhu river near Hingoli. The adult male and

female specimens of *G. biocellatus* were taken in equal numbers and analysed separately. The muscles were removed free from skin and bones and weighed accurately. These tissues were analysed for the determination of protein in males and females separately.

Protein was estimated by Micro-kjeldahl method (Raghumulu, N. 1983) by estimating total nitrogen and multiplying it by the factor 6.25 ($N \times 6.25$).

Results And Discussions:

Protein is one of the most important biochemical constituent and chemically complex of all substance in muscles and connective tissues of fish. Protein content of fish varies not only in relation to species, but in relation to time of year in individuals of same species (Mackie I.M. et.al., 1971).

The seasonal variation in the protein content may be correlated with the peak spawning and maturation of the *G.biocellatus*. Milroy (1908) observed variations in the chemical composition of Herring during the reproductive period. Siddhiqui (1967) made a comparative study of the biochemical constituent in different tissues of some fresh water teleosts.

The seasonal change in the protein content in muscles of males and females are shown in Table No. 1. The percentage of protein varies from 15.06% (Nov.) to 16.95% (June) in males where as in female 15.82% (June) to 17.88% (April). It can be seen from Table No.1, that the low protein values were found in November in males and in June in females. The high protein values were observed in May to December (except Nov.) in males and April, May in females. The high values of protein were recorded during April-May and low in June where as there are no marked changes in the protein content in females during rest of the year. Similarly there is no definite pattern of seasonal variation in the protein content in male *G. biocellatus* also. There is no marked trend of increasing or decreasing of protein content in relation to the seasons due to the breeding habit throughout the year of the fish. Jafri (1968) in his study on the seasonal changes in the biochemical composition of *Mystus seenghala*, observed the rise and fall in gonadal protein directly related to the cycle of maturation and depletion of gonads.

Table No.1 :Monthly variations in the percentage of protein content in Muscles of male and female *G.biocellatus* (%)

Month	Male	Female
January	15.26	16.18
February	15.43	16.74
March	15.80	16.13
April	16.38	17.13
May	16.67	17.88
June	16.95	15.82
July	16.90	16.24
August	16.48	16.48
September	15.96	16.54
October	16.19	16.22
November	15.06	16.05
December	16.06	16.52

REFERENCE

- (1) Aro T. Tahvonen R. Mattila T. Nurmi J. Sivonen T. and Kallio H. 2000. Effects of Season and Processing on Oil Content and Fatty Acids of Baltic Herring (*Clupea harengus membras*). J. Agric. Food Chem. 48, 6085-6093. || (2) Arannilewa S.T. Salawu S.O. Sorungbe A.A. and Ola-Salawu B.B. 2005. Effect of frozen period on the chemical, microbiological and sensory quality of frozen tilapia fish (*Sarotherodon galiaenus*). African. J. Biotech. 4, 852-855. || (3) Bandarra N.M. Batista I. Nunes M.L. and Empis J.M. 2001. Seasonal variation in the chemical composition of horse mackerel (*Trachurus trachurus*). European Food res. Technol. 212, 535-539. || (4) Day, F. 1878 The fishes of India. William Dawson & Sons, London. || (5) Dyerberg J. 1986. Linolinate Derived Poly-Unsaturated Fatty Acids and Prevention of Atherosclerosis. Nut. Rev.44, 25-31. || (6) Jafri, A.K. 1968 Seasonal changes in the biochemical composition of the cat fish, *Mystus seenghala* (Sykes). Broteria, 36 : 45-58. || (7) Kinsella J.E. 1991. The Potential Role of Fish and Seafood in Attaining Nutrient Balance and Improving Health. Mar. Tech. Soc. J. 25, 4-15. || (8) Love R.M. 1980. The Chemical Biology of Fishes, Vol. 2. New York: Academ9ic Press. || (9) Milroy, T.H. 1908 Changes in the chemical composition of the herring during the reproductive period. Biochem.J.,3:366-390. || (10) Mackie I.M. Mardyr G. and Hobbs. 1971. Fermented fish products, FAO/Fisheries re'orts N° 100 FLIP/R. 100(en) || (11) Raghuramulu, N. 1983 A Manual of Laboratory Techniques. || (12) Siddiqui., M.A. 1967 Seasonal variations in ascorbic acid content and calcium content of different tissues of *Ophiocephalus pnp09cta./tus* (Bloch). Indian J. Expt. Biol.,5: 54-55. |