

# SEASONAL VARIATIONS IN BIOCHEMICAL COMPOSITION AND CALORIFIC VALUES IN *Cat/a catla*

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## ABSTRACT

Marked seasonal variations were observed in biochemical constituents and calorific value in *Cat/a cat/a*. The best relationship between ambient water temperature Vs. biochemical constituents and calorific value was established by showing the relationship by two separate regression, lines, one between 18.0 - 29.00C and another between 29.0 - 33.00C.

Keywords: *Catla*, seasonal variation.

## INTRODUCTION

Biochemical studies of fish tissues are of considerable interest for their specificity in relation to seasonal variation. A perusal of literature indicate that studies on moisture, lipids, proteins, carbohydrates and calorific values as a function of body weight in teleost fishes remains neglected, through information regarding rate of oxygen uptake and haematological indices as a function of body weight in fishes (Munshi et.al. 1979; Pandey etnal. 1986) are available. Since amongst different biochemical constituents in the fish body protein occupies the most important place in human nutrition hence in the present study special attention has been paid to find out the seasonal variation in biochemical composition and calorific values in *Catla catla*.

## MATERIALS AND METHODS

Live specimens of *Cat/a cat/a* (Hamilton) were collected from the local fish tank at Gaya and were transported to laboratory in plastic bucket. In the laboratory the fish were treated with potassium 104

permanganate for few minutes and then transferred to glass aquaria. Unhealthy and injured fishes were rejected. The fishes were fed daily with pellets (containing ricebran & groundnut oil cake mixed with flour) during a minimum acclimation period in the laboratory for seven days. Experimental animals were also fed with this pellets daily. Laboratory maintained specimens of both sexes (i.e. mixed) were used for this study and desired data were collected. During experiments water of the aquarium was regularly aerater with help of aerater so that dissolve O<sub>2</sub> content do not fall to cause any in convenience to the fishes.

## OBSERVATIONS

### SEASONAL VARIATION IN BIOCHEMICAL COMPOSITION AND CALORIFIC VALUES.

The data showing the ambient water temperature, day length (h), water content, lipid, protein, ash content and calorific value (k.cal/g) in different month of the year in Cat/a cat/a are summarised in Table 1, The statistical relationship among various parameters have been shown.

On the basis of data (Table 1) calculated from 132 fishes (Eleven fishes in each month) examined over a period of twelve months the average values were found to be as follows :

Water content ..	73.93%	Range	72.08 - 75.21%
Lipid ..	1.66%	Range	0.40 - 3.13%
Protein ..	19.85%	Range	19.18 - 20.65%
Calorific value ..	4.52k.cal/g	Range	4.231-4.891K.cal/g

The water content, lipid, protein content and calorific values of the fish body showed variation through out the year. The water content of fish body showed almost an inverse relationship with lipid content. The water content was observed minimum in the month of October - November, after wards there was gradual increase and it was maximum in the month of August (75.40%). During winter season the percent of water content showed lesser amount as compared to summer month. In the month of July/ August there was a bit increase while in the month of October it again decreased. It has been found that the percentage of lipid content was minimum in April - June (0.46 - 0.40%) and was maximum in October/November.

**Table 1**  
**Seasonal changes in Water, Protein, Lipid and Calorific values in Catla catla (Ham.)**  
**N = 10 in each Month**

S.N.	Month	Water Temp 0C	Photoperiod (h)	Water content %	Protein %	Lipid %	Calorific values K.cal/g
1	February	23.0	10.59	73.71±0.15	19.98±0.12	1.88	4.411±0.37
2	March	26.5	11.29	74.00±0.71	19.53±0.17	1.93	4.322±0.14
3	April	30.0	12.29	74.18±0.29	19.81±0.31	0.46	4.396±0.17
4	May	32.5	13.14	74.32±0.33	20.30±0.14	0.41	4.773±0.12
5	June	33.0	13.29	74.63±0.21	20.65±0.24	0.40	4.891±0.19
6	July	30.0	13.14	75.21±0.18	20.12±0.11	1.48	4.654±0.16
7	August	30.0	12.44	75.40±0.19	19.52±0.13	2.23	4.367±0.23
8	September	29.0	12.14	75.14±0.23	19.18±0.24	2.45	4.231±0.29
9	October	27.0	11.14	73.10±0.41	19.23±0.17	3.13	4.339±0.27
10	November	24.0		08±0.53	19.71±0.1		5.9
11	December	20.0	10.29	73.01±0.29	20.02±0.13	1.72	4.601±0.28

∞  
N N  
∞ 20.20±0.29

∞ ∞ Z D

The protein content in the fish body fluctuated throughout the year from 19.18 to 20.65%. The percentage of protein was minimum in September (19.18%) and was recorded maximum in May/June (20.65%). The protein content showed an increasing trend in June with a secondary peak in December (20.20%).

The lowest calorific value (k.cal/g) was observed in the month of September (4.231k.cal/g) and highest in May/June.

## RESULT AND DISCUSSION

In present study the total calorific value ranged 47.82 - 248.08 k.cal with in the weight range 50.65 - 342g in Cat/a cat/a. The total calorific value increased by a fractional power to 0.8890 in Cat/a cat/a but Kumar (1992) reported 0.9106 in male and 0.9380 (b. value) in female *Oreochromis mossambicus* respectively.

In the present study in Cat/a cat/a the protein content range between 14.95 to 18.852%. The total protein content increases by a fractional power of 0.905. Yasmin (1989) reported that the total protein content increase by a fractional power of 0.836 and 0.876 in *H. fossilis* and *C. batrachus* respectively. It is observed that the smaller fishes have higher protein percentage as compared to the larger fishes.

In the present study in Cat/a cat/a it has been found that lipid content varies from 0.853 - 1.7120. Above finding is in agreement with Shulman (1967). He also observed that fat content depends fish size (Azov anchovy). Similar observation have been reported by Mathur (1985) in different species of fishes.

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