



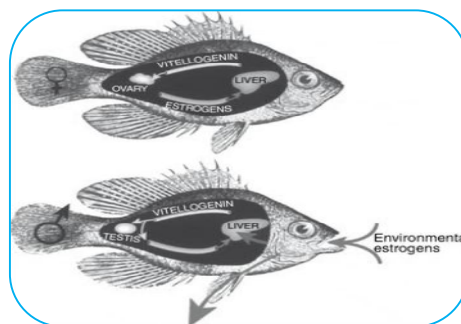
STUDY ON CHANGES OF CHOLESTEROL AND PROTEIN CONTENT IN LIVER OF TWO SPECIES OF FISHES OFF JODIA COAST IN GULF OF KUTCH

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ABSTRACT

The liver in fishes perform may function as liver of higher vertebrates. It is generally believed to be main site for production and distribution of intermediary metabolites (Popper and Schaffner, 1957). A relative increase in liver size and maturity in fish has been reported and a steady increase in liver weight of female fish along with gonadal maturation has been recorded. Marked variations in liver, glycogen, lipids, amino acids, inorganic ions, in liver of fishes in relation to sexual maturity have been presented by many workers (Love, 1970; a review). The liver in *L. tade* is of dark red colour whereas *E. tetradactylum* is of yellow brown colour and it has occupied the largest protein viscera.



KEYWORDS : fishes perform, gonadal maturation, sexual maturity.

INTRODUCTION :

It is obvious that when the main sites of metabolic processes in *E. tetradactylum* and *L. tade* the liver is studied biochemically to investigate the variations in glycogen, lipids, cholesterol, protein, sodium, potassium, calcium, magnesium, phosphorus and iron. An attempt to throw some lights on various facets of metabolism of *E. tetradactylum* and *L. tade* would be fruitful.

During maturation of gonads of fish, liver, gonads, muscles etc. organs show remarkable variations (Love, 1970). Attempts have been made to correlate serum cholesterol and tissue cholesterol with sexual maturity of fish (Idler and Bitners, 1960; Idler and Tsuyuki, 1958; McCartney, 1966-67). Various investigations dealing with similar studies on Indian fishes have appeared (Siddiki, 1966; Siddiki and Naseem, 1970; Jafri and Shremy, 1974).

Several studies have been undertaken on proteins of fish muscles Chapter III.1 (v). However, very few investigations on variations in protein content, of fishes have been undertaken suggesting transit of protein from organs like liver to ovary, at various maturing stages of ovary, was reported by Philips, et al. (1964); Yamashita (1967). A decrease in protein in the organs other than ovaries at late maturing stages in the fishes has also been reported (Love, 1970). Varghese (1976) has estimated monthly percentage of protein in white muscles and red muscles of male and female of *Pampus argenteus* and *Parastormateus niger* and found a rise in protein value from stage I to III of maturity and that declined at stages IV and V of maturity in *P. argenteus* female and in both female and male of *P. niger*.

With a view of investigate changes occurring in liver Cholesterol and Protein of fish of *E. tetradactylum* and *L.tade* the present investigation was under taken.

MATERIAL AND METHODS:

The liver was dissected out very quickly in the field from ten to fifteen live *E. tetradactylum* and *L. tade* of total range 10 to 20 cm. every month. The samples were then brought to the laboratory and were oven dried at 48° C for 3 to 5 days. Cholesterol in the liver was estimated by the method of Stademan (1957) using Leiberman- Burchard reaction, and Total nitrogen was determined by Kjeldhal's method (A.O.A.O. 1965) with distillate collected in 4% boric acid solution. Now protein nitrogen (NPN) was estimated as that protein of the total nitrogen (TN) soluble in trichloroacetic acid as per the method of Jacobs (1951). Protein nitrogen (PN) was calculated by deducting the value from total nitrogen (TN) value and Protein content by multiplying the protein nitrogen (PN) value with 6.25 the protein factor was calculated as per formula (Nimi 1972).

..... X 6.25 = Protein factor

The results are presented in Fig. 01,02 and table 01,02

RESULT AND DISCUSSION:

In case of *E. tetradactylum* the cholesterol level shows two peaks in June and August. It shows higher and lower level i.e. fluctuation from September to March. The cholesterol level increases steadily during post-spawning period April to September and it shows decreases level just before spawning and spawning period. That means storage of cholesterol in liver start during pre-spawning period when fish gets maturity gradually. The decreases level during spawning period. Indicates the mobilization of cholesterol towards gonads. The cholesterol level is also related with sex hormones as the sex hormones are steroid in nature. The Cholesterol level decreases after spawning also.

In case of *L. tade* the cholesterol level in liver increases during pre-spawning period and it show decrease and increase level during spawning period. Again it increases during May i.e. after spawning period, in *Cirrhina mrigala*, the liver cholesterol is depleted with the advancement of maturing. In *B. dentatus* and in *P. dipus*, in both the species depletion in liver cholesterol is recorded, after spawning period, during spawning period. When gonadial maturity is at peak, the liver cholesterol is also elevated. This may be for supply for cholesterol for the production of sex-hormones. The rise in liver cholesterol before spawning period may be considered as a change in cholesterol metabolism in body of the two species of fish. In *Salmo trutta* during greatest sexual maturity, serum cholesterol was at the lowest level. In *cirrhina mrigala* also, serum cholesterol level declined during gonadial maturation. The liver cholesterol of *cirrhina mrigala* depleted with the advancement of maturity.

During spawning period when gonadial maturity is at peak, the liver cholesterol is also elevated. This may be for supply of cholesterol for production of sex hormones. The rise in liver cholesterol before sexual maturity may be considered as change in cholesterol metabolism in body of the fishes which is obviously associated with the formation of sex hormones having steroid structure.

The protein content in liver increases in May to July and shows fluctuating level from July to December in *E. tetradactylum*. Comparing the protein content in liver with sexual maturity it is revealed that amount of protein increase during pre-spawning and spawning and the level starts to decrease during the late period of spawning and post spawning period i.e from February to April. In case of *L. tade* it gradually increases in pre-spawning period (July to October) and show higher level during late period of spawning and after spawning. Varghese (1976) has reported the rise in liver protein during early stage of maturity and in late stage of sexual maturity. The fall in proteins value at stages V and VI of the fishes possibly caused by depletion was also recorded by Varghese (1976). Similarly, decrease of protein content in organs other than ovaries at late maturity stages have been reported by several workers (Love, 1970). The protein content in liver of *E. tetradactylum* and *L. tade* shows higher level during pre-spawning, love level during late period spawning and after spawning agree with results of Love, (1970) and Varghese, (1976).

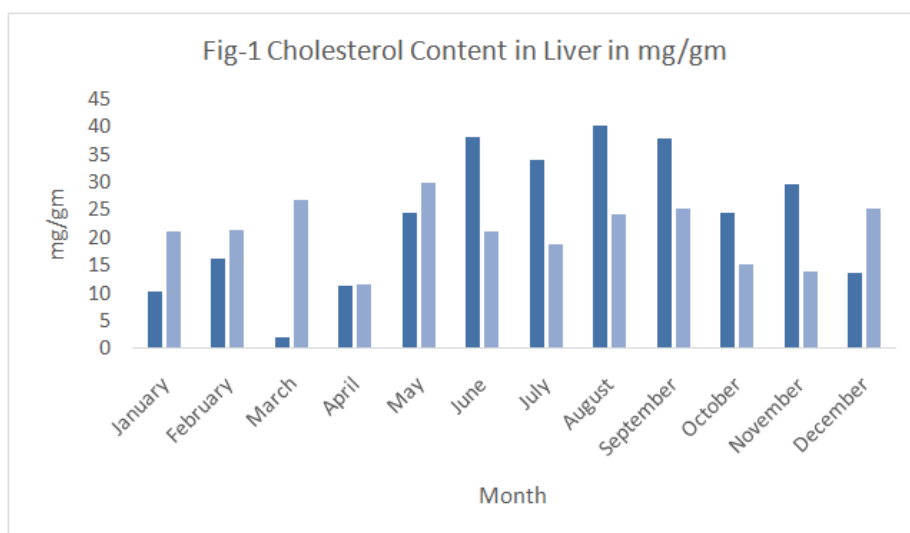
It is worth noting that when compared to liver, the red muscles have more protein, as compared to the white muscles. This may be treated as the indication of nutritive value of both the species the fish muscles.

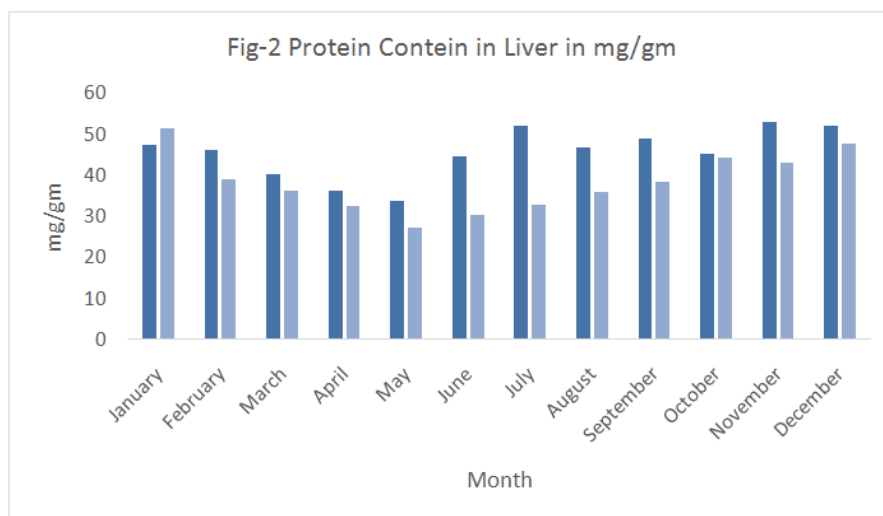
Table-1 Showing the Cholesterol Content in Liver in mg/gm

Month	<i>E. tetradactylum</i>	<i>L. tade</i>
January	10.40±0.10	21.20±0.03
February	16.25±0.03	21.30±0.03
March	2.10±0.00	26.75±0.03
April	11.40±0.03	11.45±0.06
May	24.45±0.03	29.75±0.01
June	38.10±0.05	21.10±0.03
July	33.85±0.05	18.65±0.05
August	40.05±0.03	24.30±0.03
September	37.75±0.00	25.10±0.03
October	24.40±0.05	15.20±0.00
November	29.55±0.02	13.95±0.03
December	13.60±0.04	25.30±0.01

Table-2 Showing the Protein Content in Liver in mg/gm

MONTH	<i>E. tetradactylum</i>	<i>L. tade</i>
January	47.27±0.03	51.20±0.05
February	45.95±0.06	38.90±0.03
March	40.25±0.03	36.30±0.01
April	36.30±0.03	32.40±0.00
May	33.65±0.00	27.15±0.06
June	44.65±0.08	30.20±0.06
July	52.10±0.03	32.80±0.06
August	46.65±0.05	35.85±0.03
September	49.00±0.00	38.50±0.00
October	45.10±0.03	44.20±0.03
November	52.92±0.06	42.95±0.01
December	51.90±0.03	47.70±0.02





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