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RESEARCH ARTICLE

SEASONAL METABOLIC VARIATION OF LIPID CONTENT IN FRESHWATER BIVALVE *LAMELLIDENS CORRIANUS* (Lea, 1834)

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ABSTRACT

Lipid is a water-insoluble biomolecule which has a high solubility in nonpolar organic solvents such as chloroform. The simplest lipids are the fats .The term fats is also used as a general synonym for lipids, so the more precise terms triacylglycerols or triglycerides are preferable for the simplest lipids. Triacylglycerols are used primarily for energy storage in animals. More complex lipids are phospholipids, glycolipids, and cholesterol, are the major constituents of biological cell membranes. All different body tissues shows increasing order of Lipid contents in rainy season, minimum amount of lipid values in winter season and more amount of lipid in the summer season .

INTRODUCTION

A lipid is defined as a water-insoluble biomolecule which has a high solubility in nonpolar organic solvents such as chloroform. The simplest lipids are the fats , which are triesters made up of one glycerol and three fatty acids. The term fats is also used as a general synonym for lipids, so the more precise terms triacylglycerols or triglycerides are preferable for the simplest lipids. Triacylglycerols are used primarily for energy storage in animals. More complex lipids , the phospholipids, glycolipids, and cholesterol, are the major constituents of biological cell membranes. Seasonal changes in biochemical composition have been reported by many workers. Ansell *et al*. (1964), De Zwann and Zandee (1972), Gabbott and Bayne (1973) determined seasonal changes in biochemical composition of adductor muscle, mantle, siphon and foot in *Mercenaria mercenaria* and *Mytilus edulis*. From India, relatively very few investigators such as Bidarkar (1975) on Crassostrea cucullata, Dhamane (1975) on *Paphia laterisulca*, Nagabhushanam and Mane (1975, 1978) on *Mytilus viridis*, have reported changes in the biochemical composition correlating with annual reproductive cycle of bivalves. Lipids are responsible for variety of functions in molluscs` Lipid composition in different tissues has been reported by Trumen and Pekkarinen (1990) in *Macoma balthica*. Vedpathak (1989) observed fortnightly and monthly changes in biochemical composition in freshwater molluscs.

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The review of above literature shows that there is no adequate information about freshwater mollusc, *Lamellidens corrianus* from different rivers of Maharashtra. Hence, the present study was carried out to understand the changes in biochemical composition through collection of animals from Godavari river near Nanded.

MATERIALS AND METHODS

Bivalve *Lamellidens corrianus* samples (75-80 mm in shell length) were obtained from fishermen's catch. In the present study they were collected from Godavari river near district Nanded of Maharashtra in India. Immediately after bringing to laboratory, hard shells of these freshwater bivalves were brushed and washed with fresh and clean water to remove algal biomass, mid and other waste material. The cleaned animals were then kept for depuration for 14hrs in laboratory conditions under constant aeration. For Biochemical analysis, animals were dissected and soft body tissues like mantle, hepatopancreas, gonad, Adductor muscle and gill were removed. 100 mg of each wet tissues were taken for biochemical analysis. Lipids was estimated by using Methanol-Chloroform Method (Raymont et.al.,1964).The values of lipids were expressed in terms of Lipids in mg/g dry weight tissue .

RESULTS AND DISCUSSSION

Lipid content in *Lamellidens corrianus*

1) Mantle :- The seasonal change in the lipid content in mantle of *L.corrianus* are shown in (Table and Figure). The

percentage of lipid was found to be maximum in summer and varies from 10.1120±0.2210 to 11.1233±0.4130 , increasing in rainy season and varies from 4.4420±0.4102 to 9.1412±0.5220 , whereas it is minimum in winter season and varies from 4.0240±0.2101 to 6.2234±0.3137.

2) Gonad :- The seasonal change in the lipid content in gonad *of L.corrianus* are shown in (Table and Figure). The percentage of lipid was found to be maximum in summer and varies from 10.1022±0.6301 to 11.5030±0.4112 , increasing in rainy season and varies from 4.3331±0.6222 to 8.1324±0.6324 , whereas it is minimum in winter season and varies from 4.0132±0.3102 to 5.2203±0.2002.

3) Hepatopancreas :- The seasonal change in the lipid content in hepatopancreas of *L.corrianus* are shown in (Table and Figure). The percentage of lipid was found to be maximum in summer and varies from 6.2010±0.4220 to 10.0410±0.4340 , increasing in rainy season and varies from 6.3010±0.7330 to 11.2200±0.2202 , whereas it is minimum in winter season and varies from 3.0101±0.2103 to 5.2310±0.5201 .

4) Add.Muscle:- The seasonal change in the lipid content in Add.muscle of *L.corrianus* are shown in (Table and Figure). The percentage of lipid was found to be maximum in summer and varies from 9.0302±0.4240 to 10.3201±0.2132, increasing in rainy season and varies from 6.2103±0.4020 to 9.1103±0.5023 , whereas it is minimum in winter season and varies from 4.2102±0.3202 to 5.1201±0.5360 .

5) Gills:- The seasonal change in the lipid content in gill *of L.corrianus* are shown in (Table and Figure). The percentage of lipid was found to be maximum in summer and varies from 6.1030±0.2419 to 10.5016±0.1507 , increasing in rainy season and varies from 8.4106±0.4071 to 10.2202±0.2520 , whereas it is minimum in winter season and varies from 4.0203±0.2241 to 5.1220±0.2043.

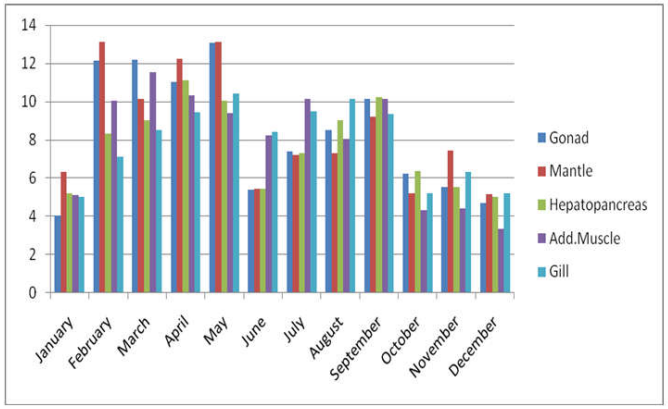

Fig: Monthly variation in lipid content of Lamellidens marginalis

DISCUSSION

The investigation shows that, there is significant variation in the biochemical composition in different body tissues according to seasonal changes. Organic constituents like protein, glycogen and lipids act as key substances for different metabolic activities. Seasonal changes in lipid content is most important in relation to energy metabolism necessary for growth and reproduction (Jayabal and Kalyani,1986; Navarro *et al*., 1989; Lodeiros *et al*., 2001). All different body tissues show increasing order of Lipid contents in rainy season, which is correlated with highest body activities of animal during this season. And due to increase inflow and turbidity of water and to cope up with the new environmental changes. It might be due to favourable environmental conditions, the period of growth with the gonadal development and lots of food availability. Similar conclusions were reported in M. edulis, in British water by Williams, 1969 and Mane and Nagabhushanam and Mane1978. Lipid variation is related to gamete development (Martinez, 1991) with the highest huge levels of lipids during the period when gonads are ripe. All the body organs show minimum amount of lipid values in winter season, which may be due to sedentary life without much body activities. Lipid is an important dietary constituent, serve as reserve energy when food supply is scanty. In stressful environmental conditions, after glycogen lipid is use as energy source (Shigmates and Takeshita, 1959; Chourpagar and Kulkarni, 2011).

It is observed that lipid contents are significantly accumulated is found to be more during the summer season in all body organs due to exposure to high temperature in summer season. Similar results are observed by Pandit (2005) by *Lamellidens marginalis* of Godavari river at Kaigaon due to exposure of mantle and foot to high temperature. The study revealed that in term of energy conservation. The organic would be exported to make compensatory adjustments to both the components of energy gain and energy loss fate of changes in the environmental conditions (Vedpathak, 1989). The relationship of the energy transfer between different tissues, their capacity of reserve amounts under food availability, and their positive relationship with the high temperature and gonadal maturation have been shown in different species of bivalve molluscs such as scallops (Robinson *et al*., 1981; Sundet and Vahl, 1981; MacDonald and Thompson, 1986; Villalaz, 1994), mussels (Zandee *et al*., 1980) and clams (Robert *et al*., 1993; Urrutia *et al*., 2001). Thus, in the present study organic constituents present in different body tissues shows seasonal changes and are correlated with the change in environmental conditions along with development.

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