

**Research Article**

# Nutritive values of fresh water mussels *Lamellidens marginalis* from Nanded region, Maharashtra

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**ABSTRACT**

In the present investigation, the nutritive value showed changes in total protein, glycogen and lipid content from foot, mantel, gill and hepatopancreas of *Lamellidens marginalis* were studied from Jan 2013 to Dec 2013. In *L. marginalis* maximum protein content was found in hepatopancreas  $304 \pm 0.0065$  mg/gm minimum from foot  $20 \pm 0.0104$ . Glycogen content was more during the summer season in all tissues. The maximum glycogen was found during the summer season in hepatopancreas ( $309.62 \pm 0.5184$  mg) and mantel tissue ( $309.62 \pm 0.0079$  mg). The minimum amount of glycogen was found in foot  $31.32 \pm 0.0023$  in the winter season. Values of lipid observed from foot  $14.74 \pm 0.6228$  and from mantel it is  $6.5 \pm 1.1401$ .

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**INTRODUCTION**

Bivalves are economically important animal known for food considered important next, to fish and prawns from the nutritive point of view. They have been consumed for thousands of years (Zhang & Sinclair 2007). Protein is the most important organic compound of animal tissue. Protein occurs in the body in the form of amino acids and other metabolites, which serve as building blocks of the body (Vijayavel *et al.*, 2007). Carbohydrates are the primary source of various metabolic processes. Carbohydrates in the tissues of aquatic animals are existing in the form of glycogen. It is well-known that the glycogen serves as an energy reserve for various metabolic processes. Changes in glycogen content are due to temperature, size, growth, reproductive status and availability of food. Accumulations of glycogen take place during their growing season and use them during rest of life.

During study period *Lamellidens marginalis* shows maximum carbohydrates content in summer and minimum in winter because of availability of adequate quantity of food during summer. Plankton is the main food item of mussel and its production is more in summer. Lipid is very important dietary constituent. it serves as an energy source when food supply is low. Changes in lipid contents are due to temperature, size, growth, reproductive status and availability of food. The decline in Lipid content was observed during breeding season.

**MATERIALS AND METHODS**

Biochemical constituents such as protein, glycogen, and lipid were estimated monthly from *L. marginalis* for biochemical analysis, bivalves were dissected and soft body tissue like a mantle, hepatopancreas, gills, and foot were removed and stored in deep freezer at 0°C temperature.

*Estimation of protein*

Protein was estimated by using the Lowry method (Lowry *et al.*, 1951). Standard solution of protein albumin (10 mg/ml) was prepared freshly. From this solution, different dilutions were made ranging from 1 mg/ml to 10 mg/ml in distilled water to prepare a standard graph. Estimation was done by taking a measurement on O.D. at 540 mu. Amount of protein calculated by using formula

$$\text{Amount of protien} = \frac{\text{amount of protien obtained from standard grap}}{\text{weight of tissue (g)}} \times 100 \text{ mg}$$

$$= \text{mg of protein per 100 mg of tissue}$$

*Estimation of glycogen*

Glycogen is estimated by using anthrone reagent method (De-Zwaan and Zandee (1972). Standard graph was used to estimate glycogen from unknown sample. Amount of glycogen is calculated by using formula.

$$\text{mg of glycogen} / 100 \text{ mg} = \frac{100 \times U \times S \text{ mg}}{1.11}$$

Whereas, U = Optical density of unknown sample.  
S = Optical density of unknown glycogen concentration,  
1.11 = factor for conversion of glucose to glycogen.

#### Estimation of lipid

Lipid content was estimated by using Menthol-Chloroform method by (Bligh and Dyer, 1959). In this method one gram of tissue was taken in mortar and pestle with anhydrous sodium sulphate, and few ml of chloroform methanol mixture was added in it. After stirring mixture is filtered in to another test tube. Then few drops of 0.05N KCL solution is added in filtrate. This removes non lipid content and releases the bound acidic lipids. Two phases developed upper and lower. Lower phase is transferred in to another container and allow to dry.. The amount of lipid present in the samples is determined by using following formula.

$$\text{Amount of lipid} = \frac{\text{weight of lipid (g)}}{\text{weight of tissue (g)}} \times 100 \text{ mg}$$

## RESULTS AND DISCUSSION

Nutritive value of *L. marginalis* were studied from Jan 2013 to Dec 2013 and expressed as mg of lipid per gm weight wet tissue. *L. marginalis* shows maximum protein

content in summer and minimum in winter. Maximum protein content was found in hepatopancreas that is  $304 \pm 0.0065$  mg/gm and minimum in winter in foot  $20 \pm 0.0104$  mg/gm (Table 1). Glycogen content was more during the summer season in all tissues. It was increased gradually from March to May and from July onwards it was decreased gradually and reached the lowest level in winter. It was again gradually increased. *L. marginalis* showed maximum glycogen in hepatopancreas and in the mantle. Maximum glycogen was found during summer season in hepatopancreas ( $309.62 \pm 0.5184$  mg) and mantle tissue ( $309.62 \pm 0.0079$  mg). The minimum amount of glycogen was found in foot  $31.32 \pm 0.0023$  in the winter season (Table 2).

Lipid content in the foot, mantle, gill and hepatopancreas. The lipid content was maximum in foot and mantle during summer and minimum in monsoon and winter seasons. *L. marginalis* showed maximum values of lipid in foot  $14.74 \pm 0.6228$ , in mantle, it is  $6.5 \pm 1.1401$ , in gill  $7.87 \pm 0.1528$  and in hepatopancreas  $4.4 \pm 0.5477$ . The minimum value of lipid observed in foot  $2 \pm 0.4472$ , in mantle  $2.6 \pm 0.5477$ , in gill  $2.1 \pm 0.2683$  and in hepatopancreas  $0.92 \pm 0.10463$  (Table 3).

**Table 1:** Month wise variations in total protein content from foot, mantle, gill and hepatopancreas of *L. marginalis*

MONTHS	FOOT (mg/gm)	MANTEL (mg/gm)	GILL (mg/gm)	HEPATOPANCREAS (mg/gm)
Jan 2013	26± 0.0178	26± 0.0294	29± 0.0054	41± 0.0148
Feb	26± 0.0228	26± 0.0151	41± 0.0089	50± 0.0650
Mar	103± 0.0924	136± 0.1868	187± 0.6507	287± 0.0258
Apr	271± 0.0367	287± 0.0258	298± 0.0030	304± 0.0065
May	263± 0.0206	263± 0.0121	295± 0.0657	298± 0.0083
Jun	261± 0.0155	263± 0.0206	288± 0.0499	294± 0.0532
July	164± 0.0576	165± 0.0958	200± 0.0310	229± 0.1353
Aug	57± 0.1175	120± 0.0206	133± 0.0593	162± 0.6035
Sep	55.8± 0.0106	80± 0.1253	123± 0.0011	142± 0.0025
Oct	46.5± 0.0136	57 ± 0.0661	65± 0.0853	88± 0.1790
Nov	20± 0.0104	32± 0.0205	45± 0.0193	88± 0.1790
Dec 2013	20± 0.0104	26± 0.0013	29± 0.0452	29± 0.0054

**Table 2:** Month wise changes in glycogen content in *L. marginalis*

MONTH	FOOT	MANTEL	GILL	HEPATOPANCREAS
Jan 2013	36.27± 0.0079	38.63± 0.0148	36.27± 0.0136	50.59± 0.0230
Feb	46.00± 0.0005	51.29± 0.0068	47.29± 0.0035	53.37± 0.0029
Mar	71.32± 0.3687	79.37± 0.3498	58.32± 0.2429	93.40± 0.1714
Apr	121.14± 0.1959	201.08± 0.2688	143.98± 0.4481	214.77± 0.4548
May	137.22± 0.0009	309.62± 0.0079	275.57± 0.0778	309.62± 0.5184
Jun	71.27± 0.0181	135.51± 0.0527	80.34± 0.0151	285.11± 0.0277
July	36.27± 0.0131	39.20± 0.0017	36.27± 0.0048	50.29± 0.0004
Aug	34.59± 0.1046	38.63± 0.009	35.72± 0.0005	40.40± 0.0004
Sep	34.59± 0.0016	36.86± 0.0010	34.59± 0.1046	36.27± 0.0005
Oct	33.48± 0.0011	38.02± 0.0015	33.48± 0.001	38.02± 0.0010
Nov	33.48± 0.001	36.86± 0.0138	32.95± 0.0038	39.20± 0.0005
Dec 2013	31.32± 0.0023	34.40± 0.0014	26.23± 0.0081	32.39± 0.0048

**Table 3:** Month wise changes in lipid content in *L. marginalis*

MONTH	FOOT mg/gm	MANTEL mg/gm	GILL mg/gm	HEPATOPANCREAS mg/gm
Jan 2013	2.6± 1.5165	3± 0.5366	3.4± 0.5477	3± 1.3416
Feb	4.2± 0.9898	5.6± 0.5477	7.87± 0.1528	4.2± 0.8366
Mar	13.28± 0.04472	5.2± 0.4472	4.4± 0.5477	4.4± 0.5477
Apr	14.4± 0.8944	6.4± 0.8944	6.6± 0.5477	4.2± 0.4472
May	14.74 ± 0.6228	6.5± 1.1401	4.8 ± 0.4472	2.8± 0.4472
Jun	12.62± 0.9311	5.6± 1.4099	4.6± 0.5477	2.6± 0.5477
July	12.58 ± 0.3834	5.4± 0.5477	4.3 ± 0.1028	2.6± 0.5477
Aug	11.66± 0.01788	4.6± 0.5477	3.6± 0.5477	2.4± 0.5477
Sep	8.48± 2.5014	4± 0.8944	3.23± 1.1303	2.4± 1.6431
Oct	6.44 ± 3.1033	3.84± 0.4202	2.6± 0.5477	1.6± 0.5477
Nov	6.54± 2.0628	3.8± 0.4472	2.36± 0.08944	1.23± 1.7474
Dec 2013	2± 0.4472	2.6± 0.5477	2.1± 0.2683	0.92 ± 1.0463

## CONCLUSION

Nutritive value showed Changes in total protein, glycogen and lipid content from foot, mantel, gill and hepatopancreas of *L. marginalis* was studied from Jan 2013 to Dec 2013. In *L. marginalis* maximum protein content was found in hepatopancreas 304± 0.0065 mg/gm minimum in winter from foot 20± 0.0104 mg/gm. Glycogen content was more during summer season in all tissues. Maximum glycogen was found during summer season in hepatopancreas (309.62± 0.5184 mg) and mantel tissue (309.62± 0.0079 mg). The minimum amount of glycogen was found in foot 31.32± 0.0023 in the winter season. The lipid content was maximum in foot and mantle during summer and minimum in monsoon and winter seasons. Values of lipid observed from foot 14.74 ± 0.6228 and from mantel it is 6.5± 1.1401.

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