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Original Article

LIPID CONTENT IN MANGROVE CLAM- *GELOINA PROXIMA* (PRIME, 1864)

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Abstract:

Lipid content estimation in indigenous mangrove clam Geloina proxima was carried out during June 2012 to May 2013. Different tissues such as foot, gill, hepatopancreas, male and female gonads of G. proxima was analysed by Folch Method to determine the lipid content. From this analysis is concluded that it contains less fat. It is also noted that the lipid content in the different tissues of clam G. proxima shows monthly variations. These variations in the lipid content may be due to several environmental factors and physiological changes that occur during spawning season.

Keywords: Lipid, Mangrove, Clam, Geloina proxima

Introduction:

Marine environment is one of the versatile environments inhabited by a variety of living organisms. It supports a vast assemblage of various forms of life, as it provides 300 times more inhabitable space than that provided by land and freshwater combined. Marine environment is usually classified into two major divisions, namely, the pelagic and the benthic divisions. Representatives of almost all groups of animals are adapted for these environment, except two small groups, namely Myriapoda and Onychophora. Their natural abundance and ability to adapt to the fluctuations in the environmental conditions have attracted researchers around the world.

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Class pelecypoda or bivalvia considered as economically the most important class of phylum Mollusca because, this class includes oysters, clams, mussels, scallops, ark shells and cockles occurring in abundance in the shallow coastal waters and most of them are used as food [1].

As per the name, the shell consists of two calcified valves, united dorsally by means of hinge teeth and the typically wedge- shaped foot. In some species, as in case of oysters, one valve is permanently attached to rock or any kind of hard substratum. The valves may be of equal or unequal sized. Almost all types of bivalves form an important component in human diet. In India, bivalves such as oysters, clams, mussels, scallops, ark shells and cockles found along the east and the west coasts, form major constituents of food of the coastal people. Survey of literature on bivalve molluscs suggests that some bivalves are left unattended, especially those occurring in the mangrove vegetation. The common bivalves of the mangrove habitats are the Oysters and the clams like *Meretrix meretrix*, *Marcia opima* as well as different *Paphia* species. These bivalves usually show greater occurrence in shallow coastal waters and estuaries, especially in intertidal zone. Hence, they are largely influenced by the environmental changes such as fluctuations in salinity and pH, rainfall, freshwater discharge of rivers, tidal amplitude, temperature fluctuations and the blooms of algae and phytoplankton [2].

Their consumption found only amongst the coastal people only and therefore, harvested clams and oysters sold in the local markets only.

Mangrove bivalves are least well known, because of very scanty information is available about them. However, they, form an important food for human consumption, especially for the coastal people[3].

The coast of Maharashtra popularly known as Konkan, that harbors a significantly diverse natural resources. Konkan constitutes a narrow belt between the western mountain range (regionally known as Western Ghats) and Arabian Sea. The Coastal belt stretches about 720 km. The coastline is indented by several estuaries, river mouths, creeks and sandy, rocky, and muddy beaches.

Dapoli tehsil of Ratnagiri district is located at 17^0 North latitude and 73^0 East longitudes, having an elevation of 230 meters above mean sea level. This tehsil has about 54 km. long coastal belt covered by mangrove vegetation that shelters number of bivalves including the clam- *Geloina proxima*. *G. proxima* is more elongate, particularly posteriorly & does not possess flexure. Shells are equivalved, trigonal-ovate in outline, inequilateral, distinctly expanded posteriorly. The *G. proxima* has synonymy as *G. expansa*,*G. bengalensis* is largely restricted to Indian oceans . The shell is immediately recognizable by the distinct subtrigonal shape. Maximum shell length 10 cm. but commonly it is 7 cm. [4]

There are various fishing methods applied to catch the shellfishes. Of which the hand picking method and removing of the attached bivalves with the help of knife or sickle are the most common ones. Among

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the shellfishes, the bivalves are most preferable food item of the local coastal people. Annual harvests of bivalves for human consumption represent about 5% by weight of the total world harvest of aquatic resources [5].

Meat of bivalve has more calorific value in comparison with the common food fishes and hence would be an excellent and economic source of nutrition for man Suryanarayan, H. and Alexander, K.M. (1972)[6].

Shellfish meat, particularly clam meat have been recommended in several dietary regimes for their high protein content, low calorific values, low fat/cholesterol profile and lower proportions of saturated fat, the presence of good lipids, significant amounts of omega- 3 - fatty acids, dietary essential amino acids, vitamin B12 and several important minerals viz. iron, zinc and copper [7- 9].

Molluscs have a great importance because of their fatty acid components and their variability in different areas. The polyunsaturated fatty acids have been recognized as effective factors in human health and nutrition, especially for cardiovascular diseases(Bruckner, 1992) [10]. The oysters from the interlittoral region contain higher cholesterol than oysters of tidal land. [11] Lipid and Fatty Acid Compositions of *Mytilus galloprovincialis* has significant variations during winter and summer season.[12]

The nutritional quality of the oysters is generally good, especially just before gamete release (pre monsoon) when the concentration of nutrients was at its maximum. A low level of fat was detected in the edible meat of oysters and mussels.[13]

Thus, clams are the edible bivalves and one of the important varieties of shellfish. They have consequently high levels of biochemical constituents. The biological, and chemical characteristics of the bivalves reflects the taste and flavour. Therefore, lipid content from different tissues of G.proxima was analysed to determines the overall quality and prize of the clam.

Methods And Material:

For experimentation, live clams from the different localities collected by hand picking method. Collected clam washed thoroughly with the estuarine water and clams brought to the laboratory. They were placed in the aerated tank for defaecation. The animals carefully opened to collect desired tissue such as gill, foot muscles, hepatopancreas and gonads (testes and ovaries) removed carefully used as per the desired aims.

Method for estimation of Lipid: Folch Method [14].

1. For 10 mg. of sample, 10 ml of Chloroform - Methanol mixture (1:5) was added in and grounded (homogenized) in a pestle and mortar at room temperature.
2. The mixture then transferred to a micro test tube and allowed to stand for 10 minutes for settling.
3. The contents were filtered in to another test tube and allowed to stand for 20 minutes.

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4. To this solution, then added 5% KCl solution using a bulb dropper.
5. This addition separates the non-lipid layer (the top layer)
6. The upper layer was discarded and the lower phase was transferred to pre-weighed test tube and dried in an oven for 1-2 days.
7. The test tube with lipid was weighed and the weight of the test tube was subtracted from the latter.
8. This gives the lipid content.

Results And Discussion:

Table No.1 Monthly variations in the percentage of lipid content in different tissues of *G.proxima.*

Month and Year	Tissue type				
	Foot	Gills	Hepatopancreas	Testes	Ovary
June 2012	5.10	5.89	7.43	7.48	8.71
July 2012	3.83	7.56	6.58	6.32	6.05
August 2012	3.52	4.58	5.92	5.06	5.12
September 2012	3.04	5.27	4.47	4.92	5.07
October 2012	5.22	2.93	5.29	4.07	4.81
November 2012	3.46	2.71	5.68	4.29	5.09
December 2012	3.12	2.65	5.17	3.76	4.56
January 2013	3.84	2.67	5.01	4.14	4.89
February 2013	3.61	3.75	4.72	4.53	5.71
March 2013	3.05	3.81	5.81	5.62	7.52
April 2013	3.37	3.21	5.79	5.70	7.83
May 2013	4.63	4.52	6.13	5.83	4.29

Fig. 1: *G. proxima*: External view.

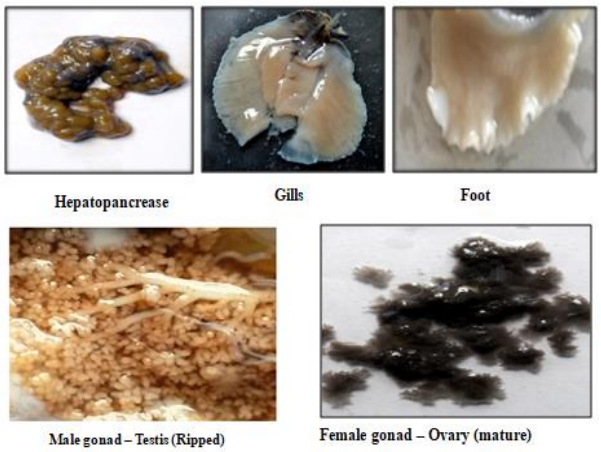

Fig. 2: Different tissues of *G. proxima* used for lipid estimation

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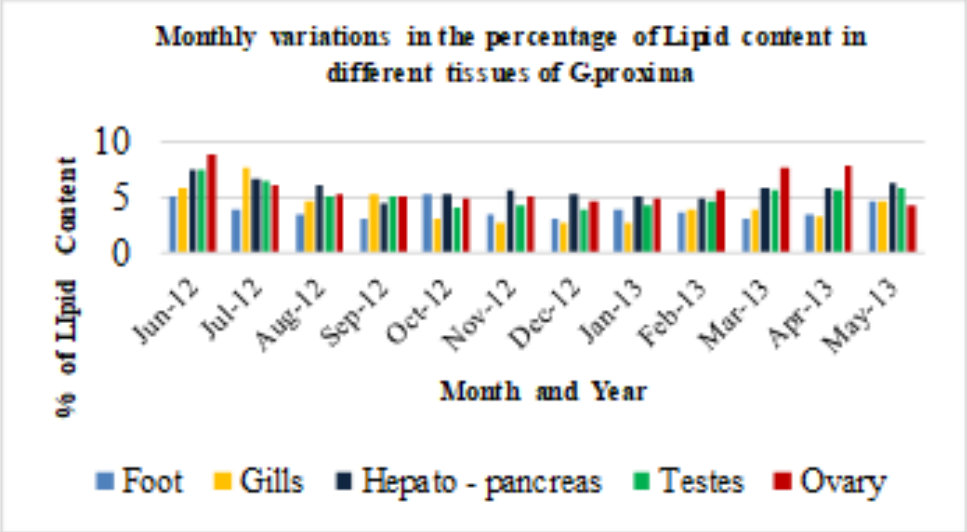

Fig.No.3: Monthly variations in the percentage of lipid content in different tissues of *G.proxima*

Discussion:

The lipid of clam *G.proxima* in the different tissues viz foot, gill, hepatopancreas and in male and female gonads reveals that it contains less fat. The monthly variations in the lipid content in the different tissues of clam *G.proxima were* also observed and have been given in Table No.1 and Fig. No.3.

The monthly variations are as follows. In foot tissue higher value 5.10 % was observed in the month of June and lower value 3.04 % was recorded in the month of September. In the gill tissue higher value 7.56 % was observed in July while lower lipid content 2.65 % recoded in the month of December. In hepato-pancreas higher lipid content 7.46% was recorded in the month of June and lower value 4.47% found in September. Testes showed high lipid content 7.48% in the month of June while low fat content 3.76% was found in the month of December. However, in ovary the lipid content found is high 8.71% as low as 4.29 % . While in testes higher values from 7.48 % recorded in the month of June and lower lipid content value 3. 76 % was recorded in the month of December. In ovary, 8.71% lipid content was observed in the month of June and is the higher value While 4.29% was the lowest finding of the lipid content in the month of May. It is interesting to note that the lipid content in testes found gradually decreased from June to December in ovary from March to May.

In many temperate bivalves, the lipid content steadily increases during summer months until spawning occurs. The flesh of Macoma species of bivalves contains high phospholipids, where as pancreas have more neutral lipids. [15] | [16] There are significant quantitative variations in the lipids and fatty acids in bivalve *A. granosa*. [17] The lipid and glycogen get accumulated mainly during spring and at the beginning of summer in *Maoma batthica.*[18]

Several patterns of temporal variability of lipids in bivalve molluscs are the result of several environmental factors acting simultaneously, such as temperature, food availability, plankton composition, and physiological factors.[19],[20] [21]

Conclusion:

It is concluded that the different tissues of clam *Geloina proxima* has less fat content. It is also concluded that the lipid content in the different tissues of clam *G. proxima shows* monthly variations. These variations in the lipid content may be due to several environmental factors and physiological changes that occur during spawning season.

References:

1. D.V. Bal and K.V. Rao, (1990): Marine fisheries of India, first revised edition, Tata McGraw-Hill Publishing Compani, New Delhi, Page No. 386.
2. N.Balkrishnan Nair; D.M. Thumpy (1980): A text book of Marine Ecology, Page No.114.
3. Deepak Apte (2012): Field Guide to the marine life of India, First edition, page No.225.
4. Morton, B.(1976): Canadian J. Zool. 54, 482- 500.
5. Copper, J.E, Knower, C. Snails and snail farming: an introduction for the veterinary profession, Veterinary Record, 1991; 129(21/28):541-549.
6. Suryanarayan, H. and Alexander, K.M. (1972). Biochemical investigations on edible molluscs of Kerala. A study on the nutritional value of some bivalves. Fish. Techno J. 9(t): 42-47.
7. Krzynowek, J., Daniel L. D'entremont and Murphy, J. 1989. Proximate composition and fatty acid and cholesterol content of squid *Loligo pealei* and *Illexillecebrosus. J. Food Sci.,* 54(1): 45-48.
8. Dong, M. Fayne. 2001. *The nutritional value of shellfish.* www.wsg.washington.edu., p. 1-8.
9. Trung tam Tin hoc- Bo Thuy San 2007, http:// *www.fishnet.gov.vn/DMSP/index-e. asp.*
10. Bruckner G (1992). Fatty acids and cardiovascular diseases. In: Chow CK, editor. Fatty acids in foods and their health implications. New York: Marcel Dekker, pp. 735-752.
11. Thompson, M.H. (1965): Fish Ind.Res. 2 (3), 11-15.
12. Ermelinda P., Antonio D., Michele M. and Francesca B. (2010): Lipid and Fatty Acid Compositions of Mytilus galloprovincialis Cultured in the Mar Grande of Taranto (Southern Italy): Feeding Strategies and Trophic Relationships. Zoological Studies 49(2): 211-219.
13. G.M. Salaskarand V.N. Nayak (2011):Nutritional quality of bivalves, Crassostrea madrasensis and Perna viridis in the kali estuary, karnataka, India, Recent Research in Science and Technology, 3(4): 06-11.
14. Folch, J., Less, M. and Sloane-Stanley, G.H., (1957): A simple method for the isolation and

purification of total lipids from animal tissue. Journal of BiologicalChemistry, 222,497-509.

15. Gabbott PA. 1983. Developmental and seasonal metabolic activities in marine molluscs. In PW Hochachka, KM Wilbur, eds. The Mollusca, vol. 2. Environmental biochemistry and physiology. New York: Academic Press, pp. 165-217.
16. Datt,A.K.;Ghosh,A.; Mishra,S.and Choudhury, A. (1985): The mangroves Proc.Nat.Symp.Biol.Util.Cons.mangroves, 319-324.
17. Chattopadhyay,A; Pal,P.L.;Ghosh,A.;Mishra,S.; Dam, T.K. and Choudhary, A. (1987): J.Mar.Biol.Assoc.India.29,1-2, 383 – 387.
18. Wenne, R. and Styczynska – Jurewiez, E. (1987) : 96 (1) 73-78.
19. Besnard JY, P Lubet, A Nouvelot. 1989. Seasonal variations in the fatty acids content of the neutral lipids and phospholipids in the female gonade of Pecten maximus L. Comp. Biochem. Phys. B 93: 21-26.
20. Pazos JA, C Ruiz, O García-Martín, M Abad, JL Sánchez.1996. Seasonal variations of the lipid content and fatty acid composition of *Crassostrea gigas* cultured in El Grove, Galicia, NW Spain. Comp. Biochem. Phys. B 114: 171-179.
21. Pazos JA, JL Sanchez, R Guillermo, ML Péres- Parallé, M Abad. 2003. Seasonal changes in lipid classes and fatty acid composition in the digestive gland of Pecten maximus. Comp. Biochem. Phys. B 134: 367-380.