

ORIGINAL ARTICLE

**SEASONAL VARIATION OF LIPID CONCENTRATION IN DIFFERENT TISSUES OF
PENAEUS INDICUS AND *PENAEUS VANNAMEI***

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ABSTRACT

In the present study the total lipid content of three tissues namely gills, intestine and muscles of marine prawn *Penaeus indicus* and *Penaeus vannamei* were analysed during October 2015 to September 2016. The lipid concentration were analysed by using standard method of Folch *et al.*, (1957). The results of the present study, the maximum lipid content were recorded from *Penaeus indicus* and minimum amount of lipid content were recorded from *Penaeus vannamei*. The total lipid content was found to be more in the muscle tissue when compared to gills and intestine. *Penaeus indicus* and *Penaeus vannamei* can be very well used as food and perhaps as a candidate species in future for culture.

Keywords: *Penaeus indicus*, *Penaeus vannamei*, Lipid, South east coast

1. INTRODUCTION

Prawns are very popular and sought for food all around the world. Their palatability is closely linked with their biochemical composition which changes considerably with season and maturation process. Lipids play significant role during the gonadal growth, maturation and development of decapods crustaceans. They are very important food reserves in the oocytes (Gallager *et al.*, 1986). Lipids are divided broadly into two categories: namely, neutral lipid, which is the stored fat and is mainly composed of triglycerides, and phospholipids and cholesterol, which are building blocks of membranes. Identification of lipid composition is important for physiological studies. The role of nutrition and diet in human health has been well established, but it has only recently become popular for a large segment of the Indian population to actively select foods for health maintenance and disease prevention. The current wave of scientific and popular literature which correlates traditional, cultural diets with the incidence of disease has brought seafood to the attention of the health-conscious to the public (Nettleton, 1985).

Lipids are nutritionally significant in crustaceans. Comparisons of wild and captive crustaceans have demonstrated the influence of dietary lipid composition on fatty acid profiles of tissues and their subsequent effect on reproductive success and spawning quality, lipids play an

important role during the development of decapod crustaceans, not only as energy source, but also as essential nutrients (Kanazawa *et al.*, 1985). Shrimps are good source of protein, yet are very low in fat and calories, making them a very healthy choice of food. Although shrimps have high cholesterol content, they are low in saturated fat, which is the fat that raises cholesterol levels in the body. Minerals are essentials in shrimp nutrition. Aside from playing important role in osmotic regulation and moulting (Vijayan and Diwan, 1996). Most of the crustacean decapods species are marine forms, but hundreds of freshwater species have been described. These are important omnivorous consumers in benthic food webs of numerous rivers, lakes and ponds. The decapods are the largest and longest lived crustaceans in marine ecosystem (Hill *et al.*, 1992). In the present investigation, the lipid composition of *Penaeus indicus* and *Penaeus vannamei* collected from South east coast of Tamil Nadu, India.

2. MATERIALS AND METHODS

The marine prawn were collected from mallipattinam coast in Thanjavur District, Tamil Nadu during October 2015 to September 2016. The shrimps were caught by the fisherman with the help of trap, line, hand net and scoop net. Totally 120 specimens were collected. After reaching the laboratory they were washed carefully with distilled water to remove dust, algal particles and killed. The shrimp tissues such as gills, intestine and muscle were dissected out carefully and preserved in screw cap vials at 0°C. For each group tissues

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from two shrimps were dissected to constitute single observation. Lipids in different tissues were estimated by adapting the standard method of Folch *et al.*, (1957).

3.RESULTS

The lipid composition of different species of *Penaeus indicus* and *Penaeus vannamei* are presented in the Table.1.

Penaeus indicus

Gills : During the present studies lipid content of gills was observed to have a minimum value of 4.11mg/g in August 2016 and maximum value of 8.69 mg/g in the month of March 2016.

Intestine : The lipid content in intestine varies from minimum 4.25 mg/g in September 2016 and maximum of 9.92 mg/g in March 2016.

Muscle : The lipid content in the muscles range from 6.13 to 12.78 mg/g. The maximum level 12.789mg/g was observed in February 2016 and minimum level 6.13mg/g was recorded in the month of July 2016.

Penaeus vannamei :

Gills : The lipid content was maximum 7.86mg/g in the month of March 2016 and minimum 3.98mg/g was recorded in August 2016.

Intestine : The lipid content in intestine varied from minimum 3.95mg/g in October 2016 and maximum of 8.75mg/g in February 2016.

Muscle : During the present studies lipid content of muscles were observed to have a minimum value of 5.89mg/g in November 2015 and maximum value of 11.69mg/g in the month of April 2016.

4.DISCUSSION

A large number of workers have estimated the lipid content of muscles in decapods crustacean (Teshima and Kanazawa, 1983; Mourente and Rodriguez, 1991 Palacios *et al.*,2000). Biochemical composition of any organisms are known to vary with season,size of animal stages of maturing and availability of food,temperature etc(George and Patel,1956 ; Gopakumar and Nair,1975).In the present study , *Penaeus indicus* were found to have significantly more lipid than *P.vannamei*. In general, lipid act as major food reserves along with protein and subjected to periodic fluctuations influenced by environmental variables like temperature (Kutty and Parulekar, 1984). In the present study, the concentration of total lipid was found to be higher in the muscle followed by gills and intestine of the shrimps. It has been reported that the content of total lipid was higher in adults than in juveniles of many crustaceans (Adeye, 2000).

The higher amount of lipid content was observed in the muscle tissue of *Penaeus indicus* (Ravichandran *et al.*, 2009). The concentration of lipid content was found to be higher in the hepatopancreas followed by gills and muscle of the prawn (Saravana Bhavan et al., 2008). The lipid content was maximum in male prawns in the size groups 96-105mm and minimum in berried females and that difference were statistically significant (Dinakaran and Soundarapandian, 2009). The lipid content was observed maximum in the tissues of muscles followed by gills and intestine (Anshu Samyal., 2011).

5.CONCLUSION

From the present observation reported that the lipid content was maximum in muscle tissues of *Penaeus indicus* and *P.vannamei* when compared to gills and intestine. So *Penaeus indicus* and *P.vannamei* is suggested to introduce in aquaculture practices as an alternative to another sized shrimp *Penaeus monodon* if necessity arises.

Table.1 Monthly variation in the lipid composition of gills, intestine and muscle tissue of *penaeus indicus* and *penaeus vannamei*

Month And Year	<i>P.indicus</i>			<i>P.vannamei</i>		
	Gills	Intestine	Muscle	Gills	Intestine	Muscle
Oct-2015	5.87	7.62	9.23	4.14	3.95	8.75
Nov-2015	6.91	8.52	9.41	5.99	4.99	5.89
Dec-2015	7.55	8.89	6.47	6.35	5.63	6.33
Jan-2016	8.16	9.44	9.36	4.72	7.92	8.84
Feb-2016	8.24	9.76	12.78	6.34	8.75	8.29
Mar-2016	8.69	9.92	11.34	7.86	8.45	9.75
Apr-2016	7.85	8.16	10.19	6.15	7.11	11.69
May-2016	7.23	7.62	12.25	6.29	6.88	11.37
Jun-2016	5.48	6.53	10.63	4.92	5.92	9.78
Jul-2016	5.33	5.71	6.13	4.66	5.54	8.21
Aug-2016	4.11	4.77	8.36	3.98	5.94	7.93
Sep-2016	5.26	4.25	6.43	4.67	5.86	6.88

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