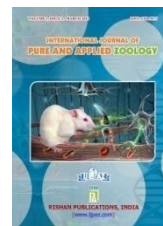




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BIOCHEMICAL STUDIES ON PROTEIN CONTENT IN DIFFERENT TISSUES OF SELECTED SHRIMPS *PENAEUS MONODON* AND *PENAEUS VANNAMEI*

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ABSTRACT

The present study was undertaken to determine the amount of protein content in different tissues of marine shrimps *Penaeus monodon* and *Penaeus vannamei*. The test specimens were obtained from shrimp culture ponds at Mallippattinam, Thanjavur District, Tamil Nadu, India. The different tissues were analyzed for protein content. The amount of protein contents were observed in muscle (149.00 ± 0.65 mg/g), gills (89.46 ± 1.26 mg/g) and intestine (114.40 ± 0.97 mg/gm) of *P. monodon* and compared to that of *P. vannamei*'s muscle (101.19 ± 0.06 mg/gm), gills (82.03 ± 1.69 mg/gm) and intestine (102.19 ± 0.54 mg/gm). The highest content of protein was observed in *P. monodon* than in *P. vannamei*.

Keywords: *Penaeus monodon*, *Penaeus. vannamei*, tissue protein, nutritive values.

INTRODUCTION

The species of shrimps *Penaeus monodon* and *Penaeus vannamei* constitute the important fishery resource in India. The demand for animal protein for human consumption is increasing. It is met largely by the terrestrially farmed animals. There

has been a considerable increase in the marine shrimp culture due to its high protein content, less fat, delicious taste and market demand in both national and international market. Many marine prawns of economic importance have been identified (e.g. *Penaeus monodon*, *P. vannamei*, and

P. indicus) and used as suitable species for aquaculture in India (Chwang *et al.*, 1986).

Feed is one of the important and essential inputs in shrimp farming. The cultured organisms are stocked at high density in the scientific aquaculture. Feeding provides proper nutrition for the prawn such that with optimum environmental conditions, the prawn will attain marketable size in the shortest time and at the least cost in order to obtain the largest margin of profit. During the marine prawns growth, the food requirement will increase substantially and if they do not get sufficient food, poor survival and production (Bautista and Subosa, 1997). The feed is the largest operating cost of prawn farming and every effort should be made to ensure efficient utilization of feeds (Forkjaer, 1994).

To obtain maximum growth, an optimum level of dietary protein is needed. *Penaeus vannamei* have a gross protein requirement of 30 to 40% and *P. monodon* have a gross protein requirement 38 to 46%. It is known fact that *P. vannamei* and *P. monodon* are most efficient diet for us (Gornall *et al.*, 1949 and Shakir *et al.*, 1994). The amino acids which, the marine prawns cannot synthesize in their body are considered as essential and it must be included in the diet of the required quantities (Glencross *et al.*, 2002).

A few authors studied the feeding habits of shrimp and stomach content (Hyslop, 1980). Many authors reported the biochemical composition of

protein, carbohydrate and lipid of the tissues of individual penaeid prawn (Watanable, 1982; Barrat and Mantano, 1986 and Whiteford, 2005).

The present study was aimed to investigate the variations in the protein content of selected marine prawns *P. monodon* and *P. vannamei*.

MATERIALS AND METHODS

The marine prawns *P. monodon* and *P. vannamei* were collected from shrimp culture ponds at Mallippattinam, Thanjavur District, Tamilnadu, India during February 2012 to January 2013. The different tissues of the muscles, gills and intestine were removed from *Penaeid species* and weighed accurately. Proteins content of the tissues were determined by the method of Lowry *et al.* (1951).

Statistical Analysis: The mean and standard deviation were employed to determine the significance of differences in the mean value of protein content using SPSS statistical packages (SPSS, 1990).

RESULTS AND DISCUSSION

The protein content of the muscles, gills, and intestine of *P. monodon* and *P. vannamei* are given in the Table 1. The total protein content was found to be fluctuated in the different tissues based on the seasons.

Table 1. Seasonal changes of total protein content of shrimps *P. monodon* and *P. vannamei*. (Each value is Mean \pm Standard Deviation and expressed in mg/gm).

Month & year	<i>P. monodon</i>			<i>P. vannamei</i>		
	Muscle	Gill	Intestine	Muscle	Gill	Intestine
Feb 2012	123.48 \pm 1.16	62.09 \pm 1.53	86.17 \pm 0.98	117.79 \pm 0.69	61.07 \pm 1.76	81.44 \pm 0.79
Mar 2012	112.73 \pm 1.02	78.95 \pm 1.60	99.03 \pm 1.45	112.74 \pm 1.18	75.37 \pm 1.01	87.82 \pm 0.63
Apr 2012	139.35 \pm 0.92	89.46 \pm 1.26	106.72 \pm 1.79	137.96 \pm 0.64	82.03 \pm 1.69	94.63 \pm 0.93
May 2012	149.00 \pm 0.65	88.98 \pm 1.46	114.40 \pm 0.97	136.26 \pm 0.99	80.45 \pm 1.09	102.19 \pm 0.54
Jun 2012	148.85 \pm 1.35	88.05 \pm 1.76	102.57 \pm 0.94	131.48 \pm 1.02	79.54 \pm 1.56	97.53 \pm 0.84
Jul 2012	143.43 \pm 1.03	85.93 \pm 1.30	98.39 \pm 0.83	129.14 \pm 0.77	78.70 \pm 1.83	89.28 \pm 0.89
Aug 2012	146.35 \pm 0.73	84.97 \pm 1.53	91.40 \pm 0.74	123.15 \pm 0.95	72.95 \pm 0.53	79.36 \pm 0.55
Sep 2012	148.11 \pm 1.20	80.52 \pm 1.53	102.44 \pm 1.16	128.09 \pm 1.04	74.14 \pm 2.12	87.73 \pm 0.65
Oct 2012	119.45 \pm 0.59	77.67 \pm 0.91	93.24 \pm 0.58	101.19 \pm 0.06	78.89 \pm 0.53	88.29 \pm 0.95
Nov 2012	127.59 \pm 1.16	74.07 \pm 0.80	79.49 \pm 0.90	117.76 \pm 1.57	62.39 \pm 1.01	77.79 \pm 0.62
Dec 2012	114.46 \pm 1.39	77.67 \pm 0.71	95.57 \pm 0.64	117.51 \pm 1.02	55.87 \pm 1.78	74.33 \pm 0.73
Jan 2013	111.59 \pm 1.18	68.83 \pm 0.53	83.95 \pm 1.48	121.16 \pm 0.46	61.39 \pm 1.13	73.53 \pm 1.34

Penaeus monodon

The muscle tissue of protein content was recorded maximum (149.00 mg/g) in May 2012 and minimum (111.59 mg/g) in January 2013. The gill tissue of protein content was recorded maximum (89.46 mg/g) in April 2012 and minimum (62.09 mg/g) in February 2012. The intestinal tissue of protein content was recorded maximum (114.40 mg/g) in May 2012 and minimum (79.49 mg/g) in November 2012.

Penaeus vannamei

The muscle protein content was recorded maximum (137.96 mg/g) in April 2012 and the minimum (101.19 mg/g) in October 2012. The gill protein content was recorded maximum (82.03 mg/g) in April 2012 and minimum (61.07 mg/g) in February 2012. The intestine protein content was recorded maximum (102.19 mg/g) in May 2012 and minimum (73.53 mg/g) in January 2013.

The present study reveals that protein content was maximum in muscle tissue of Penaeid Prawns as reported by Kutty and Parulekar (1984). Biochemical composition of any organisms is known to vary with season, size of animal, stages of maturity and availability of food, temperature, etc. (Sriraman and Reddy, 1977). Smith and Chisholm (2001) reported the low amount of protein content in gills and intestinal sample of *Penaeid* shrimps. Fenucci *et al.*, (1980) and Ali *et al.*, (2006) observed significant differences of protein between the tissues of *P. monodon* and *P. vannamei*. The present study agrees the earlier observations (Ketalo, 1982; Dominy and Ako, 1988 and Shakir *et al.*, 1994).

CONCLUSION

The present study reveals that *P. monodon*, *P. vannamei* tissues consist of high quality protein. So, *P. monodon* and *P. vannamei* are considered to be the candidate species for aquaculture.

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