

COMPARATIVE STUDY ON THE PROXIMATE COMPOSITION IN FLESH AND SHELL OF THE *PENAEUS INDICUS*

***M. Ratnakala**

Department of Zoology,

Mrs. A.V.N. College, Visakhapatnam-530001

*Author for Correspondence

ABSTRACT

The purpose of the present study is to estimate the proximate composition in two different body parts of the shrimps. For this study the samples were collected during the year 2016 in early hours of the day from Sarada-Varaha estuarine environment, east coast of India. The study area is located near Yelamanchili in Visakhapatnam. The body parts like flesh and shell were selected and made a comparative study in which we have studied the biochemical parameters such as proteins, carbohydrates, lipids, moisture and ash content. It is evident from the present study findings that the protein contents are higher in flesh than shell. Similarly the highest percentages of carbohydrates were recorded in flesh than shell. With regard to lipids the highest levels was seen in shell than flesh. Based on the findings of the present investigation it is recommended that the shrimp *Penaeus indicus* is quiet suitable as nutritional choice those who are suffering with malnutrition problems in rural and urban areas in the developing countries.

Keywords: Proteins, Carbohydrate, Lipid.

INTRODUCTION

According to Kumulu (1998) total shrimp production is reached to about six million tonnes in which on an average 3.4 million tonnes of resources from the capture fisheries and through aquaculture 2.4 million tonnes. Bhavan *et al.*, (2010) depicted that the quality and nutritional values always depends on the percentage proportions of various biochemical components such as proteins, lipids, carbohydrates, minerals, vitamins and fatty acids. They also stated that the seafood contributing major share to aquaculture sector in which almost 20% of the food comes only from shrimps. Ehigiator and Oterai, (2012) stated that understanding the importance of proximate composition of any edible seafood is at most important because of their high quality protein and other essential nutritional components. Ali *et al.*, (2005) studied about the biochemical composition in various fish species such as *Catla catla*, *Cirrhinus mrigala*, *Cyprinus carpio*, *Hypophthalmichthys molitrix*, *Labeo rohita*, Mori-Rahu Hybrid and Thalla-Rahu Hybrid. They observed that *Cyprinus carpio* is quiet suitable species for brackish water culture operations. Very limited information is available on the proximate composition of *Penaeus indicus* from the Sarada-Varaha estuarine environment. Therefore the main objective of the present study was to evaluate the proximate composition in shell and flesh of the *Penaeus indicus*.

MATERIALS AND METHODS

Collection

The shrimps were collected from the Sarada-Varaha estuarine environment, east coast of India. The collected specimens were put in crushed ice in insulated containers and brought to the laboratory of Department of Zoology, Mrs. A.V.N. College, Visakhapatnam for preservation prior to analysis.

Processing

Before performing the biochemical analysis the samples were thoroughly cleaned with deionised water to remove any adhering contaminants and drained using wick of filter papers. Five different samples were selected randomly and were dissected into edible part (Flesh) and non-edible part (Exoskeleton) for chemical analysis. The homogenized body parts were oven dried at 75-90°C and ground into fine powder. Triplicate readings were taken.

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Determination of proximate composition

Estimation of moisture and ash

The moisture and ash contents of the shrimp samples were analyzed by Association of Official Agricultural Chemists, AOAC method (1990).

Estimation of Proteins

The crude protein content of the specimens were found out by adopting standard method Lowry *et al.*, (1951)

Estimation of Carbohydrates

The carbohydrate content of the shrimps were estimated by following the method of Dubois *et al.*, (1956)

Estimation of Lipid

Lipid content of the shrimp was estimated by the following the method of Folch *et al.*, (1957).

RESULTS AND DISCUSSION

Table 1. Proximate composition in the flesh of *Penaeus indicus*

S/N	Moisture (%)	Ash (%)	Proteins (%)	Carbohydrate (%)	Lipid (%)
1	51.20±0.23	1.68±0.06	35.86±0.26	3.84±0.41	7.42±0.22
2	52.51±0.17	1.42±0.03	36.04±0.39	3.76±0.27	6.27±0.36
3	51.45±0.28	1.29±0.07	36.23±0.28	3.69±0.14	7.34±0.61
4	51.40±0.56	1.70±0.04	35.94±0.56	3.58±0.21	7.38±0.40
5	52.93±0.29	1.34±0.01	36.14±0.44	3.52±0.34	6.07±0.20
Mean ± SD	51.89±0.30	1.48±0.04	36.04±0.38	3.67±0.27	6.89±0.35

Table 2. Proximate composition in the shell of *Penaeus indicus*

S/N	Moisture (%)	Ash (%)	Proteins (%)	Carbohydrate (%)	Lipid (%)
1	58.13±0.21	3.42±0.01	26.84±0.54	2.69±0.34	8.92±0.71
2	57.68±0.37	3.04±0.20	26.92±0.22	2.72±0.21	9.64±0.52
3	58.86±0.43	2.99±0.31	25.97±0.29	2.78±0.39	9.40±0.24
4	58.47±0.32	3.12±0.27	26.73±0.40	2.92±0.44	8.76±0.47
5	58.44±0.51	2.97±0.11	26.68±0.37	2.67±0.28	9.24±0.16
Mean ± SD	58.31±0.36	3.10±0.18	26.62±0.36	2.75±0.33	9.19±0.42

Flesh

In Flesh of the *Penaeus indicus* the protein content ranged from 35.86±0.26 to 36.23±0.28 with an average value of 36.04±0.38. Carbohydrate content ranged from 3.52±0.34 to 3.84±0.41 with an average value of 3.67±0.27. Lipid content ranged from 6.07±0.20 to 7.42±0.22 with an average value of 6.89±0.35. Ash content ranged from 1.29±0.07 to 1.70±0.04 with an average value of 1.48±0.04. Moisture value ranged from 51.20±0.23 to 52.93±0.29 with an average value of 51.89±0.30 (**Table 1**).

Shell

Similarly in Shell of the *Penaeus indicus* the protein content ranged from 25.97±0.29 to 26.92±0.22 with an average value of 26.62±0.36. Carbohydrate content ranged from 2.67±0.28 to 2.92±0.44 with an average value of 2.75±0.33. Lipid content ranged from 8.76±0.47 to 9.64±0.52 with an average value of 9.19±0.42. Ash content ranged from 2.97±0.11 to 3.42±0.01 with an average value of 3.10±0.18. Moisture value ranged from 57.68±0.37 to 58.86±0.43 with an average value of 58.31±0.36 (**Table 2**).

Previous workers reported that the protein content was ranged from 17 to 21% in shrimp species (Yanar and Celik, 2006; Sriket *et al.*, 2007). Gunalan *et al.*, (2013), recorded the protein content in *L. vannamei* was 35.69%. Ravichandran *et al.*, (2009) recorded the protein values in *P. indicus* of flesh was higher than shell. Similarly in the present investigation the same trends of results were recorded in *P. indicus*.

Carbohydrates are important nutrients which are essential for the growth and development of any species because they are prime source to procure energy (Heath, 1987). Similarly Ravichandran *et al.*, (2009) also

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reported same pattern of results. The findings of the present investigation are in agreement with the results of (Ravichandran *et al.*, 2009). Ravichandran *et al.*, (2009) recorded the lower value of lipid in flesh (7.6 ± 0.7) than that of shell (9.8 ± 0.7). Similarly in the present study the lipid content was lower in flesh (6.89 ± 0.35) than that of shell (9.19 ± 0.42).

Moisture value in flesh of *P. indicus* ranged from 51.20 ± 0.23 to 52.93 ± 0.29 with an average value of 51.89 ± 0.30 . Moisture value in shell of *P. indicus* ranged from 57.68 ± 0.37 to 58.86 ± 0.43 with an average value of 58.31 ± 0.36 . The recorded moisture values in the present study more or less similar to the findings of Ali *et al.*, (2005).

Ash content of shrimp is generally ranged from 1 to 1.5%. Sriket *et al.*, (2007) reported that the amount of ash of black tiger and white shrimp as 0.95 and 1.47% respectively. It has been observed from the current study that the recorded ash contents in flesh (1.48 ± 0.04) and in shell (3.10 ± 0.18) respectively. Oksuz *et al.*, (2009) reported that the ash content of rose shrimp and red shrimp was 1.55 and 1.05% respectively. Gunalan *et al.*, (2013) recorded 1.2% in the flesh of *Litopenaeus vannamei*.

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