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NUTRITIONAL VALUES IN SHELL AND FLESH OF THE GIANT TIGER PRAWN *PENAEUS MONODON* (FABRICIUS, 1798)

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Abstract : The current study was aimed to provide the nutritional information of the penaeid shrimp *Penaeus monodon*. The samples were collected from the fishing harbour at Visakhapatnam, east coast of India. Twenty different samples were selected randomly for the biochemical analysis. The nutritional parameters like proteins, carbohydrates, lipids, moisture and ash were estimated both in shell and flesh of the shrimp. The protein content in the flesh (51.34±0.51) was higher than that of shell (37.49±0.32). Similarly the carbohydrate content of the flesh was higher (3.38±0.05) than the shell (2.49±0.02). The lipid content was lower in flesh (4.72±0.11) than that of shell (6.95±0.21). Highest level of moisture content was noticed in the flesh (15.59±0.42) than that of shell (13.70±0.18). The ash content was minimum in flesh (12.38±0.72) in contrast to the shell of the shrimp (22.41±0.29). Based on the above results we recommended that shrimp contains good amount of nutritional substances which are required for the good choice of food supplement in human nutrition.
Keywords: *Penaeus monodon*, Shell, Flesh and Biochemical Composition.

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Introduction

The essential vitamin B12, selenium, astaxanthin and omega 3-higlhy unsaturated fatty acids (HUFAs) are abundantly found in shrimp meat. Hence in recent days the consumption of shrimp species increased rapidly. The existing research works stating that they provide important antioxidants to the major systems in the body i.e. nervous and muscular systems (Venugopal, 2009). Research works on animal studies have shown that, the decreased risk of colon cancer, as well as certain diabetes related problems when diet supplemented with astaxanthin (The George Mateljan Foundation, 2015).

Very few studies were conducted on biochemical composition of shell and flesh of shrimp species. Ravichandran *et al.,* (2009) focused on the biochemical composition in shell and flesh of *Penaeus indicus*. Suravi Muduli and Lakshman Nayak (2017) was selected cultured white leg shrimp (*Litopenaeus vannamei*) species for the estimation of nutritional parameters in flesh and shell. In this study we selected giant tiger prawn

Penaeus monodon for the estimation of biochemical constituents in two different body parts (i.e. shell and flesh).

Materials and Methods

Sample collection:

The Asian tiger shrimps (*Penaeus monodon*) were collected from the Visakhapatnam fishing harbour east coast of India. Samples were stored in ice containers and brought to the laboratory, Department of Zoology, Dr. V.S. Krishna Govt. Degree College (A), Viskhapatnam during early hours of the day. Then the samples were cleaned with distilled water to remove any adherent contaminants from the body, drained under folds of filter paper. After that the shrimps which are in healthy and hygienic conditions were selected for the biochemical analysis.

Processing of the samples

Shrimps were processed in sterile environment to avoid microbial contamination. The shrimps were carefully dissected with sterile scissors to remove the shell from the flesh and biochemical analysis was performed in edible portion (flesh) as well as in non-edible portion (shell). The two different parts were oven dried at 90-105^{0}C and then ground into fine powder by using motor pestle.

Proximate analysis of the shrimps

The moisture and ash contents of the shrimp samples were analysed by Association of Official Agrichemicals, AOAC method (1990). Proteins, carbohydrates, lipid contents were estimated by adopting standard methods of (Lowry *et al.,* 1951; Dubois *et al.,* 1956 and Folch *et al.,* 1956) respectively. Triplicate readings were taken for this study.

Results and Discussion

Numerous factors will determine the proximate composition of any species they are age, sex, stage of maturity, food availability, seasons and pollution level in the aquatic environment (Kharat *et al,* 2009). Bhavan *et al.,* (2010) stated that the protein plays a vital role in the proper function, growth and maintenance of the body tissues. According to the study of Gunalan *et al.,* (2013) the protein content of *Litopenaeus vannamei* was 35.69%. Ravichandran *et al.,* (2009) reported that the percentage of protein in the flesh was higher (41.3%) than that of shell protein (32.5%). Suravi Muduli and Lakshman Nayak (2017) reported that the percentage of protein in the flesh was higher (45.27±1.01%) than that of shell protein (36.28±1.22 %). In the present investigation the reported protein content in flesh and shell of the *Penaeus monodon* following similar trends of observations with previous studies reported on shrimp species (Ravichandran *et al.,* 2009; Suravi Muduli and Lakshman Nayak, 2017).

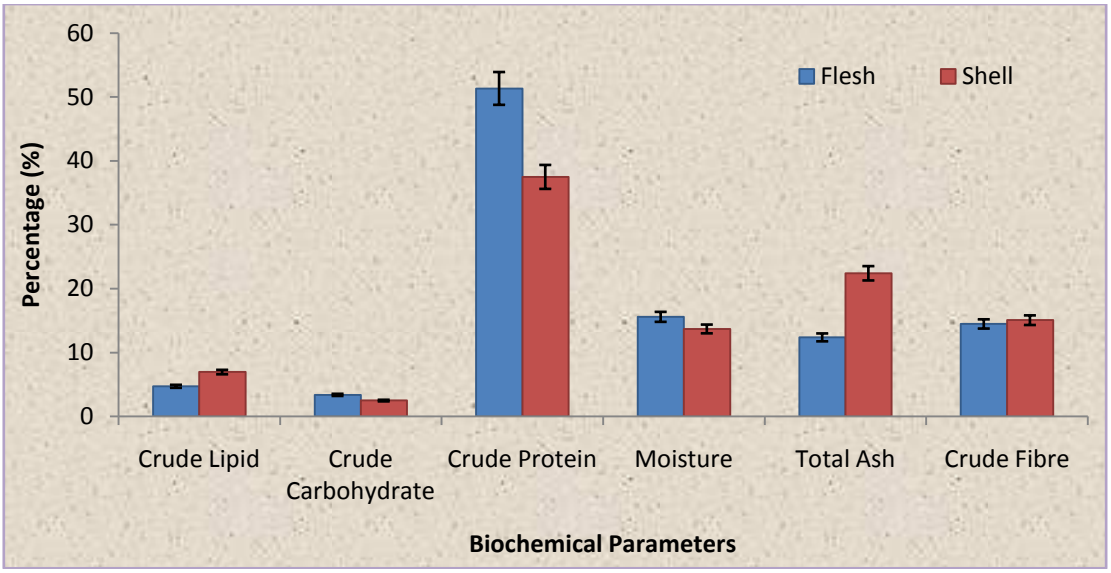

Figure 1. Mean values of Biochemical constituents in shell and flesh of *Penaeus monodo*n (% dry wet basis)

Carbohydrates are most important organic nutrients which will be utilized to generate energy resources in the body (Heath, 1987). It has been observed from the present study that the average carbohydrate content in the flesh (3.38±0.05) was higher than that of shell (2.49±0.02). Carbohydrate content exhibited an inverse relationship with protein content. Similar trends of reports were recorded by Silva and Chamul, 2000; Sriraman, 1978; Nair and Prabhu 1990; Reddy and Shanbhogue, 1994; Gunalan *et al.,* 2013; Suravi Muduli and Lakshman Nayak, 2017).

Ouzumi and Fujii (2000) stated that the lipids are prominent components in generating high energy in the body when compared to proteins and carbohydrates. It has been observed from the present study that the percentage of proteins was higher followed by lipids and carbohydrates in the muscle tissue of *Penaeus monodon*. Similar pattern of observations was previously recorded by (Nagis, 2006; Gunalan *et al.,* 2013). According to the study of Ravichandran *et al.,* (2009) the lowest value of lipid was found in flesh, the value being (7.6%) whereas the highest value of lipid was noticed in the shell (9.8%). In the present study it has been observed that the average lipid content was minimum in flesh whereas maximum amount was noticed in shell of *Penaeus monodon.*

Ravichandran *et al.,* (2009) reported the maximum moisture content in flesh (14.7±0.7%) and minimum was in shell (12.3±0.1) in *Penaeus indicus.* It has been observed from the present investigation that the maximum moisture content was recorded in flesh (15.59±0.42) whereas minimum was noticed in shell (13.70±0.18). Similarly Suravi Muduli and Lakshman Nayak, (2017) reported maximum moisture content in flesh (16.85±0.44) than in shell (13.24±0.88) with respect to *Litopenaeus vannamei.* In the present study the reported ash contents in both shell and flesh of the *P. monodon* in agreement with the findings of other workers reported elsewhere in penaeid species (Ravichandran *et al.,* 2009; Suravi Muduli and Lakshman Nayak, 2017).

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