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Short Communication

Proximate composition of the fresh water prawn *Macrobrachium rosenbergii* in cultured and frozen stage from Nellore Coast, India

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Abstract

The current study was aimed to establish the nutritional status of the fresh water prawn *Macrobrachium rosenbergii* from Nellore Coast India. 15 different samples were selected randomly for the estimation of the proximate composition. The study concentrated on the nutritional status of the prawn in dry matter basis. The average values of the proteins, carbohydrates, lipids, ash and moisture as in cultured and frozen prawns were recorded as 74.24 ± 0.49, 5.50 ± 0.34, 9.09 ± 0.09, 9.71 ± 0.19, 77.14 ± 0.19 and 60.55 ± 0.35, 8,23 ± 0.18, 7.98 ± 0.13, 21.61 ± 0.42, 74.93 ± 0.23, respectively. The analysis of the tabulated data was performed by using SPSS 21.0 statistical tool to evaluate the mean standard deviation. The higher amounts of proteins, lipids were identified in cultured prawn. As the prawn contains great amount of proteins will be helpful to minimize the protein demand in the country.

Introduction

The Prawn *Macrobrachium rosenbergii* contain greater amount of proteins, lipids and unique taste, less fat and has great demand in national and international markets. Shellfish contains potent source of nutrients required for the maintenance and growth of human body (Dong, 2001). Due to low price and efficient availability, the prawns and shrimps have good source of animal protein for low income earners (Adeyeye, 1996). Prawn contains good amount of organic and inorganic constituents. The main constituents are proteins, carbohydrates; lipids in addition to that prawn also contain a significant proportion of minerals (Ca, Mg, P, Mn and Cl) and vitamins A, C and D (Abulude *et al*., 2006). Many previous reports were available on the growth and nutritional quality of *M. rosenbergii* under different culture conditions (Gomez *et al*., 1988; Reed and Abramo, 1989; Sheen and Abramo, 1991; Hossain *et al.*, 2006; Hossain *et al.*, 2007; Habashy, 2009). However information on the nutritional status of the cultured and frozen prawns was scanty except a few reports (Cavalli *et al*., 2001; Thomson *et al.*, 2004; Bhavan *et al*., 2008; Ferdose and Hossain, 2011). Since studies on proximate composition on cultured and frozen prawns were very scanty. So the current study aimed to establish information on the proximate composition of the prawn in cultured and frozen stage.

Materials and Methods

Sample collection and experimental design

Healthy and good qualities of cultured prawns were collected from local farms nearby Nellore and frozen prawns from markets during early hours of the day. The experimental samples were packed into a sterile Thermocol containers containing dried ice, and transported to the laboratory, Department of Biochemistry, Yogi Vemana University, Kadapa.

Samples were distributed aseptically into two experimental groups and stored at -18°C until biochemical analysis. Before performing the biochemical analysis the prawns were washed thoroughly under running tap water to remove unwanted materials from the body surface then the prawns were carefully dissected with sterile scissors and isolate the required amount of flesh from both cultured and frozen prawns. Then the biochemically profiled values were tabulated.

Proximate composition

The total carbohydrate of the shrimp was identified by following the method of (Travelyan and Harrison, 1952). The total protein content of the shrimp was calculated by following the method of (Lowry *et al*., 1951). The moisture content of the shrimp was estimated by following the method of (Jain and Singh, 2000). The total lipid content of the shrimp

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was determined by the method of Bligh and Dryer (1959). The ash content of the shrimp was measured by the AOAC method (1980). To evaluate the above mentioned different parameters the following formulae used for the current experimentation

Identification of proteins

Percentage (%) of Proteins = (c-b) × 14 × d × 6.25/a × 1000 × 100

Where, a = sample weight in (g), b = volume of NaOH required for back titration and neutralize with 25 ml of 0.1N H_2SO_4 (for sample), c = volume of NaOH required for back titration and neutralize with 25 ml of 0.1N H_2SO_4 (for blank), d = normality of NaOH used for titration process, 6.25 = conversion factor of Nitrogen to protein and 14 = atomic weight of Nitrogen.

Estimation of moisture

Percentage (%) of Moisture = (weight loss/ original weight of sample taken) x100

Estimation of lipids

Percentage (%) of Lipids = (Weight of the extract/Weight of sample) x100

Calculation of ash

Percentage (%) of Ash = (Weight of Ash/Weight of sample) x 100

The carbohydrate content was determined by subtracting protein, lipid and ash from 100.

Statistical analysis

The statistical interpretation of the tabulated data was performed by using SPSS (21.0 version) for the mean standard deviation at 5% level of significance.

Results and Discussion

The proximate composition of the prawn *Macrobrachium roesenbergii* as in dry matter basis both in cultured and frozen prawn was represented in Table 1 and 2, respectively. In the current study comparison was made between cultured prawn and frozen prawn. The results were indicated that the greater amount of proteins and lipids were reported in cultured prawn than frozen prawn. 15 different samples were selected randomly for the current experimentation for the estimation of proximate composition in *Macrobrachium rosenbergii* both in cultured and frozen stage.

The proximate composition of the fish varied widely from species to species and even within the same species from one individual to another (Stansby, 1962). The difference in the individual variation in terms of proximate composition was aided by the sex, season, reproductive behaviour, food sources availability, capture period and hydrologic level (Oliveira, 2003; May-Ku *et al.*, 2006; Nargis, 2006). In this study these factors were not taken into consideration and we used adult *Macrobrachium rosenbergii* as candidate species from both the sexes.

Table 1. Proximate composition of the cultured prawn *Macrobrachium rosenbergii* in % of dry matter basis (Mean ± SD)

S. No	Proteins	Carbohydrates	Lipids	Ash	Moisture
1	73.89	4.88	8.94	9.82	76.92
2	74.04	5.22	9.07	9.76	77.01
3	73.96	5.87	9.14	9.47	76.99
4	72.99	4.99	9.11	9.62	77.24
5	74.18	5.62	9.08	9.59	77.02
6	74.64	4.92	8.99	9.99	77.14
7	74.81	5.84	9.04	9.79	76.97
8	74.79	5.48	9.24	9.58	77.14
9	73.92	5.78	9.26	9.77	77.09
10	74.54	5.44	9.09	9.94	76.97
11	74.49	5.79	8.97	9.91	77.06
12	73.83	5.67	9.02	9.84	77.28
13	74.38	5.59	9.16	9.89	77.37
14	74.29	5.63	9.21	9.36	77.42
15	74.89	5.87	9.17	9.42	77.56
Mean	74.24	5.50	9.09	9.71	77.14
S.D.	0.49	0.34	0.09	0.19	0.19

Table 2. Proximate compostion of the frozen prawn *Macrobrachium rosenbergii* in % of dry matter basis (Mean ± SD)

S. No	Proteins	Carbohydrates	Lipids	Ash	Moisture
1	60.29	8.43	8.03	21.72	74.27
2	60.86	8.27	7.81	20.97	74.86
3	59.92	7.96	7.92	20.67	74.81
4	60.64	8.07	7.97	21.48	75.03
5	60.49	8.32	8.07	21.87	74.93
6	61.02	7.92	8.14	21.76	74.79
7	60.79	8.17	8.21	20.84	75.21
8	60.54	8.52	8.11	21.75	74.97
9	60.36	8.31	7.69	21.81	75.13
10	61.05	8.19	8.02	21.86	75.16
11	59.97	8.33	7.92	21.97	74.89
12	60.41	7.99	8.04	21.84	75.18
13	60.27	8.37	7.89	21.78	75.07
14	60.79	8.41	8.07	21.91	74.91
15	60.93	8.19	7.95	21.95	74.87
Mean	60.55	8.23	7.98	21.61	74.93
S.D.	0.35	0.18	0.13	0.42	0.23

The protein content of the cultured prawn was ranged from 72.99 to 74.89 with an average value 74.24 which was greater than that of frozen prawn average protein value recorded as 60.55. Amino acids are the key stones for protein construction. Proteins are required for normal growth and proper functioning of the body tissues (Diana, 1982). Gomez *et al*. (1988) and Habashy (2009) reported that the

protein composition might be up to 90% depends on the diet composition.

The average carbohydrate content of the cultured prawn was (5.50) lower compared to the frozen prawn content recorded as 8.23 ± 0.18. Carbohydrates are first and important nutrients utilized by the body as substrate for the energy production (Heath, 1987). The average content of the lipids were greater (9.09 ± 0.009) than that of the frozen prawn recorded as 7.98 ± 0.13. Ricardo *et al.* (2003) and New (1986) reported that lipids are the good source of energy producers of the body through metabolic pathways or metabolism and acts as a carrier molecules for the non fat nutrients like A, D, E, K.

The average ash content 9.71 ± 0.19 which was less compared to the frozen prawn recorded as 21.61 ± 0.42. The moisture content of the cultured prawn was 77.14 ± 0.19 higher when compared to frozen prawn value recorded as 74.93 ± 0.23. The current study findings were more or less similar to the reports of Ferdose and Hossain (2011) reported that the protein, carbohydrates, lipid, ash and moisture contents in both cultured and frozen prawns were observed as 74.85 ± 0.65, 60.8 ± 0.12, 5.61 ± 0.37, 8.21 ± 0.14, 9.15 ± 0.61, 7.89 ± 0.005, 10.14 ± 0.55, 23.09 ± 0.39, 77.1 ± 1.69, 74.9 ± 0.98.

Conclusion

The findings of the current study suggest that the prawn *Macrobrachium rosenbergii* contains greater number of proteins and it can be recommended as a candidate species for the human consumption.

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