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Proximate Composition in the Mud Crabs *Scylla serrata* and *Scylla olivacea* from Kakinada, East Coast of India

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ABSTRACT
The purpose of the present investigation is to estimate the proximate composition in two mud crab species such as Scylla serrata and Scylla olivacea. In Scylla serrata the protein content ranged from 18.75±0.41 to 20.04±0.33 with an average value of 19.44±0.42 which is higher than the average value (18.67±0.39) of Scylla olivacea. In Scylla olivacea the Carbohydrate content ranged from 3.04±0.51 to 3.89±0.49 with an average value of 3.55±0.48 which is higher than the average value (3.09±0.54) of Scylla serrata. In Scylla serrata the lipid content ranged from 1.83±0.22 to 2.01±0.27 with an average value of 1.94±0.26 which is higher than the average value (1.88±0.18) of Scylla olivacea. In Scylla olivacea the ash content ranged from 1.06±0.10 to 1.35±0.15 with an average value of 1.20±0.11 which is higher than the average value (1.03±0.13.) of Scylla serrata. In Scylla olivacea the moisture content ranged from 74.34±1.00 to 75.31±1.06 with an average value of 74.67±1.10 which is higher than the average value (74.48±1.10] of Scylla serrata.
Keywords: *Scylla serrata, Scylla olivacea, Proximate composition.*

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INTRODUCTION

Wan Yusof et al. [1] stated that crab is one of the decapod crustaceans which come under shellfish group and they are extensively found in marine, mangrove areas and also in estuarine environment. Crabs are considered as important food sources in view of nutritional benefits after shrimps and lobsters [2]. Crab meat is an excellent source for major vitamins, minerals, fatty acids which contribute huge benefits to human kind. The crab meat not only fulfill protein requirement but also involved in curing some kind of diseases such as asthma and chronic fever [3]. Usually marine crab meat is very good source for soluble minerals (Ca, P, Na, K and Cl) and these proportions may vary from species to species but they have many advantages in various biochemical reactions, involved in acid base balance, and to maintain membrane potential [4]. Some biological studies with relevant to crab is highly explored as they are good source of antimicrobial peptides, rich in antioxidants and are widely used in food, agriculture, and pharma industries [5-7]. In spite of all the above, basic knowledge with regard to nutritional values of mangrove crabs is very much essential. However, very few studies have been carried out to date on the mud crab's nutritional profile from the coastal areas of Kakinada. Kakinada is known for good mangrove diversity and the nutritional assessment of mangrove crabs is very much required. Many people on the coastal areas mainly depend on the fish, prawn, shrimp as their food choice. As a result, accelerating the production of this species could satisfy the nutrition rich food demand to some extent. Keeping in view of this reason the primary goals of the study was to determine the nutritional profile of the mud crabs so that consumers, the food industry, and policymakers could use this information as baseline data for future research work.

MATERIAL AND METHODS

In the present investigation we have used two different crabs namely *Scylla serrata* and *Scylla olivacea.* There are about 14 specimens used for the estimation of proximate composition seven from each species irrespective of their sexes. The crabs were purchased from the Kakinada landing center during first hours of the day. The collected specimens were stored in insulated containers and brought to the Laboratory of the Department of Zoology, Andhra University for further analysis. Soon after arriving the crabs were thoroughly washed with deionized water followed by distilled water to remove any adherent particles on the body surface. Sterile forceps were used to remove the crab surface and the required amount of the

meat was separated from the selected species. The separated muscle tissues were washed with distilled water before homogenization with mortar and pestle. Later the samples were oven dried at 50-60^{0}C. Then the samples were stored in deep freezer till analysis. Before analysis the samples were taken out from the freezer and powder form can be used for the estimation of proximate parameters such as proteins, lipids, carbohydrates, moisture and ash. This study followed the standard procedures mentioned by different workers for the estimation of protein, carbohydrate, lipid, moisture and ash content as follows. Raymont et al., [8] method for proteins, Dubois et al. [9] method for carbohydrates and Folch et al. [10] method for the lipids. Moisture and ash contents were estimated by following the method of AOAC [11].

RESULTS AND DISCUSSION

Table 1. Biochemical composition of *Scylla serrata* (% in dry matter basis)

S/N	Proteins (%)	Carbohydrates (%)	Lipid (%)	Ash (%)	Moisture (%)
1	19.95±0.47	3.25±0.55	1.97±0.26	1.02±0.11	73.81±1.01
2	20.04±0.33	2.98±0.47	1.94±0.31	0.99±0.15	74.05±1.21
3	19.02±0.54	3.01±0.61	1.83±0.22	1.11±0.17	75.03±1.05
4	19.44±0.39	3.22±0.58	2.01±0.27	1.05±0.12	74.28±1.22
5	18.75±0.41	2.99±0.51	1.99±0.25	1.01±0.14	75.26±1.04
Mean ± SD	**19.44±0.42**	**3.09±0.54**	**1.94±0.26**	**1.03±.0.13**	**74.48±1.10**

Table 2. Biochemical composition of *Scylla olivacea* (% in dry matter basis)

S/N	Proteins (%)	Carbohydrates (%)	Lipid (%)	Ash (%)	Moisture (%)
1	17.99±0.38	3.89±0.49	2.01±0.15	1.11±0.09	75.00±1.25
2	18.54±0.41	3.04±0.51	1.87±0.26	1.24±0.12	75.31±1.06
3	18.92±0.36	3.69±0.46	1.75±0.19	1.26±0.11	74.38±1.22
4	19.01±0.38	3.42±0.55	1.86±0.22	1.35±0.15	74.36±1.01
5	18.92±0.44	3.75±0.39	1.93±0.10	1.06±0.10	74.34±1.00
Mean ± SD	**18.67±0.39**	**3.55±0.48**	**1.88±0.18**	**1.20±0.11**	**74.67±1.10**

In *Scylla serrata* the protein content ranged from 18.75±0.41 to 20.04±0.33 with an average value of 19.44±0.42. Carbohydrate content ranged from 2.98±0.47 to 3.25±0.55 with an average value of 3.09±0.54. Lipid content ranged from 1.83±0.22 to 2.01±0.27 with an average value of 1.94±0.26. Ash content ranged from 0.99±0.15 to 1.11±0.17 with an average value of 1.03±.0.13. Moisture value ranged from 73.81±1.01 to 75.26±1.04 with an average value of 74.48±1.10 **(Table 1).**

In *Scylla olivacea* the protein content ranged from 17.99±0.38 to 19.01±0.38 with an average value of 18.67±0.39. Carbohydrate content ranged from 3.04±0.51 to 3.89±0.49 with an average value of 3.55±0.48. Lipid content ranged from 1.75±0.19 to 2.01±0.15 with an average value of 1.88±0.18. Ash content ranged from 1.06±0.10 to 1.35±0.15 with an average value of 1.20±0.11. Moisture value ranged from 74.34±1.00 to 75.31±1.06 with an average value of 74.67±1.10 **(Table 2).**

Parvathi and Padmavathi [12] recorded the protein content in *S. serrata* and *S. olivacea* and it was ranged from 18.02±1.05 to 22.14±1.25. Islam et al. [13] reported the protein value of 13.34% for male and 16.82% for female in wild crabs. In the present study the percentage of protein in *S. serrata* (18.75±0.41 to 20.04±0.33) and in *S. olivacea* (17.99±0.38 to 19.01±0.38) in the muscle tissue following the trends of results reported by George and Gopakumar [14] who recorded the protein value in *S. serrata* as 20.92%. Similar trends of results reported by Darwin et al. [15] and Ludiya Podili Rani [16]. Parvathi and Padmavathi [12] recorded the carbohydrate content in *S. serrata* and *S. olivacea* and it was fluctuated between 3.89±0.25 to 4.97±0.47. In the present study the percentage of carbohydrate in *S. serrata* (2.98±0.47 to 3.25±0.55) and in *S. olivacea* (3.04±0.51 to 3.89±0.49) in the muscle tissue following the trends of results reported by Soundarapandian et al. [17] who recorded the carbohydrate value in *P. vigil* ranged from 2.06 to 2.76%. Similarly the present study is in accordance with the results of Murugesan et al. [18], Sudhakar et al. [19] and Harinath [20].

Parvathi and Padmavathi [12] recorded the lipid content in *S. serrata* and *S. olivacea* and it was fluctuated between 1.75±0.20 to 2.69±0.11. The lipids values are well in agreement with the studies of Parvathi and Padmavathi [12]. In the present study the percentage of lipids in *S. serrata* (1.83±0.22 to 2.01±0.27) and in *S. olivacea* (1.75±0.19 to 2.01±0.15) in the muscle tissue following the trends of results reported by Soundarapandian et al. [17] who recorded the lipid value in *P. vigil* ranged from 0.32 to 1.09%. The recorded lipid values are slightly higher than the reports of Soundarapandian et al. [17]. Parvathi and

Padmavathi [12] recorded the moisture content in *S. serrata* and *S. olivacea* and it was fluctuated between 69.01±1.42 to 73.51±1.15. The present study findings are well in agreement with the results of Soundarapandian et al. [17] who reported the moisture content of *Podophthalmus vigil* was 75.0±0.18, 74.0±0.23, 79.0±0.23 for male, female and berried females respectively. Similarly Sakthivel et al. [21] recorded the moisture values of mangrove crab *Sesarma brockii* in eyestalk ablated and intact control crabs was 79.15±4.58% and 78.24±3.58% respectively. Sarower et al. [22] reported the ash content in *Scylla serrata*, which was ranged from 1.09% % to 7.65% %. Soundarapandian et al. [17] reported maximum ash content in females (0.99%) followed by berried females (0.98%) and males (0.31%). The present study results are slightly higher than the findings of Soundarapandian et al. [17]. Parvathi and Padmavathi [12] recorded the ash content in *S. serrata* and *S. olivacea* and it was fluctuated between 1.69±0.16 to 2.46±0.25. Similarly in the present study the ash contents were ranged between 0.99±0.15 to 1.11±0.17 for *S. serrata* and 1.06±0.10 to 1.35±0.15 for *S. olivacea* respectively.

RECOMMENDATIONS

Crabs are rich in nutritional substances such as proteins, carbohydrates, lipids and various minerals which are very much essential in human diet. Developing culture strategies like fish and prawns the large scale production of crab meat is come into existence and available for coastal people who are depending on seafood as their livelihood. These strategies not only improve the health status of the coastal communities but also provide employment opportunities.

REFERENCES

1. Wan Yusof, W.R., Badruddin Ahmad, F., Ahmad, N.M., Husaini, A.S.A. and Swamy, M. (2019). Proximate composition and antioxidant properties of orange mud crab, *Scylla olivacea*. Journal of Aquatic Food Product Technology, 28(4): 365-374.
2. Savad, A.M. and Raghavan, P.R. (2001). Mud crab-culture and fattening techniques, status and prospects. Seafood Export Journal, 32: 25-29.
3. Raja, S. (1981). The edible crab *Scylla serrata* and fishery in indo-pacific region. A review. M.Sc. Dissertation, Annamalai University, India, pp: 113.
4. Sudhakar, M. (2011). Biodiveristy, resources, nutrition status and shell utilization of crabs from cuddalore coast, southeast coast of India. Ph.D. Thesis, Annamalai University, 230p.
5. Sperstad, S.V., Haug, T., Blencke, H.M., Styrvold, O.B., Li, C. and Stensvåg, K. (2011). Antimicrobial peptides from marine invertebrates: challenges and perspectives in marine antimicrobial peptide discovery. Biotechnology Advances, 29(5): 519-530.
6. Zhao, J., Wen, X., Li, S., Zhu, D. and Li, Y. (2015). Effects of dietary lipid levels on growth, feed utilization, body composition and antioxidants of juvenile mud crab *Scylla paramamosain* (Estampador). Aquaculture, 435: 200-206.
7. Wan Yusof, W.R., Badruddin Ahmad, F. and Swamy, M. (2017). A brief review on the antioxidants and antimicrobial peptides revealed in mud crabs from the genus of Scylla. Journal of Marine Biology, 2017.
8. Raymont, J.E.G., Austin, J. and Lindford, E. (1964). Biochemical studies on marine zooplankton. I. The biochemical composition of *Neomysis intiger*. Journal of the Council/ International Permanent Council for the Exploration of the Sea, 28: 354-363.
9. Dubois, M., Giles, K.A., Hamilton, J.K., Rebors, P.A. and Smith, F. (1956). Calorimetric method for determination of sugars and related substances. Analytical Chemistry, 28: 350-356.
10. Folch, J., Lees, M. and Sloane Stanley, G.H. (1957). A simple method for the isolation and purification of total lipids from animal tissues. Journal of Biological Chemistry, 226(1): 497-509.
11. AOAC (1990). Official methods of analysis 15th Edition. Washington DC. 222-245 pp.
12. Parvathi, D. and Padmavathi, P. (2020). Proximate Composition of Mud Crabs *Scylla serrata* and *Scylla olivacea* from the Coast of Visakhapatnam, Andhra Pradesh, India. Bulletin of Environment, Pharmacology and Life Sciences, 10(1): 22-24.
13. Islam, T., Saha, D., Bhowmik, S., Nordin, N., Islam, S., Nur, A.A.U. and Begum, M. (2022). Nutritional properties of wild and fattening mud crab (*Scylla serrata*) in the south-eastern district of Bangladesh. Heliyon, e09696.
14. George, C. and Gopakumar, K. (1987). Biochemical studies on crab *Scylla serrata*. Fishery Technology, 24(1): 57-61.
15. Darwin, Ch., Suneetha, K. and Kavitha, K. (2017). Studies on Biochemical Composition of Marine Gastropod *Purpura bufo* off Visakhapatnam Coast. International Journal of Recent Innovations in Academic Research, 1(1): 1-6.
16. Ludiya Podili Rani (2017). Seasonal variations in protein content in Muscle and Intestine of *Penaeus indicus* (H. milne Edwards 1837). International Journal of Recent Innovations in Academic Research, 1(1): 20-22.
17. Soundarapandian, P., Ravichandran, S. and Varadharajan, D. (2013). Biochemical composition of edible crab, *Podophthalmus vigil* (Fabricius). Journal Marine Science and Research Development, 3(2): 1-4.
18. Murugesan, R., Soundarapandian, P. and Manivannan, K. (2008). Effect of Unilateral Eyestalk Ablation on the Biochemical changes of edible portunid crab *Charybdis lucifera* (Fabricus). Journal of Fisheries and Aquatic Science, 3: 82-86.

19. Sudhakar, M., Manivannan, K. and Soundrapandian, P. (2009). Nutritive value of hard and soft shell crabs of *Portunussanguinolentus* (Herbst). Journal Animal and Veterinary Advances, 1(2): 44-48.
20. Harinath P. (2017). Variations in Biochemical composition in liver of two fresh water prawns *Macrobrachium rosenbergii* and *Macrobrachium malcolmsonii*. International Journal of Recent Innovations in Academic Research, 1(1): 7-10.
21. Sakthivel, D., Vijayakumar, N. and Anandan, V. (2014). Biochemical Composition of Mangrove Carb *Sesarma brockii* From Pondicherry Southeast of India. International Journal of Science inventions today, 3(3): 187-202.
22. Sarower, M.G., Bilkis, S., Rauf, M.A., Khanom, M. and Islam, M.S. (2013). Comparative biochemical composition of natural and fattened mud crab *Scylla serrata*. Journal of Scientific Research, 5(3): 545-553.

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