



ISSN : 0973-7057

Comparative analysis of lipid in muscle of freshwater edible crab *Sartoriana spinigera*

Kumari Neetu* & Suhasini Besra

University Department of Zoology, Ranchi University, Ranchi, Jharkhand, India

Received : 21th November, 2017 ; Revised : 20th December, 2017

Abstract : Present study deals with estimation of total tissue lipid content from different body parts of freshwater crab *Sartoriana spinigera*. The result showed the value of average lipid concentration in abdomen, cheliped & walking leg wet muscle of *S. spinigera* (50.71-95.10g) during summer season (20°C-26°C) was 45.167±10.169 mg/g, 13.33±13.84 mg/g, 12.5±12.47mg/g and showed a positive correlation (b=0.306; r=0.97), (b=0.347; r=0.81), (b=0.338; r=0.87) between body weight and lipid concentration.

Keywords : *S. spinigera*, Muscle extract, Lipid content, correlation coefficient.

INTRODUCTION

Research is currently underway to examine the feasibility of developing and marketing of various freshwater crabs. Although research as a whole seafood products, including crustacean shellfish have been landed for their health promoting characteristics. Aquatic animal fats are good sources of essential fatty acids that are not synthesized in the human body. Polyunsaturated fatty acid (PUFA) content in particular has been shown to be beneficial in the reduction of coronary artery disease, rheumatoid arthritis and respiratory distress in asthmatics (Leaf & Weber, 1988)¹. Amino acids and Docosahexaenoic acid (DHA) are major components of cell membrane phospholipids and are the predominant long chain PUFAs of the central nervous system. Long-chain PUFAs accumulate rapidly in the brain during the period of maximal brain growth, which lasts from the last trimester of pregnancy to about 2 years of age in humans (Carlson & Neuringer, 1999; Innis, 2000)^{2,3}. Crustacean shellfish are

also good source of various minerals and high quality protein (Fagbua *et al.*, 2013)⁴. Although the nutritional composition of several commercially harvested species of crab has been partially characterized, shellfish vary widely in their nutrient content (Ackman *et al.*, 1988; Krzynowek *et al.*, 1982)^{5,6}. Researchers have also reported differences in concentrations of moisture, fat, ash, protein and various volatile compounds in meats from different body parts of the blue crab, *Callinectes sapidus* & *Callinectes amnicola* (Gates & Parker, 1992; Moronkola *et al.*, 2011)^{7,8}. Fundamental knowledge of chemical composition and nutrient content is needed to facilitate the processing utilization and marketing of value added freshwater crab *S. spinigera* products for human consumption. So, the aim of the present study is to investigate the lipid content of freshwater crab *Sartoriana spinigera* to enrich its nutritional information to explore the utilization of this species to some extent.

MATERIALS & METHODS

Live specimens of freshwater crab *S.spinigera* of different weight groups were collected from freshwater bodies like ponds, rivers and dams of Jharkhand brought

*Corresponding author :

Phone : 8969497075

E-mail : kneetu121@gmail.com

Proceedings of 7th International Conference on -"Global Scenario of Life Science, Agriculture, Nursing & Medical Research for the Welfare of Rural & Urban Folk(GOSLANRUF, 3-5 December, 2017)" held at METAS College of Nursing, Ranchi, Jharkhand & Organised jointly by MSET-ICCB & METAS.

to Zoology Department Laboratory of Ranchi University. The crabs were then allowed to get acclimatized in the laboratory conditions for one week in large aquaria filled with little water and sand and fed with fish meal.

Before experimentation the crab was taken blotted dry with cloth and was weighed. Anesthetized and muscle from different body parts viz. abdomen, chelipede and walking legs were collected. For the extraction of lipid concentration Folch J *et al* (1957)⁹ was followed. 1 gm of wet tissue was taken and homogenized on 20 ml of chloroform-methanol (in the ratio 2:1). It was then left undisturbed for 2 hours in the dark and filtered through Whatman filter paper (No. 41). The filtrate was preserved. The residue re-extracted in the same solvent (half of the

original volume) and filtered in Whatman's filter paper (No. 41). Both the filtrates were pooled, and the total volume was noted.

To the filtrate, 1/5th volume of 0.6% saline was added, and mixture was transferred to a separating funnel and left undisturbed overnight in the dark. The lower layer was carefully taken out from the separating funnel in a pre-weighed beaker and 4 ml of benzene and 8 ml of ethanol was added. This mixture was evaporated to dryness at room temperature.

The beaker (after total evaporation) was weighed again and the difference obtained was weight of lipid in the tissue.

RESULTS & DISCUSSION

Table1:- Estimated value of lipid (mg/g) in wet tissue of Abdomen, Cheliped, Walking leg muscle of crab (50.71-95.10 g) during summer season (20°C-26°C)

Sl. No.	Body Weight (g)	Concentration of lipid in Abdomen muscle (mg/g)	Concentration of lipid in Cheliped muscle (mg/g)	Concentration of lipid in Walking leg muscle (mg/g)
1	50.71	39	10	10
2	52.10	39	10	00
3	60.12	40	00	10
4	80.17	50	15	14
5	94.62	51	20	18
6	95.10	52	25	23
	Mean	45.16	13.33	12.5
	SD	±10.16	±13.84	±12.47
	r	0.97	0.81	0.87

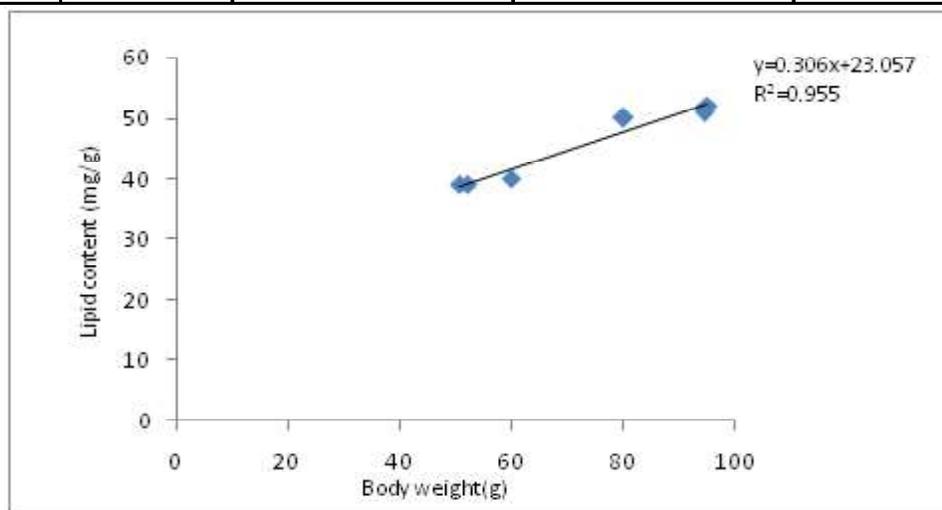


Fig-1 Correlation between body weight (g) vs. lipid concentration (mg/g) of Abdomen muscle in *S. spinigera* during Summer Season (20°C-26°C).

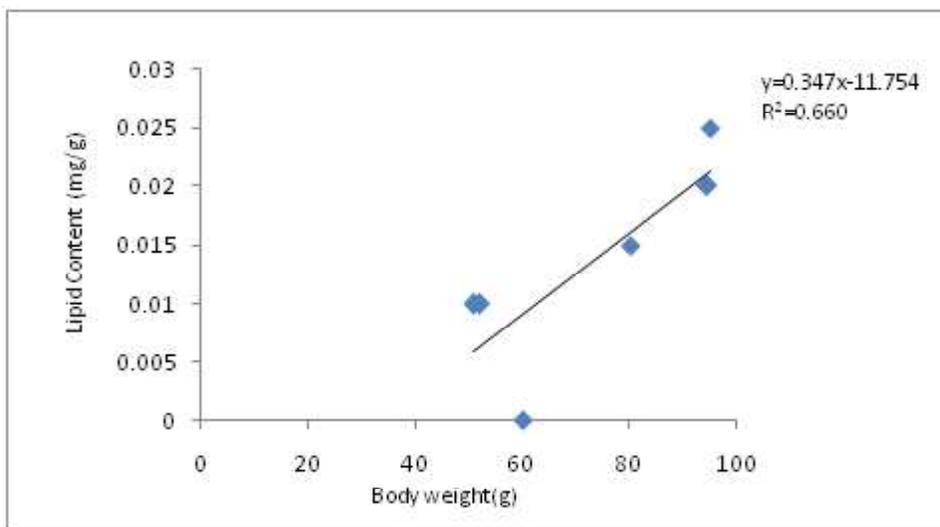


Fig-2 Correlation between body weight (g) vs. lipid concentration (mg/g) of chelate muscle in *S. spinigera* during Summer Season (20°C-26°C).

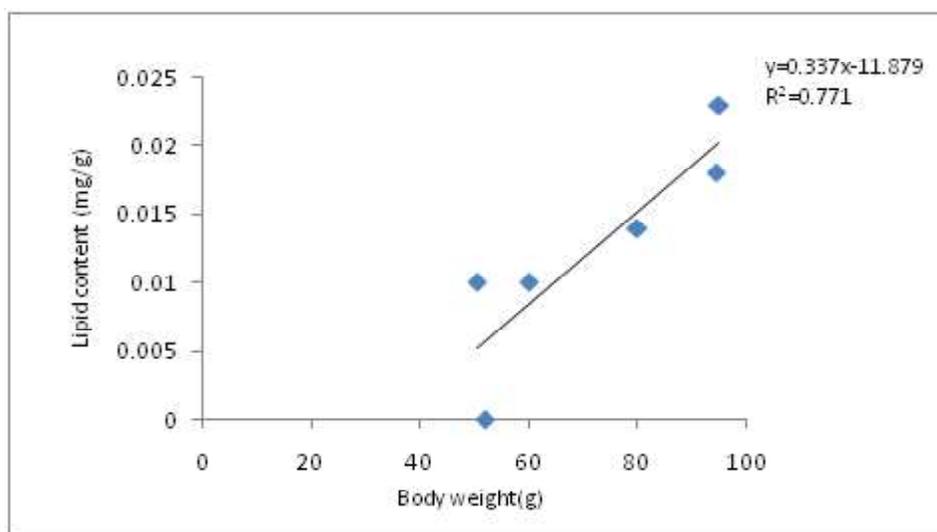


Fig-3 Correlation between body weight (g) vs. lipid concentration (mg/g) of walking leg muscle in *S. spinigera* during Summer Season (20°C-26°C).

Lipids which are the main organic reserve and source of metabolic energy are indispensable in maintaining cellular integrity. In the present study lipid content obtained was found to be low in all the parts analyzed viz. abdomen, chelate & walking leg wet muscle of *S. spinigera* 45.16±10.16 mg/g (4.5%), 13.33±13.84 mg/g (1.3%), 12.5±12.47 mg/g (1.25%) respectively. The crab abdomen muscle (45.16±10.16 mg/g) possessed a substantial higher fat than chelate muscle (13.33±13.84 mg/g) and walking leg muscle (12.5±12.47 mg/g). Fig 1, 2 & 3 showed

positive correlation (b=0.306; r=0.97), (b=0.347; r=0.81), (b=0.338; r=0.87) between body weight (g) and protein concentration (mg/g) of abdomen, chelate & walking leg muscle.

The obtained values are lower than that reported by Moronkola *et al* (2011)⁸ observed average fat contents (0.060±0.050%) in crab tissue, (0.060±0.050%) in crunchy chest, (0.002±0.001%) in walking leg of marine blue crab *Callinectes amnicola*.

Varadharajan *et al* (2014)¹⁰ reported average lipid contents were higher in cephalothorax (0.57±1.25%) and minimum in swimming and walking legs 0.19±0.28% of freshwater crab *Spiralothelphusa hydrodroma* (Herbst, 1794).

Islam *et al* (2017)¹¹ studied the fatty acid profile of freshwater crab *Paratelphusa lamellifrons* and reported that the lipid content in body meat (17.64±1.0%) is higher than that of claw meat (13.24±0.80%). Wherein lipids were found to be 4.82±0.61% and 3.38±0.35% in body and claw meat in female and 5.15±0.67%, 3.39±0.67% in male crab *Maydelliathelphusa masoniana*¹², 4.68±0.28% and 3.92±0.25% in body and claw meat in male and 4.44±0.52% and 3.81±0.33% in female crab *Portunus pelagicus*¹³, 4.83±0.61% in female crab *Paratelphusa masoniana*¹⁴. The lipid concentration in abdomen muscle was higher than chelate muscle and walking leg muscle. This difference obtained may be that during breeding season crabs were adult and berried and for the process of vitellogenesis abdominal lipid were in higher concentration than chelate and walking leg muscle.

REFERENCES

1. Leaf, A. & Weber, P. C. 1988. Cardiovascular effects of n-3 fatty acid, *New England Journal of Medicine*, **318**: 549-555.
2. Carlson, S. E and Neuringer, M. 1999. Polyunsaturated fatty acid status and neurodevelopment: A summary and critical analysis of the literature. *Lipids*, **34**: 171-178.
3. Innis, S.M. 2000. The role of dietary n6 and n3 fatty acids in the developing brain. *Evelopmental Neurosci.*, **22**: 474-480.
4. Fagburo, O., Oso, J. A., Majolagbe, F.A. and Oladapo A. O. 2013. Quality analysis of freshwater crab *Cardisoma armatum* and Marine blue crab *Callinectes amnicola* collected from Yaba Lagos, Nigeria. *Nat Sci*, **11(8)**: 22-29, 1545-0740.
5. Ackman, R. G. and McLeod, C. 1988. Total lipids and nutritionally important fatty acids of some Nova Scotia Fish and Shellfish food products. *Canadian Institute of Food Science and Technology, Journal*, **21(4)**, 390-398
6. Krzynowek, J., Wiggin, K. and Donahue, P. 1982. Cholesterol and fatty acid content in three species of crab found in the Northwest Atlantic. *Journal of Food Science*, **47**: 1025-1026.
7. Gates, K.W. and Parker, A.H. 1992. Characterization of minced meat extracted from the Blue Crab picking plant by-products, *Journal of Food Science*, **57(2)** 267:270-292.
8. Moronkola, B.A., Olowu, R. A., Tovide, O.O., and Ayejuyo, O. O. 2011. Determination of proximate and mineral contents of crab *Callinectes amnicola* living on the shore of Ojo river, Lagos, Nigeria. *Sci. Revs. Chem. Commun.*: **1(1)**, 1-6.
9. Folch J. *et al.* 1957: Estimation of total lipids. *J. Biol. Chem.* **222**: 497-509.
10. Varadharajan D and Soundarapandian P 2014. Proximate composition and mineral contents of freshwater crab *Spiralothelphusa hydrodroma* (Herbst, 1794) from Parangipettai, *South East Coast of India. J Aquac Res Development* **5**:2.
11. Islam, M. B., Sarkar M. M., Rahman, M. R., Khan M., Afroze, M., Hasan M. A., Hosen M. J and Sarkar M. S. U, 2017. Fatty acid profile of freshwater crab *Paratelphusa lamellifrons* from Padma river of Rajshahi city, Bangladesh. *J Nutr Food Sci*, **7**:6
12. Manhas P, Langer S, Noorani IA, Gupta RK, 2016. Patterns of variation in the proximate composition of *Maydellithelphusa masoniana* (Henderson), (a decapods crustacean), found in the local water bodies of Jammu region of J&K state (India). *International Journal of Fisheries and Aquatic Studies* **4**:119-125.
13. Akbar Z, Qasim R, Siddiqui PJA 1988. Seasonal variations in biochemical composition of edible crab (*Portunus Pelagicus Linnaeus*). *J Islam Acad Sci* **1**:127-133.
14. Langer S, Manhas P, Bakhtiyar Y, Rayees S, Singh G 2013 Studies on the seasonal fluctuations in the proximate body compositions of *Paratelphusa masoniana* (Henderson) (Female), a local freshwater crab of Jammu region. *Advance Journal of Food Science and Technology* **5**:986-990.

