REVIEW OF RESEARCH
ISSN: 2249-894X
IMPACT FACTOR : 5.7631(UIF)
VOLUME - 13 | ISSUE - 5 | FEBRUARY - 2024

BIOCHEMICAL STUDY OF THE *MASTACEMBELUS ARMATUS* (LECEPEDE, 1800) INFECTED WITH CESTODE PARASITE, *SENGA SP*. FROM BULDANA DISTRICT (M.S.) INDIA.

Ishwar Dharma Padvi , Mahesh Ramchandra Tandale and Digvijay Ramchandra Tonchar
Department of Zoology, Shri Vyankatesh Art's, Commerce and Science College, Deulgaon Raja.

ABSTRACT

Biochemical studies have revealed important metabolic differences between the host and parasites. The biochemical composition of the parasite is subjected to variations and these variations are likely to be influenced by the variations of the host. The present study deals with biochemical estimation of host and its parasites (infected, noninfected intestinal tissue of Mastacembelus armatus and Senga Sp.). The results show higher concentration of lipids in parasites than its host.

KEYWORDS: *Biochemical, Parasites,Mastacembelus armatus, Buldana, Senga Sp.*

INTRODUCTION

Fish is consistently among the most commonly used and low-cost dietary sources of animal protein for most people worldwide. It is a valuable source of essential nutrients, especially high-quality protein and fats (macronutrients), vitamins, and minerals (micronutrients) that make a vital contribution to the world's food and nutrition security. As a food product, fish is of greater importance in developing countries where it accounts for 75% of the daily animal protein, referred to as "rich and poor food" as an important companion. Compared with other animal protein sources, fish is readily available even in poorer communities at a relatively cheaper price.

Fish is very crucial to a nutritious diet in many areas across the world and it provides about 3.3 billion people with almost 20% of their average per capita intake of animal protein. As the global population increases, potential nutritional concerns are raised, and fish represents an important source of animal protein. For this reason, global fish for human consumption is projected to increase by 16.3% indicating that 90% of the fish being produced will be utilized for human consumption by the year 2029. In 2018, fish accounted for about 17% of the total animal protein and 7% of this was animal protein consumed globally. The consumption of fish and fish products has experienced major changes in the past decades. The world evident per capita fish consumption has been increasing steadily from an average of 12.5 kg in the '80s to 14.4 kg in the '90s and reaching 20.5 kg in 2017

Fish constitute a cheap source of food and provide good food components to tide over the nutritional needs of human beings. For the last few decades, fish have been extensively used as a protein-rich diet for human consumption in India and thus, contribute a lot to its economy. It is estimated that about 10 million tons of fish is required annually to meet the present-day demand for

fish protein in India against an annual production of only 3.5 million tons. The majority of the fish serve as an intermediate host for many helminth parasites, which reduces the food value of the fish. Parasitism plays a central role in fish biology. Among the parasites, that infect freshwater fishes, helminth forms the most diversified group. All species of fish are vulnerable to various parasitic infections depending on fish species and the type of stream inhabited. Parasitic diseases reduce fish production as well as their nutritious value by affecting the normal physiology of fish and can result in mass mortalities of fish

The biochemistryand physiology of Cestode have been comprehensivelyreviewed by Smyth and McManus (1989) and specific aspectshave been reviewed by Arai (1980), Arme and Pappas (1983a,b), Barratt (1981), McManus (1987) and McManus andBryant (1986).

The Proteins are absorbed by the parasites by diffusion andtransfusion. Proteins have many different biological functions.They are everywhere in their distribution and there is nosatisfactory scheme of classifying them. The largest groups ofproteins are the enzyme proteins provide a rich environment forthe nourishment of cestodes. The cestodes utilize differentdegrees of protein that produce energy. Literature revealsthat the parasites canadapt themselves to the parasiticmode of life, the protein usually constitutes between 20 to 40 %of the dry weight (John Barrett, 1981).The glycogen content of various helminthsfluctuates considerablyand there is variation in habitat, though no similarity inthe nutrition of worms. Glucose is an important source of energy for cestodes, inhabiting the alimentary tract of vertebrates (Mishra et al 1945). Cestodes possess storedcarbohydrate metabolism, with an enormous amount of storedcarbohydrates (Daugherty 1956, Fairbairn, Werthein, HarpuretSchiller 1961, Markov, 1943 and Read et Rothman, 1957 b).Cestode parasites store relatively large quantities ofpolysaccharides, which in most cases have been assumed tobe glycogen (Read 1949 and Reid 1942).Lipids are of great importance to the body of cestodes as thechief concentrated storage form of energy, besides their role incellular structure and various other biochemical functions.The higher content of lipids is found in older proglottids (Brandand Van T., 1952).

The present investigation deals with the biochemical studiesof freshwater fish *Mastacembelus armatus* (Lecepede, 1800)infected with cestodeparasites, *Senga*Sp. From Buldana district (M. S.)India.

MATERIAL AND METHODS

Sample Collection

The worms were collected from the intestine of *Mastacembelus armatus* (Lecepede, 1800)and then washed with distilled water. Collected worms were then dried on the blotting paper to remove excess water transferred to watch glass and weighed on a sensitive balance. After 50-60 C for 24 hrs. the dry weight was also taken.

Biochemical estimation

The estimation of protein content in the Cestode parasites was carried out by Lowry's method (1951), the glycogen estimation was carried out by Kemp et al. (1954) method and lipid estimation by Folch et al. (1957) method.

RESULT AND DISCUSSION

In the present investigation, Cestode parasites i.e. *Senga* sp.were carried out for biochemical estimation of primarymetabolites such as protein, glycogen, and lipid (Graph No. 1).

It shows that the protein content of the worm *Senga* sp. Obtained 0.52 ± 0.03 mg/100mg dry wt. of tissue per ml sol. Such infected as well as non-infected intestines of *Mastacembelus armatus* (Lecepede, 1800)obtained 0.68 ± 0.02 mg/100mg dry wt. of tissue per ml sol and 0.78 ± 0.03 mg/100mg dry wt. of tissue per ml sol respectively. The protein content is lower in cestodeparasites as compared to the host (Asawari Fartade, 2011 andAmol Thosar et al., 2014). Rajkumar T. Pawar, 2020 observed that protein content is higher in cestode parasites i.e.*Lytocestus vyasaeiare*, Pawar, 2011 as compared to the host.

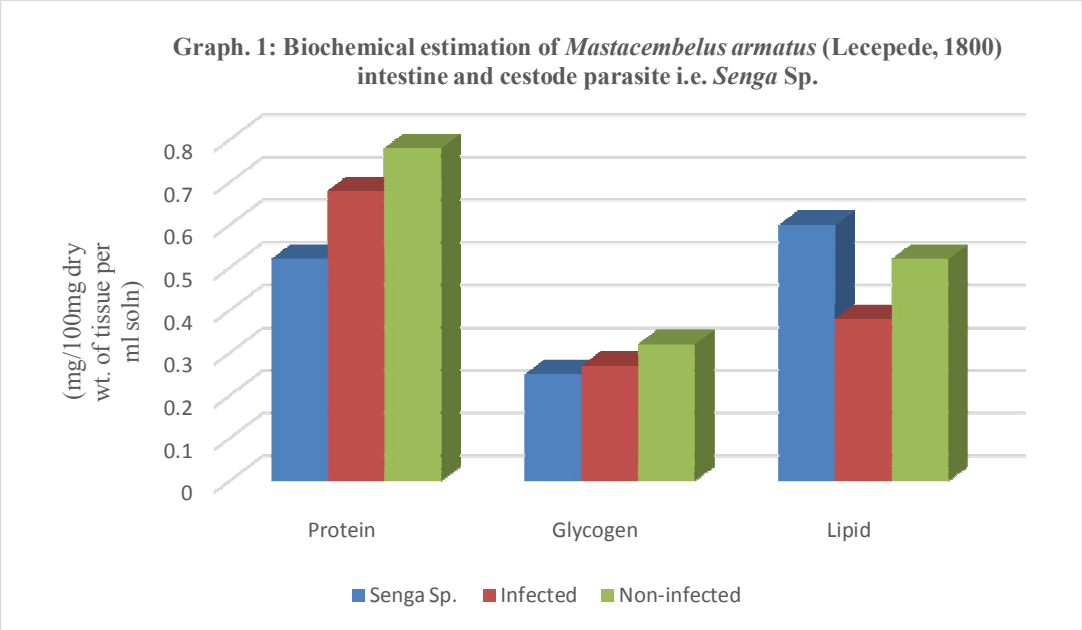
The glycogen content of *Senga*sp. obtained 0.25±0.004mg/100mg dry wt. of tissue per ml sol. Such as infected as wellas non-infected intestines of *Mastacembelus armatus* (Lecepede, 1800)obtained 0.27±0.006 mg/100mg dry wt. of tissue per ml soland0.42±0.019 mg/100mg dry wt. of tissue per ml solrespectively.Glycogen content is lower in cestode parasites as compared to infected and non-infected intestines of a host(Rajkumar T. Pawar, 2020 and Asawari Fartade, 2011).Glycogen content is higher in cestode parasites as compared to infected and non-infected intestines of the host (Amol Thosar et al.,2014).

While the lipid content of *Senga* sp. obtained 0.60±0.01mg/100mg dry wt. of tissue per ml sol. Such as infected as well as non-infected intestines of *Mastacembelus armatus* (Lecepede, 1800) obtained 0.38±0.015 mg/100mg dry wt. of tissue per ml sol and 0.52±0.13 mg/100mg dry wt. of tissue per ml sol respectively. Lipid content is higher in Cestode parasites as compared to the host intestine (Rajkumar T. Pawar, 2020 and Asawari Fartade, 2011). Lipid content is lower in Cestodeparasites as compared to the host intestine (Amol Thosar et al.,2014).

From the present experimental study, it has been observed that the lipid content is high in cestode parasites as compared to protein and glycogen. These parasites absorb most of the nourishing from the host and fulfill its needs causing hindrance in the proper development of tissue (B. V. Jadhav et al. 2008).

Table No. 1: Biochemical estimation of *Mastacembelus armatus* (Lecepede, 1800) intestine and cestode parasite i.e. *Senga* Sp.

Name of Parameter	***Senga* Sp.**	**Intestinal tissue of *Mastacembelus armatus* (Lecepede, 1800)**	
		Infected	**Non-infected**
Protein (mg/100mg dry wt. of tissue per ml soln)	0.52 ± 0.03	0.68 ± 0.02	0.78 ± 0.03
Glycogen (mg/100mg dry wt. of tissue per ml soln)	0.25±0.004	0.27±0.006	0.32±0.019
Lipid (mg/100mg dry wt. of tissue per ml soln)	0.60±0.01	0.38±0.015	0.52±0.13



ACKNOWLEDGMENT

The author is thankful to the Principal and also the head of Department of Zoology, Shri Vyankatesh Art'scommerce and Science College, Deulgaon Raja, Dist.Buldanafor providing the laboratory facilities during this research work.

REFERENCES

1. Amol Thosar, Rahul Khawal, Sushil Jawale and Sunita Borde 2014. Somebiochemical aspects of Anaplocephalidean Cestode Parasites in Ovis bharal(L.). The Ecoscan. Special issue, Vol. V:01-04:2014.

2. Asawari Fartade and Ravindra Chati, 2016. Biochemical studies on cestodeparasites in Gallus gallus domesticus in Solapur and Osmanabad district,M.S (India). International Journal of Fauna and Biological Studies 2016; 3(4):109-110

3.Barrett, J. 1969. The effect of aging on the metabolism of the infective larvae ofStrongyloid esratti Sand ground, 1925. Parasitology 59: 343-347.

4.Chellappa S., 1988. Energy reserves in the male three-spined stickleback,Gasterosteus aculeatus L. (Pisces, Gasterosteidae): annual variation andrelation to reproductive aggression. Ph.D. thesis, University of Glasgow.

5. Daugherty, J.W, 1956. The effect of host castration and fasting on the rate ofglycogen sisin Hymenolepis diminuta. J. Parasitol. 42: 17-20.

6. Fairbairn, D.G., Werthim, R.P.Harpur and Schiller, E.L. 1961. Biochemistry of normal and irradiated strains of Hymenolepis diminuta. EXP. Parasitol 11:248-263.

7. Jadhav, B. V, 2008. Biosystematic studies of Davainea shindein.sp. (Cestoda: Davainidae, Fuhrmall, 1907) from Gallus gallus domisticus. Natl Acad SciLett, 31:7-8.

8. John Barrett 1981. Biochemistry of parasitic helminths.

9. Keith Wilson and John Walker, 2006. Principles and techniques ofBiochemistry and Molecular Biology. Cambridge University press, New York.

10. Lowry, O.H., Rosebrough, N. J., Farr, A. L., and Randall, R. J. 1951. The methodof protein estimation. J.Biol.Chem 193: 265 (The original method).

11. Maulu S, Nawanzi K, Abdel-Tawwab M, Khalil HS. Fish Nutritional Value as an Approach to Children's Nutrition. Front Nutr. 2021 Dec. 15;8:780844. doi: 10.3389/fnut.2021.780844. PMID: 34977125; PMCID: PMC8715098.

12. Nanware SS, Nazneen Uzma Bhure DB and Garad VB, 2012. Studies on
the protein content of cestode Cotugnia and its host Gallus gallus domesticus.Journal of Experimental Sciences 3(1) 40-41.
13.Rahul Khawal, Amol Thosar and Sunita Borde 2020. Biochemical Study of The Freshwater Fish Clarias Batrachus(L) Infected with Cestode Parasite, Lytocestus Sp. From
Aurangabad District (M.S.) India.Vol- 9, Issue - 12, Dec– 2020. Issn . 2277 - 8160 • DOI: 10.36106/Gjra
14. Rajkumar T. Pawar, 2020. Biochemical studies of the freshwater catfish(Clarias batrachus) infected with cestode parasite: Lytocestus vyasaei(Pawar, 2011). Asian Journal of Advances in Research, 3(2), 11-14.
15. Reid, W. M. 1942. Certain nutritional requirements of the fowl cestode,Raillietina cesticillus (Molin) as demonstrated by short periods of starvationof the host. J. Parasitol. 28: 319-340.
16. Richard P. Feynman, 1963. Basic Biochemistry.
17. Satish Saraf and Rajesh Katyayani, 2016. Biochemical studies of cestodeparasite in freshwaterfish *Mastacembalus armatus* from Paithan region.Indian Journal of Applied Research, Volume 6(10), Pp.324-325.
18. Satish Saraf, 2017. Biochemical studies on protein content in cestode parasiteCotugnia sp. and their host Gallus gallus domesticus from Paithan Dist.Aurangabad. Indian journal of Apllied Research. Volume 7(1). Pp. 758-759.
19. Smyth, J. D. and McManus, D. P. 1989. The physiology and biochemistry ofCestodes. Cambridge University Press.
20. Von Brand .T., 1966. Biochemistry of parasites. Academic Press, New York andLondon.
21. Von Brand, 1952. Chemical physiology of Endo parasitic animals. Academicpress. Inc. New York.