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BIOCHEMICAL ESTIMATION OF SENGA SP. IN FRESH WATER FISH MASTACEMBELUS ARMATUS FROM PAITHAN DIST. AURANGABAD (M.S.) INDIA

Zoology

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ABSTRACT

Biochemical estimation such as protein, glycogen and lipids are determined in cestode parasite i.e. Senga Sp. and also infected and non-infected intestine of host i.e. Mastacembelus armatus. Results, after comparison between cestode parasites and host intestine, the protein and glycogen concentration is lower in Senga Sp. as compare to host intestine (infected and non-infected intestine) and lipid concentration is higher than Senga Sp. as compare to host intestine (infected and non-infected intestine). But the protein, glycogen, lipid concentration is higher in non-infected intestine as compare to infected intestine.

KEYWORDS

Aurangabad, *Mastacembelus Armatus*, Senga Sp.

INTRODUCTION

Biochemistry is closely related to molecular biology, the study of the molecular mechanisms by which genetic information encoded in DNA is able to result in the processes of life (Astbury, W. T.,1961).

Biochemistry is the study of structure, composition and chemical reactions of substances in living systems. Parasitology has developed into a multi-dimensional approach in helminth research. They serve as valuable models for the study of fundamental biological phenomena. The biochemistry and physiology of Cestode has been comprehensively reviewed by Smyth and McManus (1989) and specific aspects have been reviewed by Arai (1980), Arme and Pappas (1983 a,b), Barratt (1981), McManus (1987) and McManus and Bryant (1986).

Much of biochemistry deals with the structures, functions and interactions of biological macromolecules, such as proteins, nucleic acids, carbohydrates and lipids, which provide the structure of cells and perform many of the functions associated with life (Eldra P. Solomon; Linda R. Berg; Diana W. Martin, 2007).

The chemistry of the cell also depends on the reactions of smaller molecules and ions. These can be inorganic, for example water and metal ions, or organic, for example the amino acids, which are used to synthesize proteins(Marks (2012), Chapter 14). The mechanisms by which cells harness energy from their environment via chemical reactions are known as metabolism. The findings of biochemistry are applied primarily in medicine, nutrition, and agriculture. In medicine, biochemists investigate the causes and cures of diseases (Finkel, Richard; Cubeddu, Luigi; Clark, Michelle, 2009). In nutrition, they study how to maintain health wellness and study the effects of nutritional deficiencies (UNICEF, 2010). In agriculture, biochemists investigate soil and fertilizers, and try to discover ways to improve crop cultivation, crop storage and pest control.

The proteins are absorbed by the parasites by diffusion and transfusion. The cestode parasites completely lack alimentation in all stages of life history. The pre-digested food in host small intestine (especially ileum) is the chief source of nourishment for cestode parasites soluble nutrients like glucose amino acids, glycerol etc. diffuse directly through general body surface (integument). Proteins are the chief components within the cell, said to be carrying out the duties specified by the information encoded in genes (H. Lodish, 2004).

The main carbohydrate reserve in parasitic helminth is "Glycogen" which is a typical energy reserve of helminthes inhabiting biotopes with low oxygen tension. The main polysaccharide in cestode is glycogen, closely resembling mammalian glycogen. The early work of Foster (1856) demonstrated the occurrence of glycogen in helminthes. Glucose is said to be an important energy source for helminthes inhabiting the alimentary tract of vertebrates. It is generally believed that helminthes absorbed glucose against a concentration gradient and use their endogenous carbohydrates only as an energy source when it is unobtainable from its media.

Lipids are of great importance to the body of cestodes as the chief concentrated storage form of energy, besides their role in cellular structure and various other biochemical functions. Lipid energy metabolism centres upon the anabolism and catabolism of long-chain fatty acids and the esters which these acids form with various alcohols. Such as lipids sterols, phosphoglycerides, sphingolipids, and glycolipids serve principally as structural components of membranes rather than as energy reserves and will not be discussed further. The structures of lipids of proven or possible significance in energy metabolism are summarized (Allenen 1976).

The present study deals with the biochemical estimation of Cestode parasites i.e. *Senga* Sp. in fresh water fish i.e. *Mastacembalus armatus.*

MATERIAL AND METHODS

A) Sample Collection

The worms were collected from the intestine of fresh water fish *Mastacembalus armatus* and then washed with distilled water. Collected worms were then dried on the blotting paper to remove excess water and transferred to watch glass and weight on sensitive balance. After 50-60^{0}C for 24 hrs. the dry weight was also taken.

B) Biochemical estimation

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

RESULT AND DISCUSSION

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

The result shows that the protein content of cestode parasite, *Senga* sp. obtained 0.32± 0.026 mg/100mg dry wt. of tissue per ml solution. Such as infected as well as non-infected intestine of fresh water fish *Mastacembalus armatus* obtained 0.39± 0.02 mg/100mg dry wt. of tissue per ml solution and 0.450.017 mg/100mg dry wt. of tissue per ml solution respectively. Protein content is lower in cestode parasites as compare to host (Asawari Fartade, 2011 and Satish Saraf and Rajesh Katyayani, 2016).

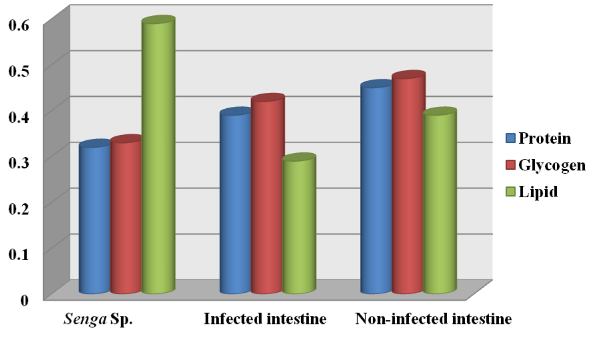
The glycogen content of *Senga* sp. obtained 0.33± 0.017 mg/100mg dry wt. of tissue per ml solution. Such as infected as well as non-infected intestine of fresh water fish *Mastacembalus armatus* obtained 0.42± 0.01mg/100mg dry wt. of tissue per ml solution and 0.47± 0.02 mg/100mg dry wt. of tissue per ml solution respectively. Glycogen content is lower in *senga* sp. as compare to infected and non-infected intestine of host (Asawari Fartade, 2011 and Satish Saraf and Rajesh Katyayani, 2016).

While the lipid content of *Senga* sp. obtained 0.59± 0.036 mg/100mg dry wt. of tissue per ml solution. Such as infected as well as non-infected intestine of goat obtained 0.29± 0.02 mg/100mg dry wt. of tissue per ml solution and 0.39± 0.01 mg/100mg dry wt. of tissue per ml solution respectively. Lipid content is higher in Cestode parasites as compare to host intestine (Asawari Fartade, 2011 and Satish Saraf and Rajesh Katyayani, 2016).

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

Table No. 1: Biochemical estimation of cestode parasites i.e. *Senga* Sp. and infected and non-infected intestine of fresh water fish *Mastacembalus armatus.*

Name of Parameter	*Senga* Sp.	Infected intestine	Non-infected intestine
Protein (mg/100mg dry wt. of tissue per ml sol^n)	0.32± 0.026	0.39± 0.02	0.450.017
Glycogen (mg/100mg dry wt. of tissue per ml sol^n)	0.33± 0.017	0.42± 0.01	0.47± 0.02
Lipid (mg/100mg dry wt. of tissue per ml sol^n)	0.59± 0.036	0.29± 0.02	0.39± 0.01



Graph No. 1: Biochemical estimation of cestode parasites i.e. *Senga* Sp. and infected and non-infected intestine of fresh water fish *Mastacembalus armatus.*

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