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Original Article

Biochemical Studies on Cestode Parasites in Chiloscyllium plagiosum (Anonymous (Bennett), 1830) in West coast Raigad M. S. (India)

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Abstract

All diseases manifest as abnormalities in cellular biomolecules, chemical reactions, or processes. Cestode infections, which are common in almost all vertebrates, are mostly caused by obligatory parasites. Once the parasite enters the host organ, it adapts itself and causes some pathological changes, such as mechanical damage or effect of toxic substances, and sometimes decline in growth. Cestode parasites use food from the intestinal gut of the host. Metabolism depends on the feeding habits and rich nourishment available in the gut of the host. In the present study, biochemical components of the cestode parasite Phyllobothrium vatsalabaiae n. sp. and its host Chiloscyllium plagiosum (Anonymous (Bennett), 1830) from the west coast of Raigad District () India, were investigated. The results showed that the examined fish species could have suffered from malnutrition due to cestode infection.

Key words: Biochemical component, Cestode parasites, Chiloscyllium plagiosum, Phyllobothrium vatsalabaiae n. sp.

Introduction:

Cestode parasites use food from the intestinal gut of the host. Metabolism depends on the feeding habits and rich nourishment available in the gut of the host. Parasites use this nourishment for normal development and growth. A major part of the energy source utilized by the parasites is carbohydrates; the percentage of carbohydrates in the host, where the environment is rich in nourishment, normal development, and reproduction of the parasites is accounted for in the host diet. The host carbohydrates also have an effect on growth; worms grew better in a host fed protein-free diet containing carbohydrates.

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 the cestode is glycogen, which closely resembles the mammalian glycogen. The early work of Bernard Claude (1889) and Foster (1856) demonstrated the occurrence of glycogen in helminthes.

Daugherty et al. (1956), Fairbairn, Wertheim, Harpur, and Schiller (1961), Markov (1939), Read, and Rothman (1957 b) have pointed out that the cestode has a high rate of transport of exogenous glucose into the body, a high rate of utilization of endogenous carbohydrates, and a high rate of glycogenesis, 151 cestode parasites that store relatively large quantities of polysaccharides, which in most cases are assumed to be glycogen, Read, (1949 b), Reid (1942).

Material and Method:

The collected worms were dried on blotting paper to remove excess water, transferred to a previously weighed watch glass, and then weighed on a sensitive balance. The wet weight of the tissue was measured and kept in an oven at 58–60 °C for twenty-four hours to dry the material. The dry weight of the material was obtained and the powder was prepared. The powder was weighted 100mg on a sensitive balance and was homogenized by mortal pestle adding 1ml of 30% KOH to it and transferred in centrifuge tube kept in boiling water bath for 3 to 5 minutes, cooled at room temperature, then adds 0.2ml of 2% Na2 So4 solution.

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The same 6 ml of absolute alcohol was added by stirring with a glass rod and kept in a refrigerator overnight to form a carbohydrate ppt. This carbohydrate ppt solution was centrifuged for 15 min at 3000 RPM and discards the supernatant (glycogen settled at the bottom) was discarded, and the residue was dissolved by adding 10 ml of distilled water bath for 10 minutes, immediately cooled, and readings were taken with a Colorimeter at a 620µm filter. Similarly, the standard glucose concentration was used (100 mg of glucose in 200 ml of distilled water), and the optical densities were measured. Estimation of protein content in the parasite was carried out by Lowry's method (1951), glycogen estimation was carried out by Kemp et al. (1954), and lipid estimation by Barnes and Blackstock (1973).

Observation:

Biochemical content in the intestine of *Chiloscyllium plagiosum* (anonymous (Bennett), 1830) and its parasites (*Phyllobothrium vatsalabaiae n.sp*.)

Table: Biochemical estimation of *Phyllobothrium vatsalabaiae n.sp* from *Chiloscyllium plagiosum*

Sr	Tissue	Glycogen	Protein	Lipid
1	Normal Intestine	20.01 ± 0.83 mg/100mg	24.72 ± 0.73 mg/100mg	10.27 ± 0.61 mg/100mg
2	Infected Intestine	16.20 ± 0.53 mg/100mg	21.32 ± 0.8 mg/100mg	7.98 ± 0.41 mg/100mg
3	*Phyllobothrium vatsalabaiae n. sp.*	17.88 ± 0.46 mg/100mg	26.72 ± 1.10 mg/100mg	5.04 ± 0.71 mg/100mg

Result and Discussion:

Biochemical estimation of *Phyllobothrium vatsalabaiae n.sp. Chiloscyllium plagiosum* (anonymous (Bennett), 1830) is shown in table. According to these values it shows that the amount of glycogen present in the host intestine (Normal) is 20.01 ± 0.83 mg/100 mg infected 16.20 ± 0.53 mg/100 mg of the wet weight of tissue and in parasites 17.88 ± 0.46 mg/100 mg wet weight of tissue. The protein content in *Phyllobothrium vatsalabaiae n.sp*. 26.72 ± 1.10 mg/100 mg of solution and infected intestine shows 21.32 ± 0.8 mg/100 mg of solution (Normal) intestine 24.72 ± 0.73 mg/100 mg of solution). Lipid content in *Phyllobothrium vatsalabaiae n.sp.* Showed 5.04 ± 0.71 mg/100 mg while in the Normal intestine of host 10.27 ± 0.61 mg/100 mg (Infested) intestine 7.98 ± 0.41 mg/100 mg.

The result when compared showed that the worm *Phyllobothrium vatsalabaiae* n.sp.,
Obtained 4.19 % of glycogen from the intestinal tissue of its respective host; the glycogen content in the infected intestinal tissue was low as compare to the normal fish). *Chiloscyllium plagiosum* (anonymous (Bennett), 1830). The results when compared showed that the worm *Phyllobothrium vatsalabaiae n. sp.,* obtained 3.4% of protein from the intestinal tissue of its respective host; the protein content in the infected intestinal tissue was lower than that in thecontrol.

Normal fish intestinal tissue of *Chiloscyllium plagiosum* (Benntt) The results when compared showed that the worm *Phyllobothrium vatsalabaiae n. sp*. obtained 2.29% of lipid from the intestinal tissue of its respective host; the lipid content in the infected intestinal tissue was lower than that in the normal fish *Chiloscyllium plagiosum* (Anonymous (Bennet1830)

Conclusion:

Biochemical estimation of glycogen, protein, and lipid from the cestode parasites, *Phyllobothrium vatsalabaiae n. sp.* from the host Chiloscyllium plagiosum, and the infected and uninfected intestinal tissues of the host were carried out, and it can be concluded that the fish species examined could have suffered malnutrition due to cestode infection. This condition may result in the devaluation of glycogen, protein, and lipid content in the fish body. Protein deficiency impairs normal metabolism in humans Therefore, infected fish can transmit disease to human resulting in poor public health.

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Conflicts of interest

The authors declare that there are no conflicts of interest regarding the publication of this paper

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