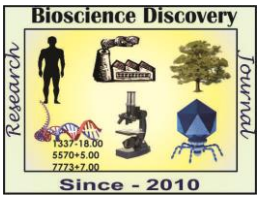
Bioscience Discovery, 11(4):236-238, Oct - 2020

Open Access, Peer Reviewed, Referred Research Journal

Print & Online available on https://jbsd.in
ISSN: 2229-3469 (Print); ISSN: 2231-024X (Online)

Research Article



Analysis of glycogen in Tapeworms (Cestodes) in Some Marine Fishes

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Article Info

Received: 02-08-2020,
Revised: 12-09-2020,
Accepted: 16-09-2020

Keywords: Tapeworms, Cestode, Marine water, Fishes.

Abstract

The tapeworms (Cestodes) when live in the intestine of hosts, they utilize food from the gastrointestinal tract. Metabolism of these cestodes depends on the feeding habits and the rich nourishment available in the gut of the host. These worms use this nourishment for their normal development and growth. The metabolic and in vitro studies suggest that a complex nutritional relationship occurs between a cestode and its host. It has been observed in some cestodes that they are capable of fixing CO_2. Thus, it is clear that the parasites use the waste metabolic materials from the hosts intestinal mucosa very efficiently, where as these are capable of taking the nutritional material by direct contact with the mucosal wall.

INTRODUCTION

It has been known more than hundred years that parasitic worms contains polysaccharides, Weinland classic work illustrated that the metabolism of intestinal worms are characterized by the fermentation of Carbohydrates, following the work of these and other pioneers who studied some phase of the Carbohydrate, relationships of the parasites (Phifer, 1960). It is obvious that many endoparasites have a pronounced carbohydrate metabolism.

Sufficient literature is present for parasitic worms in relation to the distribution of carbohydrates. The quantitative values found in previous and many of the recent literature (Adam *et al.*,1997). They have been obtained by rather unspecific chemical methods; these often give higher values than those obtained by means of an enzymatic procedure (glucose oxidase). The use of various analytical procedures may explain for example, the widely differing glucose values reported for *Monieziaexpansa*. Reliable quantitative and semi quantitative data has been obtained by means of paper chromatography (Riser, 1955; Shinde, 1976; Smith, 1963)

The glycogen content of various helminths fluctuates considerably and there is variation in habitat, though no similarity in nutrition of worms are of importance. This reveals the glucose concentration in the tissues of *Taenia taeniaeformis*, which rises by as much as 100-200 mg/100mg. On incubating in vitro in glucose containing medium, but it increases when it also rises in worms incubated in sodium for saline, which do not permit glucose absorption. In this enlarged tissue glucose has been presumably derived from glycogen break down. In case of *Hymenolepis diminuta* glucose is not evenly distributed along the Strobila but whether the nutritional factors play a role in it is not known.

The glucose content of cestodes depends to some extent on the stage in the life cycle (Tseng shen, 1933; Williams, 1958).In few cestodes developmental history changes the growth and

parasite is rapid at the first 12-24 hours and then slow down even if the concentration is high as it was in the early phase. It has been observed that the same in *Hymenolepis diminuta* increases from 15% of the dry substance in 5 to 7 days old worms to 37% of the dry in 13 to 16 days old specimens (Metric and Cannon 1970). It has been also observed that the uptake of glucose is very much effective when CO_2 is present in the surrounding.

MATERIAL AND METHODS

One hundred and eight intestines were brought and these intestines were dissected for the collection of parasites. The identical parasites are sorted with the help of microscope, few of them fixed in 4% formalin for identification of the genus *Calycobothrium chaturaii n.sp.,Phoreiobothrium hiwarae, n.sp., Nybelinia robusta, Nybelinia eqidetata, Uncibilocularis babarae, n.sp., Hexacanalis shisodae, n.sp., Polypocephalus allii, Tylocephalum shrivardhanasis n.sp., Tetragono cephalum pratisthanae n.sp.*

Small pieces of infected, non-infected intestine and parasites were collected for glycogen estimation. Estimation of glycogen content in a particular parasite was initiated here by Kemp method.

The collected worms were kept on blotting paper to remove excess of water. The material transferred to a previously weighed watch glass and weighed on a sensitive balance. The wet weight of the tissue is taken and kept in oven at 60˚c. for twenty four hours to make the material dry. The dry weight of the material was taken and prepared a powder. This powder was weighed 122.10mgs on a sensitive balance and was homogenized in a mortar pastle, added 5ml of 5% TCA and Transferred in a centrifuge tube. This material is digested in a boiling water both for 15 minutes at 2000 RPM.

1ml of supernatant was taken in a test tube, added 3ml of Sulphuric acid and boiled for 5 minutes,. The mixture should shake well, then immediately cooled and readings were taken in Erma's Colorimeter at 530mu filter.The amounts of Glycogen in the worms were calculated by the Formula:

$$\text{Percentage of Glycogen} = \frac{100 \times U}{1.11} \times S$$

Where,

U = O. D. of Unknown solution.
S = O.D. of the 100 mg of Glucose standard.
1.11 = Conversion factor of glucose to Glycogen.
S = 2

RESULTS AND DISCUSSION

Analysis of glycogen in Tapeworms (Cestodes) in Some Marine Fishes results showed very charectrisitics. It was low percentage was recorded in percentage of glycogen in parasite. *Calycobothrium chaturaii n.sp.* percentage of glycogen in parasites 81.8 mg/100ml than *Nybelinia robusta Linton1890* as 75.67 mg/100ml, than *Nybelinia equidetata Shipley et Hornell, 1906* 72.97 mg/100ml.

Table 1: percentage of Glycogen in Tapeworms

Name of parasite	% of Glycogen in parasites	% of glycogen in host body	% of glycogen in Normal host
Calycobothrium chaturaii n.sp.	81.8 mg/100ml	86.48 mg/100ml	90.09 mg/100ml
Phoreiobothrium hiwarae, n.sp.	72.07 mg/100ml	77.47 mg/ 100ml	86.48 mg/100ml
Nybelinia robusta Linton1890.	75.67 mg/100ml	83.65 mg/100ml	88.28 mg/100ml
Nybelinia equidetata Shipley et Hornell, 1906.	72.97 mg/100ml	79.27 mg/100ml	84.68 mg/100ml
Uncibiloculari sbabarae, n.sp.	81.44 mg/100ml	83.06 mg/100ml	87.20 mg/100ml

Percentage of glycogen in host body was highest in *Calycobothrium chaturaii n.sp*.86.48 mg/100ml followed by 83.06 mg/100ml, *Nybelinia robusta Linton1890.* 83.65 mg/100ml. Percentage of glycogen in Normal host was highest recorded *Calycobothrium chaturaii n.sp.* 90.09 mg/100ml and least recorded from the fish of *Nybelinia equidetata Shipley et Hornell, 1906.* 84.68 mg/100ml.

Observing the results it shows that the worms *Moniezia govindae Sp.Nov.,Stilesia hafeezae Sp.Nov. and Avitellina are* quite potent in obtaining a sufficient amount of glycogen from the environment. Thus it is concluded that the worm could maintain a good balance in glycogen content and histopathological relations.

ACKNOWLEDGEMENT

The authors are thankful to Principal, Pratishthan Mahavidyalaya, Paithan, Aurangabad, for their kind help, inspiration and providing necessary laboratory facilities.

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How to cite this article

Khodke A. B., 2020. Analysis of glycogen in Tapeworms (Cestodes) in Some Marine Fishes. *Bioscience Discovery*, **11**(4):236-238.

Google Scholar citation: https://scholar.google.co.in/citations?user=vPzEyC8AAAAJ&hl=en