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# Glycogen Content of Cestode Parasite *Cotugnia dinogopora* (Pasquale, 1890) Diamare, 1893, in *Gallus gallus domesticus*

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**Abstract:** The present investigation deals with the estimation of glycogen content of cestode parasite, *Cotugnia dinogopora* and its host tissue i.e. normal and infected intestinal tissue of *Gallus gallus domesticus* from Mumbai Andheri, India. Glycogen content in cestode parasite is lower as compared to glycogen content of infected intestine as well as normal intestine.

**Keywords:** Biochemistry, Glycogen content, Cestode, Intestinal tissue, *Gallus gallus domesticus*, *Cotugnia dinogopora*

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## Introduction

Glycogen is a multibranched polysaccharide of glucose that serves as a form of energy storage. Glycogen are found in every part of cell; since they are fundamental in all aspects of cell structure and function. The glycogen is absorbed by the parasites by diffusion and transfusion. Glycogen in most of the cestodes provides a significant reserve store of energy, particularly in forms which are parasitic in animals and which exist in environments of low oxygen tension. The cestode parasites utilize the food from the intestinal gut of host. The metabolism depends on the feeding habits and the rich nourishment available in the gut of the host. Glycogen acts as a blood glucose buffer and thereby plays an important role in blood glucose homeo-stasis. Glycogen in other locations (brain, muscle, etc.) functions as a short-term source of glucose for immediate use as energy (Adeva-Andany *et al.*, 2016).

Glucose is an important source of energy for cestodes, inhabiting the alimentary tract of vertebrates. Cestodes possess carbohydrate metabolism, with enormous amount of stored

Table 1: Biochemical contents in the intestine of *Gallus gallus domesticus* and *Cotugnia dinogopora*

| Glycogen content | Cestode parasite | Intestinal tissue | |
|---|---|---|---|
| | ***Cotugnia dinogopora*** | **Infected** | **Non-infected** |
| | 12.34 mg/100 ml of solution | 16.33 mg/100 ml of solution | 19.37 mg/100 ml of solution |

carbohydrate (Daughtery, 1955). Cestode parasites stores relatively large quantities of polysaccharides, which in most cases has been assumed to be glycogen (Read, 1957).

## Materials and Methods

The worms were collected from the alimentary tract of *Gallus gallus domesticus* and then washed with distilled water. Small pieces of infected and non-infected intestines were also collected to find the glycogen content in respective parasites and their hosts (Kemp and Van Heijningen, 1954).

The collected worms and host intestine were kept on blotting paper to remove excess water. This material was transferred on a watch glass and weighed. Then it was ground into homogeneous paste in mortar pestle. To this paste 1 ml of 30% KOH was added and taken in centrifuge tube and digested in hot water bath for 20 min, cooled and added 1.5 ml of 95% ethanol by stirring with glass rod. Gently boiled in hot water bath, cooled and centrifused for 15 min at 2000 rpm. Supernatant was drained on filter and 5 ml distlled water was added. 5 ml of test solution, 5 ml of glucose standared solution and 5 ml of DW was taken separately in three test tubes. In each tube 10 ml of anthron reagent was added and mixed, then heated for 10 min and immediately cooled and readings were taken with the help of colorimeter at 620 nm setting a blank 100.

## Results and Discussion

Table 1 shows the mean percentage of glycogen in *Cotugnia dinogopora* (12.34mg) was lower than infected (16.33 mg) and non-infected (19.37 mg/100 ml) intestinal tissue.

A lot of work has been done on the bio-chemical composition of cestodes. Some recent studies include those on *Lytocestus* sp. (parasi-tizing the intestine of *Clarias batrachus*) whose protein, lipid and glycogen contents were estimated as 11.2 mg/g wet weight of the tissue, 22.5 mg/g and 12.61 mg/100 ml of solution, respectively (Hiware and Jadhav, 2002). The parasites living in the anaerobic and semiaerobic habitat obtain their energy mainly through fermentation of carbohydrates because under anaerobic conditions, carbohydrates act as better substrates for energy production in comparison to that of protein or fat (Jawale *et al.*, 2011). The body covering or the tegument of the cestodes consists mainly of mucopolysaccharides often complexed with proteins to form mucoproteins or glycoproteins (Von Brand, 1950).

It is now well established that glycogen is the main reserve food product in cestodes and Markov (1939) used the glycogen as criteria of starvation or nutrition. During cestodes development the growth of parasites is rapid at the first 18-24 h and then slows down even if the concentration is high as it was in the early stage. The similar result has been also reported for protein present in *Davainea shindei* which is 13.20 mg/mg wt. of tissue whereas in host intestine it is 15.42 mg/mg of tissue (Jadhav *et al*., 2008).

Brand Von (1952) suggested that the, tapeworm obtain their nutrient supply either from intestinal mucosa or exocrine interic circulation of the host. Hence, the observed decrease in glycogen content in the infected host tissue as compared to non-infected host tissue might be due to the parasite which obtain nutrients from infected host intestine.

## Ethical Statement

This study was in accordance and guidelines with the Academic Research Committee (ARC) of the Government of Maharashtra Ismail Yusuf College Jogeshwari (E) Mumbai, Maharashtra, India

## Author Contributions

All the authors have contributed equally to the completion of this research and agreed to the published version of the manuscript.


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## Conflict of Interest

The authors declare no conflicts of interest.

## References


Adeva-Andany MM, González-Lucán M, Donapetry-García C, Fernández-Fernández C and Ameneiros-Rodríguez E. (2016) Glycogen metabolism in humans. BBA Clin. 5: 85-100.

Brand Von T. (1952) Chemical physiology of end parasitic animals. Academic Press, New York.

Daughtery JW. (1955) Intermediatry protein metabolism helminth III the amino acid oxidases in Hymenolepis diminuata and some effect of change in host physiology. Exp Parasitol. 4: 455-463.

Hiware CJ and Jadhav BV. (2002) Quantitative studies on protein in some cestodes collected from different hosts and localities of Western Maharashtra. Zool. Society India, pp. 152-156.

Jadhav BV., Singh SP, Bhure DB and Padwal ND. (2008) Biosystematic studies of *Davainea shindei* n.sp. (Cestoda- Davainidae) Fuhrmann, 1907 from *Gallus gallusdomesticus.* Nat Acad Sci Letter 31(7&8): 245-250.

Jawale S, Fartade A and Borde S. (2011) Biochemical studies of Caryophyllidean tapeworms in fresh water fish *Clarias batrachus*. Recent Res Sci Technol. 3(3): 35-36.

Kemp A and Van Heijningen AJ. (1954) A colorimetric micro-method for the determination of glycogen in tissues. Biochem J. 56(4): 646-648.

Markov GS. (1939) Nutrition of tapeworms in artificial media. Compt Rend Acad Sc URSS (Dok.) 25: 93-96.

Read CP. (1957) The role of carbohydrates in the biology of cestodes. III. Studies on two species from dogfish. Exp Parasitol. 6(3): 288-293.

Von Brand T. (1950) Carbohydrate metabolism of parasites. J Parasitol. 36: 178-192.