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Estimation of Glycogen Content of Nematodes from Ovis Bharal, Aurangabad Region (M.S.), India

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Abstract

In the present work, focus has been given to understand the mode of carbohydrate metabolism in parasites. The study of glycogen levels furnish the basic information about substrates and their intermediatory metabolites by which it is possible to get fair idea of metabolic pathway in which energy is derived by the nematode parasites.

Keywords: Glycogen, nematodes, *Oesophagostomum columbianum, O. asperum* and *Bunostomum trigonocephalum*.

Introduction

An often carbohydrates in animal parasites occur more in the form of glycogen than the glucose and trahalose. Investigation on the chemistry of glycogen revealed that there is variation in the glycogen chemical composition in the molecular chain length between the host and parasites and from parasites to parasites. In this study we attempted to understand the metabolic pathways of three important nematodes parasites, i. e. *Oesophagostomum columbianum, Oesophagostomum asperum* and *Bunostomum trigonocephalum*. Biochemical investigation is related to the chemical process occurs in living form with the ultimate purpose of understanding cell role in molecular term. Author, therefore undertakes the study of glycogen as it forms an important product of parasite to obtain the energy. So as to understand the intricate mechanism and to stop the establishment of parasites within the host (*Capra hircus*), the biochemical investigation is very important.

Material and Methods

Glycogen was estimated by the method of Kemp and Kito (1954). The nematode parasites were washed well with Tyrode's solution and weighed, they were separated into different species sexwise and were ground in 5ml of 80% (v/v) methanol and the suspension was centrifuged the supernatant containing glucose was decanted. To the precipitate, 5 ml of deproteinising solution (5% TCA containing 100 mg of silver sulphate) was added and glycogen was extracted heating in a boiling water bath for 15 minutes. The volume was made upto 5 ml to compensate the evaporation during heating and it was centrifuged for 15 minutes at 3000 rpm.

1 ml of the clear supernatant was added in a test tube to 3ml of concentrated sulphuric acid, mixing with vigorous shaking. The mixture was kept in a boiling water bath for 4- 6 minutes and subsequently cooled under running water the intensity of pink colour formed was read at 520 nm in spectrophotometer (Carlzins Jena Spectrophotometer) in a silica cuvette of 1 cm light path against a blank. The glycogen content was expressed as mg/g wet weight of the tissue. A standard graph was prepared with analytical grade pure glycogen and assays were compared.

Results

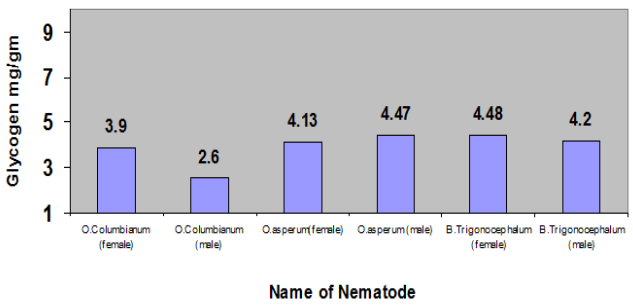
To analyze the glycogen content of nematode parasites Kemp and Kitos method (1954) were used and results are shown in the table 1. It was found that *Oesophagostomum columbianum* female has 3.9 mg of glycogen per gram and male has 2.6 mg of glycogen. The ratio between female and male was 1:3. *Oesophagostomum. asperum* female has 4.13 mg glycogen per gram and male has 4.47 mg glycogen per gram. The ratio between female and male was 1:1. *Bunostomum trigonocephalum* female has 4.48 mg of glycogen per gram and *Bunostomum trigonocephalum* male has 4.2 mg glycogen per gram. The ratio between female and male is 1: 1.

Table 1. Comparative glycogen profile of nematodes

Name of Nematode	Glycogen mg/g Wet weight	Standard deviation (S.D.)	Remark of Female and male ratio
Oesophagostomum Columbianum (female)	3.9	+0.97	1:3
Oesophagostomum Columbianum (male)	2.6	± 0.9	
Oesophagostomum Asperum (female)	4.13	+1.08	1:1
Oesophagostomum Asperum (male)	4.47	+0.99	
Bunostomum trigonocephalum (female)	4.48	+1.33	1:1
Bunostomum trigonocephalum (male)	4.2	±0.56	

As compared to all three parasites with their glycogen level nearly similar even not remarkable variation in their male and female of nematode parasites. The study on biochemistry of the helminthe parsites done by many workers such as (Barret, 1981), (Brand, 1974) and the comparative study on the developing eggs of *Ascaris* eggs given by Costello and Smith (1964). The study of glycolysis was also done in Haemonchus contortus larvae and rat liver (Ward and Schofield, 1967). The variation of glycogen content was found in the three sheep nematodes in laboratory condition (Premavati and Chopra, 1979) In the present study, glycogen content, which form the major source of energy,was analysed on wet weight basis in nematode parasites. *O. columbianum* female has (see Table no.1) 3.9 mg / g where as the male has 2.6 mg/g of glycogen. In the case of *O. asperum,* female has 4.13 mg/g where as the male has 4.47 mg/g of glycogen. *B. trigonocephalum* female has 4.46 mg / g where as its male has 4.2 mg / g of glycogen. After the relative comparison of three nematode parasites all the female had somewhat uniform level of glycogen and O. *asperum* had relatively high glycogen content than the other two parasites. Concisely, the *O.columbinum* particularly the male shows lowest level of glycogen while as *B. trigonocephalum* reached at the highest level of glycogen contented which determined the activity of nematode parasites.

Graph 1 COMPARATIVE GLYCOGEN PROFILE



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