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A COMPARATIVE STUDY OF RAILLIETINA ECHINOBOTHRIDA, RAILLIETINA CESTICILLUS, RAILLIETINA TETRAGONA, AND CHOANOTAENIA INFUNDIBULUM THE INTESTINAL PARASITES OF GALLUS DOMESTICUS ON THE GLYCOGEN CONTENT

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ABSTRACT
Raillietina echinobothrida, Raillietina cesticillus, Raillietina tetragona and *Choanotaenia infundibulum* are the endoparasites living in the intestinal region of *Gallus domesticus.* Study of glycogen was conducted on the mature proglottids of the above recommended parasites and levels were evaluated statistically in relation to metabolic activities. *Raillietina echinobothrida, Raillietina cesticillus, Raillietina tetragona, Choanotaenia infundibulum, Gallus domesticus*.

KEY WORDS: *Cestode, Glycogen, Choanotaenia infundibulum, Raillietina echinobothrida, Raillietina cesticillus, Raillietina tetragona.*

INTRODUCTION

Raillietina echinobothrida, Raillietina cesticillus, Raillietina tetragona and *Choanotaenia infundibulum* are the intestinal parasites of host *Gallus domesticus.* Hence care should be taken for carbohydrate metabolism because it is the main energy source in cestodes Daugherty (1952) found the importance of carbohydrate intermediate of the krebs cycle in protein metabolism of cestodes.

Four six carbon monosaccharides are D-Glucose, D-Fructose, D-Galactose, D-Mannose, and D-Sucrose is by far the most important in the nutrition and metabolism of the birds. The main function of the carbohydrate in the diet is to provide energy to the birds. The polysaccharides of major importance are starch, cellulose, pentosans and several other complex carbohydrates. Although cellulose and starch are composed of glucose units, chicken possesses enzymes that can hydrolyse only starch and thus constitute bulk of poultry nation. The absorption of glucose from poutry feed takes about a minute, (Railey, 1984). The levels of glycogen vary with relation to the nutrition of the host. The investigators through the host feed deficiency and starvation experiments (Read and Rothman, 1957: Nadakal *et al.,* 1974) Proceed that the starvations of the birds leads to reduction in the glycogen content. The cestode parasites where observed in the intestine *of Gallus gallus domesticus* from Maharashtra by Jadhav and Dama (1997); Dama and Jadhav (1997; 1998); Dama and Kirdak (2002); Dama et al., (2012); Thorat and Dama (2015) and Pathan *et al.,* (2015).

These compounds formed from glucose, apparently provide the tape worm with necessary building blocks for production of amino acids and fats. Cheng (1964) stated that interrelation ship between carbohydrate and protein metabolism is probably very close in certain helminthes. In the present study a comparative study of glycogens was conducted on the mature proglottids of *Raillietina echinobothrida, Raillietina cesticillus, Raillietina tetragona* and *Choanotaenia infundibulum.* For which the parasites were obtained from different region of nizamabad was washed in saline after wards it was kept on the blotting paper to remove excess water. After identification of the parasites glycogen content was analyzed by student 't' test.

MATERIALS AND METHODS

Glycogen content was determined by the modified Anthrone method of Klicpera *et.al* (1957) principle. Concentrated sulphuric acid hydrolyses glycosidic bonds to give the monosaccharides which are further dehydrated to furfural and its derivatives. The furfural reacts with anthrone (10-keto 2,10-dihydro-anthracene) to give a blue green complex. 50 mg of parasite tissue was collected weighed and transferred into test tubes containing 1ml of 30% KOH (30 grams in 100ml distilled water). The test tubes were placed in a boiling water bath for an hour at 100 degree celcious the samples were cooled and to each 0.5 ml of 2% sodium sulphate (2 grams in 100 ml distilled water) and 6 ml of absolute alcohol were added in order to precipitate glycogen. The tubes were stoppered and left in the refrigerator for an over night for complete precipitation of glycogen. The following day the sample were centrifuged for about 15 to 20 minutes at 3000 rpm. The supernatant was discarded and the sediment was dissolved in 3 to 10 ml of distilled water. Those were again centrifuged at 1000rpm for 10 minutes and the supernatant was transferred in to another test tube which was used for the estimation of glycogen. 1 ml of the blank distilled water, 1ml of standard solution there for 0.1 mg glucose solution (10 mg of glucose dissolved in the 100 ml of distilled water) and 1 ml of supernatant. Test solution were taken

separately in different test tubes. To each of the above test tubes 5 ml of 0.16% anthrone reagent (160 mg of anthrone dissolved in 100 ml of 96% sulfuric acid). Was added and was mixed up by shaking thoroughly in ice cold water. All the samples were boiled for 10 minutes at 100 degree celcious in a hot water bath. After boiling they were immediately cooled by using running tap water. The blue green colour developed was read at 610 µm in a spectrophotometer. The glycogen estimated was expressed in mg/100 mg wet weight of the tissue.

RESULTS

Glycogen content was determined by the modified Anthrone method of Klicpera *et.al.*, (1957), principle. For the purpose of the study glycogen deposit in the mature proglottids of the parasites are used. The mature proglottids are selected as they are more active in the metabolic activity when compared to immature and gravid proglottids. The values for glycogen content in the 4 parasites

Raillietina echinobothrida
Raillietina cesticillus
Raillietina tetragona
Choanotaenia infundibulum

Are summarized in the table-1 (A) and are also shown in the histogram-I as well as in pie chart for glycogen.

The glycogen content in *R. echinobothrida* ranges from 1.782 to 3.987 mg /100 mg wet weight the mean value is 3.119 ± 0.959.in *R. cesticillus* glycogen content varies from 1.174 ± 1.495 mg for which the mean values is 1.350 ± 0.131 mg. The glycogen values for *R. tetragona* was found to be between 1.126 to 2.904 mg with mean value 1.920 ± 0.789mg. In the parasite *Choanotaenia infundibulum* the glycogen content ranges from 0.784 to 1.068 mg for which the mean value is o.978 ± 0.105 mg to100 mg wet weight of the tissue.

The perusal of the mean value in the table clearly indicates that the highest content of glycogen is deposited by the *R. echinobothrida.*

Table 1. Estimation of glycogen in cestode parasites of fowl expressed in milligrams per 100 mg wet weight of the tissue

S.N	*Raillitiena echinobothrida* (Mature proglottids)	*Raillietina cesticillus* (Mature proglottids)	*Raillietina tetragona* (Mature segments)	*Choanotaenia infundibulum* (Mature segment)
1	3.987	1.483	2.904	0.902
2	3.173	1.296	2.904	0.784
3	4.272	1.174	2.221	0.988
4	3.582	1.495	1.167	1.068
5	1.922	1.205	1.126	1.064
6	1.782	1.452	1.202	1.066
X	3.119	1.350	1.920	0.978
SD	±0.959	±0.131	±0.789	±0.105

Table-(b). Ratios and 't' values for glycogen content X

SL NO	Name of the parasite	Ratios	't' value	Probability	Remarks
1	R. echinobothrida R. cesticillus	23:10	4.47	0.01	Significant
2	R. echinobothrida R. tetragona	16:10	2.36	0.05	Not significant
3	R. echinobothrida Choanotaenia infundibulum	30:10	5.43	0.01	Significant

Series1=Mean value
Series2=Standard deviation

This is followed by *Raillietina tetragona*, *R.cesticillus* and *Choanotaenia infundibulum* respectively. It is notable that the parasite *Choanotaenia infundibulum* has deposited to the lowest amount of glycogen in contrast to all other parasites investigated. The ratios for (1) *R.echinobothrida* (2) *R.cesticillus* (3) *R.tetragona* (4) *Chonaotaenia infundibulum* respectively are 23:10, 16:10, 30:10. These results are further supported by the student's 't' test analysis. The 't' test values are significant at level 1% between *R.echinobothrida/R.cesticillus,* 50% between *R.echinobothrida/R.tetragona,* 1% between *R. echinobothrida/ Choanotaenia infundibulum.* (Table-Ib)

DISCUSSION

Endoparasites living in alimentary canal anaerobically. This is possible only due to preservation of polysaccharides in the form of glycogen. A carbohydrate is the main energy source for helminthes parasites (Barrett, 1976). During the process of TCA cycle in animal 38 moles of glucose yielding anaerobically. In which the glycolysis is the pathway for carbohydrate breakdown. This less amount of obtaining energy in endoparasites anaerobically is valuable for the storage of endogenous glycogen.

During the present study we have taken the mature segments of the parasites. Because highest glycogen was found in mature region followed by gravid and immature region. Similar gradient of glycogen has been reported (Read, 1956; Daugherty and Taylor, 1956; Coles and Simpkin, 1975) in Hymenolepis. In *Neokrimia singhia,* the amount of glycogen is high in mature region when compared to immature and gravid regions of the body (Siva Sai Kumar, 1989). Sailaja, (1991) also observes the variation in the levels of glycogen in the immature, mature, and gravid region of the *Choanotaenia arcidothresi.* The mature region has the highest glycogen content next come the gravid region followed by the immature region. Merrtick, (1970) reported a similar distribution of the glycogen along the strobilia of *Hymenolepis diminuta.*

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