ESTIMATION OF GLUCOSE AND LIPASE LEVEL IN CESTODE PARASITES OF DOMESTIC PIGEONS (*COLUMBA LIVIA*) (GMELIN, 1789)

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خلاصہ

کبوتر (Columba livia) سے جمع شدہ فیتوں *Raillietina galeritae*, *Cotugnia streptopell* اور *Raillietina flaccida* میں گلوکوز اور لائپیز کی مقدار معلوم کی گئی۔ کروپ، تلی، جگر، لبلبے اور سنگدانے میں طفیلے نہیں پائے گئے۔

R. galeritae, C. streptopell اور *R. Flaccida* میں گلوکوز کی اوسط مقدار بالترتیب 29.33.35.66 اور 42.00 ملی گرام/ڈیسی لیٹر پائی گئی جبکہ لائپیز کی اوسط مقدار بالترتیب 0.174,0.280 اور 0.599 ملی گرام/ڈیسی لیٹر حاصل ہوئی۔ گلوکوز اور لائپیز کی زیادہ سے زیادہ مقدار *R.flaccida* میں جبکہ سب سے کم اوسط مقدار R.galeritae میں پائی گئی۔

Abstract

Concentration of glucose and lipase was observed in *Cotugnia Streptopell, Raillietina galeritae* and *Raillietina flaccid* in whole cestode from the intestine of domestic pigeons (*Columba livia*). No parasites were found in crop, spleen, liver, pancreas and gizzard. Mean values of glucose in *C. Streptopell, R. galeritae and R. flaccida* were observed as 35.66, 29.33 and 42.00 mg/dL, respectively while, mean values of lipase were observed as 0.280, 0.174, 0599 mg/dL, respectively. The maximum values of glucose and lipase were obtained in *R. flaccida* while *R. galeritae* showed lowest mean values.

Introduction

Domestic pigeons (*Columba livia*) may harbor a huge number of endoparasites such as nematodes, trematodes, cestodes, acanthocephalans and unicellular protozoans (Senlik *et al*., 2005; Mushi *et at.*, 2000; Ruff and Read, 1973). Among all these parasites, infections by different species of cestodes are very frequent and globally distributed (Fan, 1995). Understanding of the parasitic diseases of the pigeons is necessary for the expansion of possible control measures, which may facilitate its survival.

Different species of cestode have been studied by Fatihu *et al.* (1991), Khan *et al.* (1994), lbrahim *et al.* (1995) and Amin-Babjee *et al.* (l997). Kumaran *et al.* (1981) revealed that among cestodes parasites of domestic pigeons, *Raillietina* species are the most common cestodes. Biochemistry of the parasites has immense importance. It provides knowledge regarding the purpose and construction of molecular components within the parasitic body. In the present work, *Cotugnia streptopell, Raillietina galeritae* and *Raillietina flaccid* were examined for the estimation of glucose and lipase from the whole body.

Materials and Methods

Cotugnia streptopell, Raillietina galeritae and *Raillietina flaccid* of varying size were collected from the intestine of the infected pigeons. Level of lipase and glucose was estimated in these parasites. 2gm samples were ground in 2mL of distilled water and homogenized in Teflon Pyrex tissue grinder for 5 minutes at 1000 rpm. The homogenates were centrifuge at 3500 rpm in Labofuge 15000 for 15 minutes. Supernatants were used for biochemical analysis. Three replicates were used for each sample for accuracy of the results.

Estimation of Glucose

Three test tubes were used as standard, sample and reagent blank. 10 µL of sample in sample test tube and 10 µL in standard test tube were taken. Then 1000 µL of GOD-PAP Reagent was added in all tubes including the tube marked as reagent blank. The absorbance was measured against reagent blank after the incubation for 25 minutes at 15-25 °C, at 546 nm on Schimadzu spectrophotometer U V-120. Randox kit (ADM. J74521) was used.

Concentration of glucose was estimated by the following formula:

$$\text{Glucose concentration (mg/dL)} = \frac{A_{sample}}{A_{standard}} X100$$

Estimation of Lipase

Lipase was determined by the turbidimetric method of Randox kit No.LI 188 by following Tietz and Shuey (1993).

Reagents:

1. Buffer

Buffer was Tris buffer and concentration in test was 26mmol/l with pH 8.9.

2. Substrate

Substrate was composed by 16.7mmol/L concentration of Sodium deoxycholate, 0.04mmol/L concentration of calcium chloride, Triolein concentration in test was 0.3mmol/L and Colipase concentration was 4 mg/L. The content of one vial of substrate 2 was reconstituted with 2.5mL of the 20 x 2.5mL of buffer 1.

3. Standard

Standard of lipase was state on vial in U/L. One vial was dissolved in 3mL of redistilled water, stable for 5 days at +2 to +8 ^{0} C.

Procedure

1.0 mL of reagent was mixed thoroughly with 0.04 mL of samples in two test tubes marked as sample and standard. Absorbance A_1 was measured after 4 min and absorbance A_2 was taken after further 5 minutes at 340nm.

Calculation was made by the following formulas.

$$\text{Lipase activity} = \text{factor} \times \Delta A_{sample}$$

$$\text{Factor} = \text{Activity}_{standard} / \text{Activity}_{sample}$$

After the calculation of (Akhter *et al*., 2006) statistical analysis was carried out by using minitab 17.

Results

Estimation of glucose and lipase were observed in *C. Streptopell, R. galeritae and Raillietina flaccid* in whole body. Mean values of glucose in *C. Streptopell, R. galeritae* and *R. flaccida* were observed as 35.66, 29.33 and 42.00mg/dL, respectively. The maximum value of glucose was obtained in *R. flaccida* while *R. galeritae* showed lowest mean value of glucose (Table 1).

Table 1. Level of Glucose in different cestode parasites.

	Mean (mg/dL)	S.D	S.E	Range(mg/dL)
C. streptopell	35.667	4.041	2.333	31.093-40.240
R. galeritae	29.333	1.528	0.882	27.605-31.062
R. flaccida	42.000	6.000	3.464	35.210-48.790

Mean values of lipase in *C. Streptopell, R. galeritae* and *R. flaccida* were observed as 0.280, 0.174, 0599 mg/dL respectively. The maximum value of lipase was obtained in *R. flaccida* while *R. galeritae* showed lowest mean value of lipase (Table 2).

Table 2. Level of Lipase in different cestode parasites.

	Mean (mg/dL)	S.D	S.E	Range(mg/dL)
C. streptopell	0.280	0.061	0.035	0.211-0.348
R. galeritae	0.174	0.056	0.032	0.111-0.237
R. flaccida	0.599	0.200	0.115	0.373-0.825

Discussion

Enzyme activity of parasites mainly depends on intestinal environment of the host and varies in different parasitic species because of the capability of parasites to assimilate foodstuff from host (Akhter *et al.,* 2006). The glucose content was different in different species because glucose content of parasite based upon the glucose quantity in host food. Fasting of host also affects the glucose content in parasites.

In present investigation the maximum value of glucose was obtained in *R. flaccida* while *R. galeritae* showed lowest mean value of glucose. Glucose content varies in different segments of cestode. Daughtery and Taylor (1956) found a very high activity of glycogen in the pregravid proglottid and in the mid portion of

strobili of *Hymenolepis diminuta* while low in anterior and posterior end. Laurie (1961) observed absorption of glucose and glactose in different species of cestodes from elasmobranch fishes. Krasnosnoshchkov and Tomilovskala (1975) concluded that in whole cestode, glucose-6-phosphatase was associated with genital organ and fixating apparatus of scolex. Akhter *et al. (*2006) studied glucose content in *C. digonopora, C. cuneata* and *Raillietina torquata.* The contents were 5.4mmol/L, 1.7mmol/L, 2.6mmol/L and 4.6mmol/L respectively.

Glycogen is found involved in indication of variation in metabolic condition and it is said to be stored food in cestodes (Hopkin, 1950). The enhancement of specific enzyme amount depend on factors like enzyme activity in tissue, from cells its rate of leakage and from plasma its clearance rate (Boyd, 1983).

The information available on the action of lipase in parasitic tapeworm is insufficient; however tapeworms have lipase as it was verified during the analysis of somatic extracts by Bailey and Fairbairn (1968). Mandlowitz *et al.,* (1960) also demonstrated activity of lipase in *Schistosoma mansoni* cercaria. Activity of lipase was different in different species. Some parasites stored more lipase and some parasites stored less lipase. This observation agreed with Balde and Barde (2011). Akhter *et al. (*2006) demonstrated the lipase activity in *C. digonopora, C. cuneata, Raillietina spp.* and *Raillietina torquata* 0.02u/L, 0.06u/L, 0.04u/L, and 0.02u/L respectively.

Ruff and Read (1973) observed that in the presence of parasites, pancreatic lipase activity was inhibited. Inhibition has been reported to depend on many factors like surface area of worms, contact of worms with enzymes, pH and some other factors. At high pH lipase activity was enhanced in the presence of worms same findings were found in present investigation. Some of the qualitative and quantitative studies of lipases in a number of parasitic helminths are those of Rogers (1941) and Carpenter (1952). Hence, there is some data on the content of this enzyme, which provides some knowledge about the degradation of the lipid material and subsequent utility to these parasites.

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