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Total protein and lipid estimation in the Harderian gland of *Pati* duck (*Anas platyrhynchos domesticus*) of Assam: A postnatal developmental study

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Abstract

The present study was undertaken to estimate the total protein and lipid in the Harderian gland of *Pati* ducks (*Anas platyrhynchos domesticus*) of Assam during the postnatal development. Total 45 (forty five) numbers of apparently healthy *Pati* ducks (*Anas platyrhynchos domesticus*) were utilized for present study. The quantity of total protein of the Harderian gland reflected a descending trend in advancement of the age of the birds. The quantity of the total lipids in the Harderian gland of *Pati* duck increased from 0 week age to 42 weeks age. The total lipid and total protein content of the Harderian gland of *Pati* duck were inversely proportional to each other.

Keywords: Lipid estimation, Harderian glan, *Pati* duck, *Anas platyrhynchos domesticus*

Introduction

In Assam most of the people living in village are agriculture based and along with agriculture livestock rearing is common practice. The agro-climatic condition of Assam is suitable for duck rearing. Duck rearing contribute a major part to uplift the socio-economic of the rural poor people of Assam and others states located in the coastal regions of India. The National Bureau of Animal Genetic Resources situated in Haryana has incorporated the duck variety found in Assam in its list of livestock. The indigenous duck variety of Assam is the only duck enlisted in the website of the bureau under the name '*pati*' (0200 PATI 11001) of Animal Genetic Resources. Based on the variety of its secretory products, Harderian Gland may have numerous functions, including the lubrication of the eye, immune response, pheromone production, osmoregulation, thermoregulation and photo protection in different animal species. The major secretory products of the gland include lipids, porphyrins and indoles (Payne, 1994)^[9]. Therefore an attempt was made to estimate the total protein and lipid in the Harderian gland of *Pati* duck of Assam.

Materials and Methods

The present study was conducted on total forty five (45) numbers *Pati* duck of Assam at different stages of postnatal development. The Ducks were divided into five (5) as age group 0, 4, 16, 24, and 42 weeks. For biochemical parameter the fresh tissue samples were collected immediately after slaughter and washed in normal saline to remove blood and other debris. After that the weight of the tissue samples were recorded with electronic balance and then grinded with the help of pestle and mortar. Equal volume of phosphate buffer solution (pH 7.2) was added to each tissue samples. After that the samples were homogenized with the help of ultra sonicator for 15 minutes at 1 minute pulse interval and 18238 Joules energy the samples were centrifuged at 1,500 rpm for 15 minutes and the supernatant was transferred to a new tube. The total protein was estimated using the method described by Lowry (1951) and the total lipid was determined by the method described by Fring and Dunn (1970)^[4].

Results and Discussion**Total protein**

In the present biochemical analysis of the Harderian gland of *Pati* duck (*Anas platyrhynchos domesticus*) of Assam, the total protein was determined in per mg tissue of the Harderian

gland as $138.74 \pm 0.46 \mu\text{gm}$, $93.93 \pm 0.34 \mu\text{gm}$, $74.01 \pm 0.34 \mu\text{gm}$, $63.51 \pm 0.32 \mu\text{gm}$ and $55.34 \pm 0.52 \mu\text{gm}$ in the 0 week, 4 weeks, 16 weeks, 24 weeks and 42 weeks respectively (Table 1 and Fig.1). The quantity of total protein of the Harderian gland reflected a descending trend in advancement of the age of the Birds. The highest total protein was found in the 0 week age group and lowest in 42 weeks age group. This was due to the deposition of lipid and Mucopolysaccharides in the secretory cells along with the advancement of the age. Payne (1994) [8] reported about the lipid deposition in the Harderian gland cell in avian species. Zaia *et al.* (2000) [9] determined total protein in different tissue of Rat and the results were in agreement of the present study. A slightly higher value was reported in the biochemical assessment of total protein content in submandibular salivary gland tissue of Rat by Ahmed A. El Mansi *et al.* (2013) [11].

Total Lipids

The total Lipids in per mg tissue of the Harderian gland of *Pati* duck was estimated as $45.93 \pm 0.38 \mu\text{gm}$, $143.53 \pm 0.39 \mu\text{gm}$, $153.79 \pm 0.55 \mu\text{gm}$ and $464.15 \pm 0.98 \mu\text{gm}$ in the 0 week, 4 weeks, 16 weeks, 24 weeks and 42 weeks respectively (Table 1 and Fig. 1). The quantity of the total lipids in the Harderian gland of *Pati* duck increased from 0 week age to 42 weeks age. In the Mouse percentage of the total natural lipid was determined in liver tissue by Nelson (1962) [5-6] and the results were similar that of adult age group

of present study. Pikul (1985) [9] determined the total Lipids, Fat composition, and Malonaldehyde concentration in Chicken Liver, Heart, Adipose tissue, and Plasma which was also in agreement with the lipid content of the Harderian gland of the adult *Pati* duck of the present study.

Table 1: Average (Mean \pm SE) intra cellular lipids and intra cellular protein ($\mu\text{gm}/\text{mille gm}$ of tissue) harderian gland of *pati* duck during post noetal development

Age group	Total lipids ($\mu\text{gm}/\text{mille gm}$ of tissue)	Total protein ($\mu\text{gm}/\text{mille gm}$ of tissue)
0 week	45.93 ± 0.38	138.74 ± 0.46
4 week	143.53 ± 0.39	93.93 ± 0.34
16 week	153.79 ± 0.39	74.01 ± 0.34
24 week	307.97 ± 0.55	63.51 ± 0.32
42 week	464.15 ± 0.98	55.34 ± 0.52

In the Figure and Table, it reflected that the total lipid and total protein content of the Harderian gland of *Pati* duck inversely proportional to each other. When the total protein content decreased from 0 week to 42 weeks age but the total lipids content increased from 0 week to 42 weeks. Along with the advancement of the age of the birds the cells of the Harderian gland filled with mucous substance and became inactive, at the same time new cells developed towards the central canal.

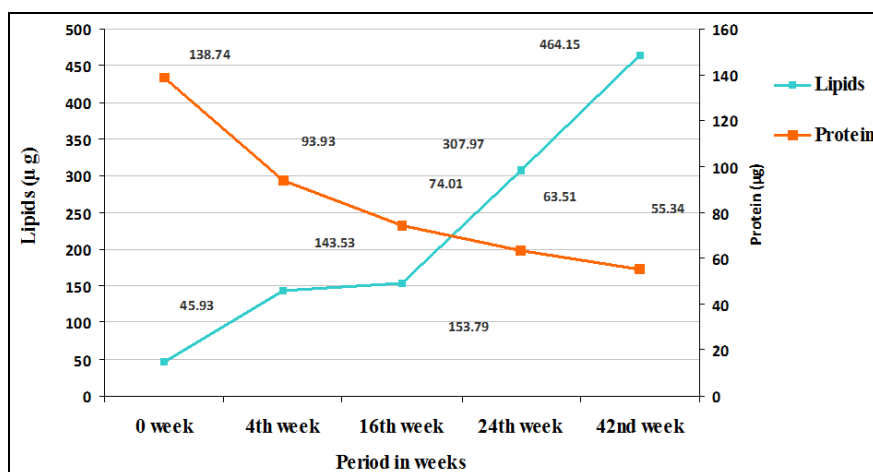


Fig 1: Graphical representation of average value of lipid and protein of the Harderian gland of *Pati* duck

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