Original Research Article

The Hormonal Study of the Thyroid Gland of Male and Female Chabro Chicken Reared in Summer and Winter Seasons

Amit Singh Vishen¹, Varsha Gupta¹, M. M. Farooqui¹, Renu Yadav¹, R. K. Gupta²* and Anand Singh¹

¹Department of Veterinary Anatomy, College of Veterinary and Animal Sciences, U.P., India
Pandit Deen Dayal Upadhyaya Pashu Chikitsa Vigyan Vishwavidyalaya Evam Go-Anusandhan Sansthan, (DUVASU), Mathura – 281001, Uttar Pradesh, India

²Department of Veterinary Pathology, College of Veterinary Science and Animal Husbandry, ANDUAT, Kumarganj, Ayodhya-224229, Uttar Pradesh, India

*Corresponding author

Abstract

The present study was conducted on thyroid gland of eight to ten weeks old 12 apparently healthy Chabro chickens procured from Poultry Farm, DUVASU, Mathura. The birds were divided into two groups consist of six chickens in each group (three male and three female) reared in summer and winter seasons. The serum concentration of T₃, T₄ and TSH hormone was measured in both groups. In summer the concentration of T₃ was higher in male than female but T₄ concentration was higher in female chabro. In winter the concentrations of T₃ and T₄ was higher in female in comparison to male chabro. The concentration of T₃, T₄ and TSH was higher in winter season than summer season. Increased activity of active follicles in winter season was responsible for higher concentration of thyroid hormones in the same season.

Keywords
Thyroid gland, Chabro chicken, Hormone, Season

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Introduction

Thyroid is a bilobed structure situated on either side of trachea. It is the only gland in the body of both mammals and birds that stores hormone in its inactive form. In birds, thyroid gland controls the basal metabolic rate, differentiation and development of the central nervous system, development and growth of muscles and bones, control of reproduction and integumentary development including feathering. The thyroid hormones are primarily involved in energy production by increasing the metabolic rate. This increase in energy production is to the greatest extent manifested as heat production. Secretion of
TSH and T4 of thyroid gland play an important role in maintenance of body temperature in hot and cold seasons in fowl (Hahn et al., 1965).

Materials and Methods

The present study was conducted on thyroid gland of eight to ten weeks old 12 apparently healthy Chabro chickens procured from Poultry Farm, DUVASU, Mathura. The birds were divided into two groups consist of six chickens in each group (three male and three female) reared in summer and winter seasons. Serum concentration of T3, T4 and TSH were determined by Chemiluminescence Immuno Assay technology by using Bayer Centaur Abott architect kits supplied by Garrytown, New York. The serum concentration of T3, T4 and TSH were detected for 6 chickens (3 males, 3 females) in each season i.e. summer (6 chickens) and winter (6 chickens).

Results and Discussion

In summer the concentration of T3 was higher in male (80±7.00 ng/dL) than female (72.67 ± 8.25 ng/dL) and T4 concentration was higher in female chabro (0.17 ± 0.07µg/dL) than male chabro chicken (0.1 ± 0.00 µg/dL). The thyroid stimulating hormone (TSH) concentration was equal in both male and female (0.01 ± 0.00 µIU/ml) (Table 1). In winter the concentration of T3 (122.67 ± 23.62 ng/dL) and T4 (0.77 ± 0.03 µg/dL) was higher in female in comparison to male chabro (T3 was 109.00 ± 25.74 ng/dL and T4 was 0.63 ± 0.18 µg/dL) but TSH concentration was slightly higher in male chabro chicken (0.05 ± 0.00 µIU/ml) in comparison to female chabro (0.04 ± 0.01 µIU/ml) (Table 1). The concentration of T3 and T4 was 76.33 ± 5.11 ng/dL and 0.13 ± 0.03 µg/dL, respectively in summer. The respective figures in winter were 115.83 ± 15.92 ng/dL and 0.70 ± 0.09 µg/dL (Table 2). Sinha et al., (2016) in eight weeks old Pati ducks reported the T3 and T4 concentration as 2.593 ± 0.006 nmol/L and 46.708 ± 0.401 nmol/L, respectively (irrespective of season). The concentrations of T3, T4 and TSH were higher in winter season than summer season (Table 2).

Table.1 Average values (Mean ± SE) for plasma concentration of T3, T4 and TSH hormones in male and female chabro chickens reared in summer and winter seasons

<table>
<thead>
<tr>
<th></th>
<th>M1 (n=3)</th>
<th>M2 (n=3)</th>
<th>M3 (n=3)</th>
<th>MEAN</th>
<th>F1 (n=3)</th>
<th>F2 (n=3)</th>
<th>F3 (n=3)</th>
<th>MEAN</th>
</tr>
</thead>
<tbody>
<tr>
<td>SUMMER</td>
<td>T3</td>
<td>78</td>
<td>69</td>
<td>93</td>
<td>80 ± 7</td>
<td>76</td>
<td>57</td>
<td>85</td>
</tr>
<tr>
<td></td>
<td>T4</td>
<td>0.1</td>
<td>0.1</td>
<td>0.1</td>
<td>0.1 ± 0.00</td>
<td>0.1</td>
<td>0.3</td>
<td>0.1</td>
</tr>
<tr>
<td></td>
<td>TSH</td>
<td>0.01</td>
<td>0.01</td>
<td>0.01</td>
<td>0.01 ± 0.00</td>
<td>0.02</td>
<td>0.01</td>
<td>0.01</td>
</tr>
<tr>
<td>WINTER</td>
<td>T3</td>
<td>106</td>
<td>66</td>
<td>155</td>
<td>109.00 ± 25.74</td>
<td>135</td>
<td>156</td>
<td>77</td>
</tr>
<tr>
<td></td>
<td>T4</td>
<td>0.7</td>
<td>0.9</td>
<td>0.3</td>
<td>0.63 ± 0.18</td>
<td>0.7</td>
<td>0.8</td>
<td>0.8</td>
</tr>
<tr>
<td></td>
<td>TSH</td>
<td>0.06</td>
<td>0.05</td>
<td>0.05</td>
<td>0.05 ± 0.00</td>
<td>0.04</td>
<td>0.03</td>
<td>0.06</td>
</tr>
</tbody>
</table>
Table 2: Average values (Mean ± SE) for plasma concentration of T3, T4 and TSH hormones in chabro chickens (both male and female) reared in summer and winter seasons

<table>
<thead>
<tr>
<th></th>
<th>Summer</th>
<th>Winter</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>T3 (ng/dl)</td>
<td>76.33 ± 5.11</td>
<td>115.83 ± 15.92</td>
<td>0.067</td>
</tr>
<tr>
<td>T4 (µg/dl)</td>
<td>0.13 ± 0.03a</td>
<td>0.70 ± 0.09b</td>
<td>0.001</td>
</tr>
<tr>
<td>TSH (µIU/ml)</td>
<td>0.01 ± 0.00a</td>
<td>0.05 ± 0.00b</td>
<td>0.001</td>
</tr>
</tbody>
</table>

NOTE: Superscript a, b ... shows significant change in values between summer and winter season.


It was concluded that the concentration of T3, T4 and TSH was higher in winter season than summer season due to increased activity of active follicles in winter season.

References


Hahn, D.W., Ishibashi, T. and Turner, C.W. 1965. Alteration of Thyroid Hormone Secretion Rate in Fowls Changed from a Cold to a Warm Environment. Missouri Agriculture Experiment Station Journal Series No. 2955.


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