

## TOTAL CHOLESTEROL CONTENT OF BREAST AND THIGH MUSCLE OF BROILERS IN DIETARY INCLUSION OF ORGANIC CHROMIUM

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**Abstract:** An experimental study was conducted to evaluate the influence of dietary organic chromium on total cholesterol content of broilers for a period of six weeks in one hundred and twenty eight commercial, straight run day-old-broiler chicks. These chicks were randomly grouped into 4 treatment groups consisted of basal diets (T<sub>1</sub>), 250 (T<sub>2</sub>), 500 (T<sub>3</sub>) and 750 (T<sub>4</sub>) µg organic chromium per kg basal diet. The birds supplemented with 750 µg organic chromium per kg diet (T<sub>4</sub>) recorded lowest breast muscle cholesterol level of 64.49 mg per cent. The other two treatment groups recorded the intermediate levels, which were also significantly lower than control group. Similarly, the broiler fed diet with T<sub>3</sub> had significantly less thigh muscle cholesterol (96.14 mg per cent) followed by T<sub>4</sub> and T<sub>2</sub> as compared to control group. However, the total cholesterol in breast and thigh muscle did not significantly differ between chromium supplemented groups.

**Key words:** Breast muscle, broiler, cholesterol, chromium, organic.

### Introduction

As the requirement to produce poultry more efficiently increase, new methods of improvement need to be sought outside of genetic and nutritional requirements. Chromium supplementation brings about a new interest in trace mineral nutrition, because it improves nutritional quality of poultry meat. Published research related to chromium supplementation of poultry diets is very limited, however, most of the studies prior to 1991 evaluated inorganic chromium effects on poultry (Suksombat and Kanchanatawee, 2005).

In broilers, dietary supplementation of organic chromium revealed no significant difference in body weight gain, feed consumption, feed conversion ratio, and livability between treatment groups from first week to the end of experimental period. However, moisture and ether extract content of breast and thigh muscle did not differ significantly between the treatment groups (Anandhi *et al.*, 2006).

The present study was carried out to evaluate the total cholesterol content of broilers at six weeks of age as influenced by dietary inclusion of organic chromium.

### Materials and methods:

One hundred and twenty eight commercial, straight run day-old broiler chicks belonging to single hatch were randomly allotted into four treatment groups of basal diet (T<sub>1</sub>), 250 (T<sub>2</sub>), 500 (T<sub>3</sub>) and 750 (T<sub>4</sub>) µg organic chromium per kg basal diet, with four replicates of eight birds each for six weeks period under standard managemental conditions.

At the end of experiment, one male and one female from each replicate were randomly picked up. The thigh and breast muscle samples were collected from each carcass and stored at -20°C for estimation of total meat cholesterol.

The meat samples were chopped and minced with mortal and pestle. The total lipid was extracted from the muscle samples as per the method of Folch *et al.* (1957) and the meat total cholesterol was estimated by one step method of Wybenga *et al.* (1970).

The data collected were subjected to statistical analysis as per the methods suggested by Snedecor and Cochran (1989).

### Results

The mean breast and thigh muscle total cholesterol content of broilers as influenced by dietary inclusion of organic chromium is presented in Table 1.

**Table 1: Mean breast and thigh muscle total cholesterol content (mg %) ( $\pm$  SE) of broilers at 6 weeks of age as influenced by dietary inclusion of organic chromium**

Treatment groups	Breast	Thigh
T1- Basal diet	77.62 <sup>a</sup> ± 4.19	106.06 <sup>a</sup> ± 2.57
T2- Basal diet + 250 µg of organic chromium/ kg diet	67.32 <sup>b</sup> ± 2.05	97.65 <sup>b</sup> ± 2.34
T3 -Basal diet + 500 µg of organic chromium/ kg diet	67.27 <sup>b</sup> ± 2.95	96.14 <sup>b</sup> ± 2.52
T4 -Basal diet + 750 µg of organic chromium/ kg diet	64.49 <sup>b</sup> ± 3.53	96.99 <sup>b</sup> ± 2.34

Value given in each cell is the mean of eight observations;

<sup>a,b</sup> Means within a column with no common superscript differ significantly (P < 0.05)

Analysis of variance of data on breast and thigh muscle total cholesterol showed a significant (P < 0.05) reduction in organic chromium supplemented groups than control group. The birds supplemented with 750 µg organic chromium per kg diet (T<sub>4</sub>) recorded lowest breast muscle cholesterol level of 64.49 mg per cent while control group (T<sub>1</sub>) had significantly (P < 0.05) high breast meat cholesterol level of 77.62 mg per cent. The other two treatment groups recorded the intermediate levels, which were also significantly (P < 0.05) lower than control group.

Similarly, the broiler fed diet with 500 µg organic chromium per kg diet, T<sub>3</sub> had significantly ( $P < 0.05$ ) less thigh muscle cholesterol (96.14 mg per cent) followed by T<sub>4</sub> (96.99 mg per cent) and T<sub>2</sub> (97.65 mg per cent) as compared to control group (106.6 mg per cent).

However, the total cholesterol in breast and thigh muscle did not significantly differ between chromium supplemented groups.

### Discussion

Analysis of data on breast and thigh meat cholesterol showed a significant ( $P < 0.05$ ) difference between control (T<sub>1</sub>) and chromium supplemented groups (T<sub>2</sub>, T<sub>3</sub> and T<sub>4</sub>). However, there was no difference among chromium supplemented groups. The observed breast muscle cholesterol values were higher than earlier reports of Bakalli *et al.* (1995) and Pesti and Bakalli (1996) who recorded 57.22 mg per 100 gm wet tissue and muscle cholesterol values of chromium supplemented groups are nearer to the values observed by Raj Manohar (2000) who recorded 63.61 mg per cent at 43 days of age in broilers.

Control group (T<sub>1</sub>) had 106.06 mg per cent thigh muscle cholesterol which coincide with the values of Raj Manohar (2000) who observed 108.73 mg per cent thigh muscle cholesterol at 43 days of age in broilers. However, chromium supplemented groups had lesser thigh muscle cholesterol ranged from 96.14 to 97.65 mg per cent.

On conclusion, dietary supplementation of organic chromium reduced the muscle cholesterol levels, and however showed no significant difference between the treatment groups.

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