CHAPTER-V
SUMMARY AND CONCLUSIONS

India is one of the largest economies in the world with annual growth rate of 6.2%. Agriculture and allied sectors, contribute nearly 14.1% to the Gross Domestic Product (GDP) at constant 2004-05 prices, while providing livelihood to 58.2% of the country’s population. Livestock population of India is among the highest in the world (512.1 million) and this sector contributes approximately 4% to 27% to national and agricultural GDP, respectively. Poultry is one of the fastest growing segments of the agricultural sector in India with around 8% growth rate per annum (Anonymous, 2016a). India is a fourth largest broiler producer after China, Brazil and USA in the world and contributes nearly 45% of the total meat production of the country (Kotaiah, 2016). Poultry production sector in developing countries are facing some problems, ensuring feed availability at affordable price remains the key concern for the poultry industry with more than 70 per cent of production cost being in the form of feed. Nevertheless, the quality of the feed also plays a major role in poultry production (Asghar et al., 2000). In view of the potential beneficial effects of organic supplementation in broiler diet, the present investigation was undertaken to confirm the earlier observations and to assess “Effect of organic chromium supplementation on performance of broiler chickens” with following objectives.

1. To study the effect of supplementation of organic chromium on feed intake, growth performance and feed conversion ratio of broiler chickens.

2. To study the effect of supplementation of organic chromium on hematobiochemical parameters of broiler chickens.

3. To study the effect of supplementation of organic chromium on carcass characteristics of broiler chickens.

4. To work out economics of supplementation of organic chromium in the feed/diet of broiler chickens.

Two hundred (200) unsexed, day old ‘Cobb 400’ broiler chicks of same hatch were weighed individually and distributed randomly into four treatment groups,
consisting 50 chicks in each treatment group. Each group was further divided into five replicates of 10 birds each. The four treatments were viz. control-without supplementation of organic chromium (T₁), organic chromium supplementation @ 400 µg/kg of feed (T₂), 800 µg/kg of feed (T₃) and 1200 µg/kg of feed (T₄). The chicks were reared in deep litter system from 0-6 weeks and standard farm managerial practices were followed. The experimental birds were fed ad-libitum as per BIS (2002) specifications. The broad parameters were studied included feed intake, body weight, body weight gain, feed conversion ratio, carcass characteristics, haematobiochemical parameters and economics of inclusion in broilers ration.

Average feed (g/bird/week) consumed by birds in T₁, T₂, T₃ and T₄ experimental groups from 0 to 6 weeks was ranging from 186.82 ± 7.82 to 987.48 ± 39.62, 177.56 ± 7.00 to 956.70 ± 20.44, 183.28 ± 6.19 to 955.36 ± 18.74 and 190.64 ± 7.19 to 996.40 ± 8.81 g/bird and the values for overall feed intake were 4055.62 ± 131.86, 3972.94 ± 132.91, 3989.28 ± 131.01 and 4022.60 ± 131.67 g/bird in T₁, T₂, T₃ and T₄ groups, respectively.

Statistical analysis revealed that weekly feed intake (g) and overall feed intake (g) did not vary significantly (P>0.05) among different treatment groups like T₁, T₂, T₃ and T₄, respectively. Overall feed intake (g) was found highest in T₁ group followed by T₄, T₃ and T₂ groups, respectively.

Average initial body weights of the chicks were 45.00 ± 0.60, 44.98 ± 0.69, 44.60 ± 0.78 and 44.40 ± 0.72 g and the corresponding average final body weights at the end of experiment were 2160.70 ± 36.50, 2167.84 ± 38.08, 2199.30 ± 41.86 and 2235.68 ± 42.53 g in the T₁, T₂, T₃ and T₄ experimental groups, respectively. Statistical analysis of data on final body weights revealed non-significant improvement in all treatment groups T₂, T₃ and T₄ as compared to control group T₁. The highest total body weight of experimental birds was observed in T₄ followed by T₃, T₂ and control group T₁.

Average values for weekly body weight gain (g/bird/week) and total body weight gain (g/bird) were 352.62 ± 8.25 and 2115.70 ± 18.44 in T₁, 353.81 ± 8.59 and 2122.86 ± 18.68 in T₂, 359.12 ± 10.25 and 2154.70 ± 19.94 in T₃ and 365.21 ± 9.19 and 2191.28 ± 19.83 in T₄ experimental groups, respectively. Total weekly body weight gain showed the highest value in T₄, i.e. 1200 µg organic chromium
supplemented group. Statistical analysis of data revealed that and other treatment groups. Highest total body weight gain was observed in T4 group, followed by T3, T2 and T1 groups, respectively.

Overall mean values for FCR of experimental birds was 1.92 ± 0.03, 1.87 ± 0.02, 1.85 ± 0.05 and 1.84 ± 0.07 in T1, T2, T3 and T4 experimental groups, respectively. Result of statistical analysis revealed although non-significant (P<0.05) but improved FCR in chromium supplemented groups, with lowest FCR in T4 group followed by T3, T2 and T1 groups, respectively.

Regarding hematological parameters, mean values for hemoglobin (Hb) (g/dl) were recorded as 10.84 ± 0.22, 11.83 ± 0.49, 12.15 ± 0.45 and 12.35 ± 0.38 in T1, T2, T3 and T4 experimental groups, respectively. While mean values for packed cell volume (PCV) (%) were recorded as 30.10 ± 0.93, 29.70 ± 1.19, 30.90 ± 1.70 and 30.10 ± 1.58 in T1, T2, T3 and T4 experimental groups, respectively. Statistical analysis of Hb and PCV values of experimental birds showed non-significant (P>0.05) difference between and different treatment groups.

Average mean values for Total Erythrocyte Count (TEC) (x 10^6/µL) were recorded as 2.73 ± 0.20, 2.77 ± 0.18, 3.13 ± 0.17 and 2.92 ± 0.15 in T1, T2, T3 and T4 treatment groups, respectively. While mean values for Total Leucocytes Count (TLC) (x 10^3/µL) were recorded as 28.00 ± 0.89, 28.27 ± 1.06, 28.11 ± 1.03 and 29.15 ± 1.24 in T1, T2, T3 and T4 experimental groups, respectively. Statistical analysis of Hb, PCV, TEC and TLC among different experimental groups showed non-significant values of Hb, PCV, TEC and TLC among different experimental groups but they were in normal range for poultry suggesting that supplementation of organic chromium do not have any adverse effect on overall health.

Regarding blood biochemical parameters, mean values for Aspartate Amino Transferase (AST) (IU/L) were recorded as 350.17 ± 9.65, 353.82 ± 7.80, 356.74 ± 9.13 and 363.24 ± 9.55 in T1, T2, T3 and T4 experimental groups, respectively. While mean values for Alanine Amino Transferase (ALT) (IU/L) were recorded as 6.34 ± 0.44, 6.32 ± 0.72, 6.24 ± 0.62 and 6.36 ± 0.66 in T1, T2, T3 and T4 treatment groups, respectively. Statistical analysis of AST and ALT values of experimental birds showed non-significant (P>0.05) difference among different experimental groups, viz. T1, T2, T3 and T4. However, activities of both AST and ALT were within normal
physiological range and not showed any adverse effect on overall health and liver function of broiler birds, on supplementation of organic chromium.

Regarding other blood biochemical parameters, mean values for glucose (mg/dL) were recorded as 257.90 ± 9.91, 253.20 ± 1.97, 246.32 ± 2.25 and 235.60 ± 2.69 in T₁, T₂, T₃ and T₄ experimental groups, respectively. While mean values for triglycerides (mg/dL) and total cholesterol (mg/dL) were recorded as 83.90 ± 1.30, 79.10 ± 1.90, 75.00 ± 1.41 and 71.40 ± 2.40 and 170.80 ± 2.47, 168.00 ± 2.74, 160.80 ± 4.42 and 154.80 ± 2.27 in T₁, T₂, T₃ and T₄ treatment groups, respectively. Statistical analysis of glucose value of experimental birds showed, significant (P<0.05) reduction in T₄ group as compare to control. But, treatment groups did not differ significantly amongst them. Statistical analysis of value of triglycerides of experimental birds showed, significant (P<0.05) reduction in T₃ and T₄ group as compare to T₂ group and control (T₁). Statistical analysis of total cholesterol level of experimental birds showed, significant (P<0.05) reduction in T₄ group as compare to control. But, treatment groups did not differ significantly amongst them.

While considering the effect on carcass characteristics, the values obtained for dressing percent (%) of carcass were 69.90 ± 2.19, 70.44 ± 0.50, 72.26 ± 0.45 and 74.61 ± 0.63 in T₁, T₂, T₃ and T₄ experimental groups, respectively revealing non-significant difference. Higher values of dressed weight and higher dressing percent were found in T₄ group as compared to rest of treatments. Statistical analysis of values indicated non-significant (P>0.05) difference between control (T₁) and different treatment groups (T₂, T₃ and T₄) in respect to live weight (g) and dressed weight (g) and dressing percent of experimental birds. Average values obtained for weights of liver, gizzard, heart, kidney and spleen showed non-significant difference among different groups.

Evaluation of economics of feeding for different treatments in present study revealed that highest return over feed cost was found in T₄ group followed by T₃ and T₂ groups, whereas lowest return over feed cost was observed in control group. Profit per chick (Rs.) was in Rs. 39.95, 42.60, 44.09 and 45.15 in T₁, T₂, T₃ and T₄ respectively. So profit per bird (Rs.) over control (T₁) group was 2.65 in T₂ group, 4.14 in T₃ group and 5.20 in T₄ group. Data of profit showed 6.63%, 10.37% and 13.02% more economic benefit than T₁ in T₂, T₃ and T₄ groups, respectively.
CONCLUSIONS:

Dietary supplementation of organic chromium showed numerically lowered total feed intake (g/bird) in all organic chromium supplemented groups as compared to control.

Dietary supplementation of organic chromium showed numerically higher total body weight (g) in all chromium supplemented groups as compared to control.

Dietary supplementation of organic chromium resulted in significant (P<0.05) improvement in total body weight gain (g) in T4 group which supplemented with 1200 µg organic chromium as compared to control. While, total body weight gain (g) was numerically higher in all organic chromium supplemented groups as compared to control.

Dietary supplementation of organic chromium resulted in numerically improved feed conversion ratio in all treatment groups as compared to control.

Values for different haemato-biochemical parameters like hemoglobin (Hb), packed cell volume (PCV), total erythrocyte count (TEC), total leucocyte counts (TLC), alanine amino transferase (ALT) and aspartate amino transferase (AST) were found non-significant among different experimental groups. Whereas, values of glucose, triglycerides and total cholesterol were observed significantly (P<0.05) lowered in organic chromium supplemented groups as compared to control.

Values obtained for carcass characteristics revealed non-significant effect of organic chromium on dressed weight (g), dressing percent (%) and organ weights (g) of liver, heart, gizzard, kidney and spleen.

Total return over feed cost (Rs.) and profit over control per chicks (Rs.) were higher in all organic chromium supplemented groups as compared to control, with highest value observed in T4 group, supplemented with 1200 µg organic chromium/kg diet.

So, it may be inferred that use of organic chromium as chromium propionate @1200 µg/kg diet can be incorporated successfully in the diet of broiler chickens to improve the growth performance, return over feed cost and profit per bird without any adverse effect on health and carcass characteristics of broilers.