



Chelated copper, zinc and manganese Improved Performance, Haematological and Serum Biochemical Indices of Layers (late-lay)

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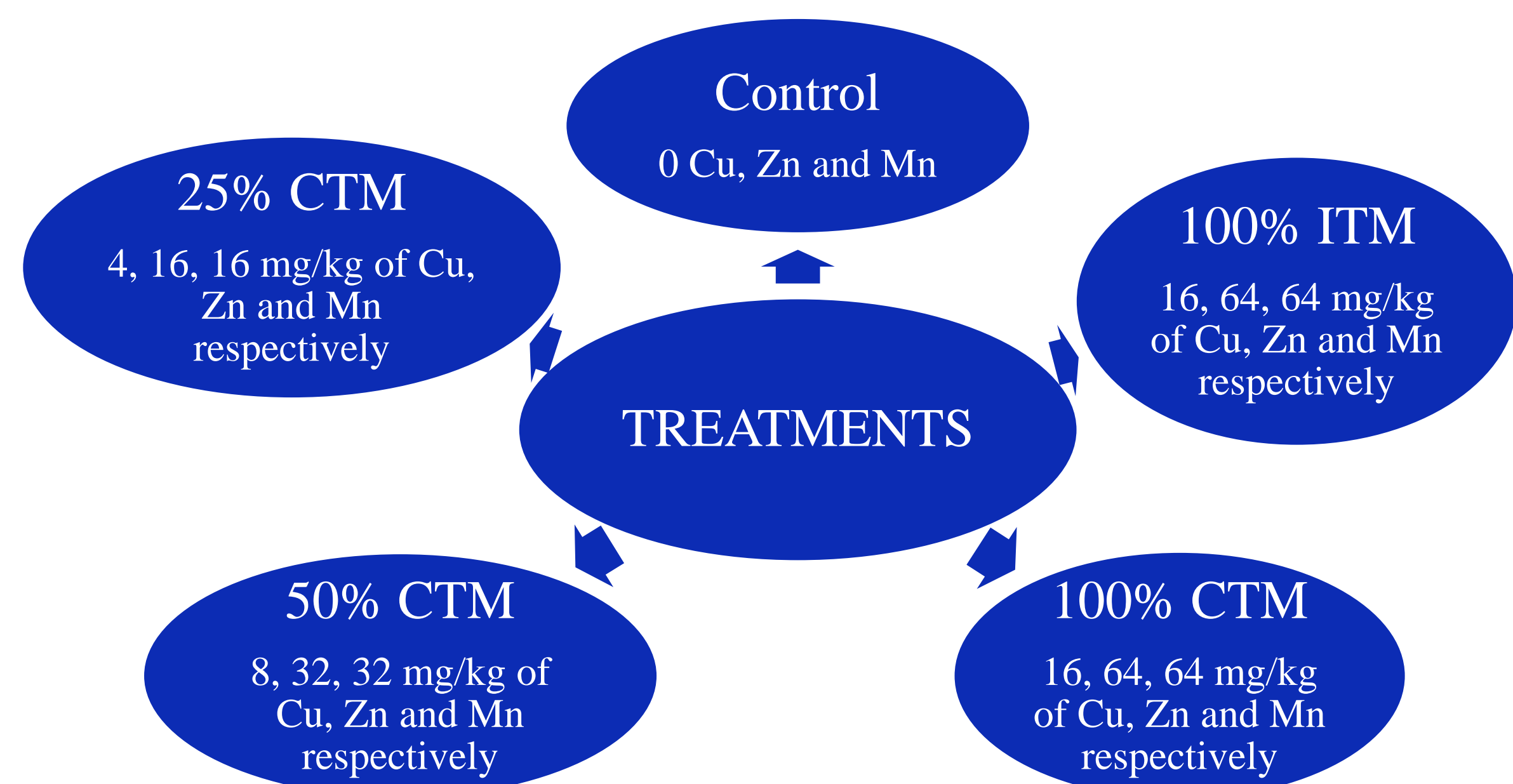
Introduction:

Copper, zinc and manganese are involved in several metabolic and physiological processes required for normal functioning of the animal. Chelates may improve performance and blood parameters of animals because they move to the site of absorption without any chemical interference due to their electrically neutral nature (Liu *et al.*, 2016). This study evaluated the performance, haematological and serum biochemical indices of laying hens (late-lay) fed diets supplemented with inorganic or chelated blends of copper, zinc and manganese

Methods

➤ This study was carried out according to the research ethics and guidelines of the Animal Care and Review Committee of the College of Animal Science and Livestock Production, Federal University of Agriculture, Abeokuta, Nigeria.

➤ A 77-day feeding trial was carried out using 540 (58 weeks old) Nera Black Hens. Birds were randomly allocated to five dietary treatment groups with 12 replicates of 9 birds each.

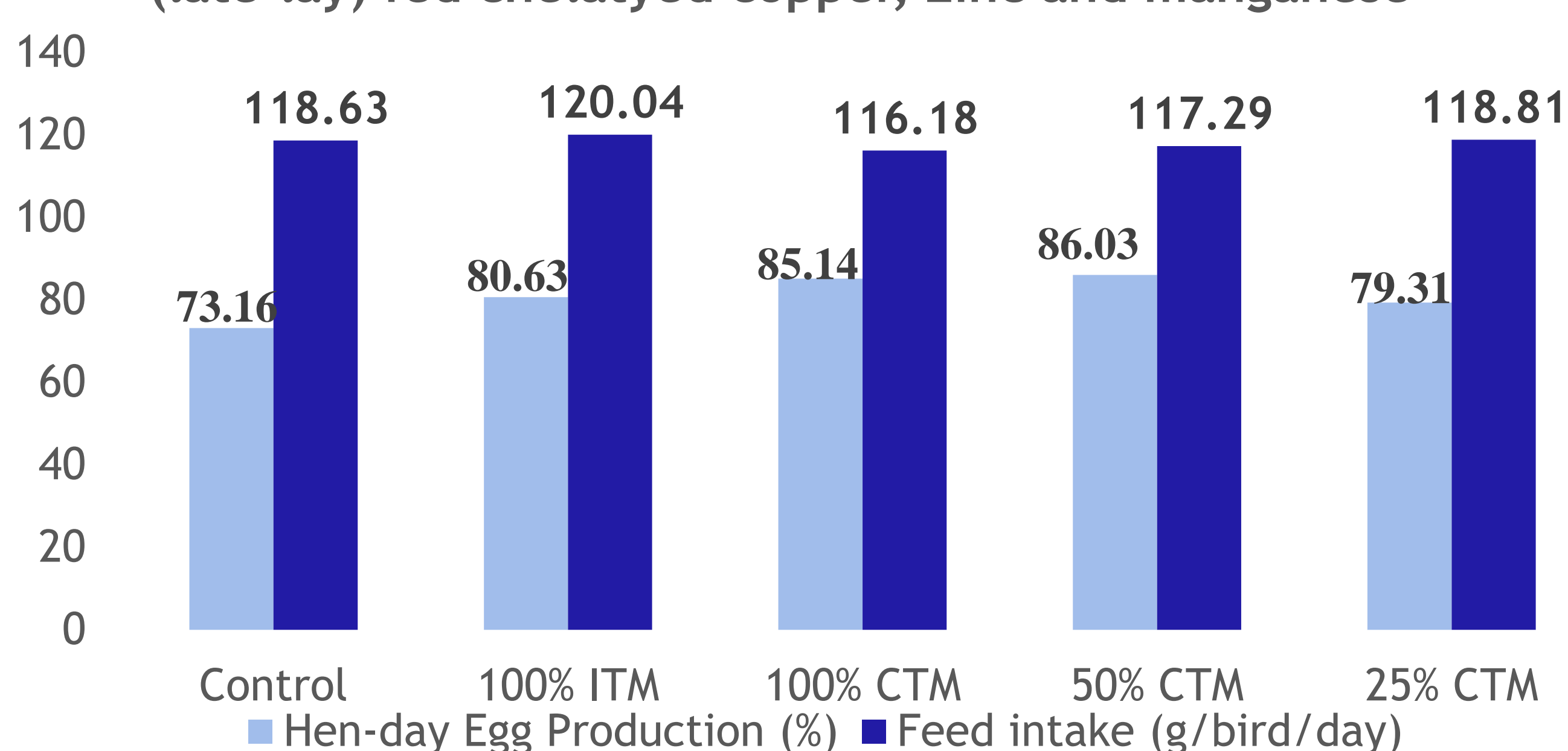


➤ On day 77 of the experiment, 2.5 mL of blood was collected individually from 4 birds per replicate via brachial vein puncture and transferred to sample tubes containing EDTA for hematological analyses. Another 2.5 mL of blood was collected into sample tubes for serum biochemical analyses. Data collected were subjected to One-Way Analysis of Variance with 5 % significance in a Completely Randomized Design.

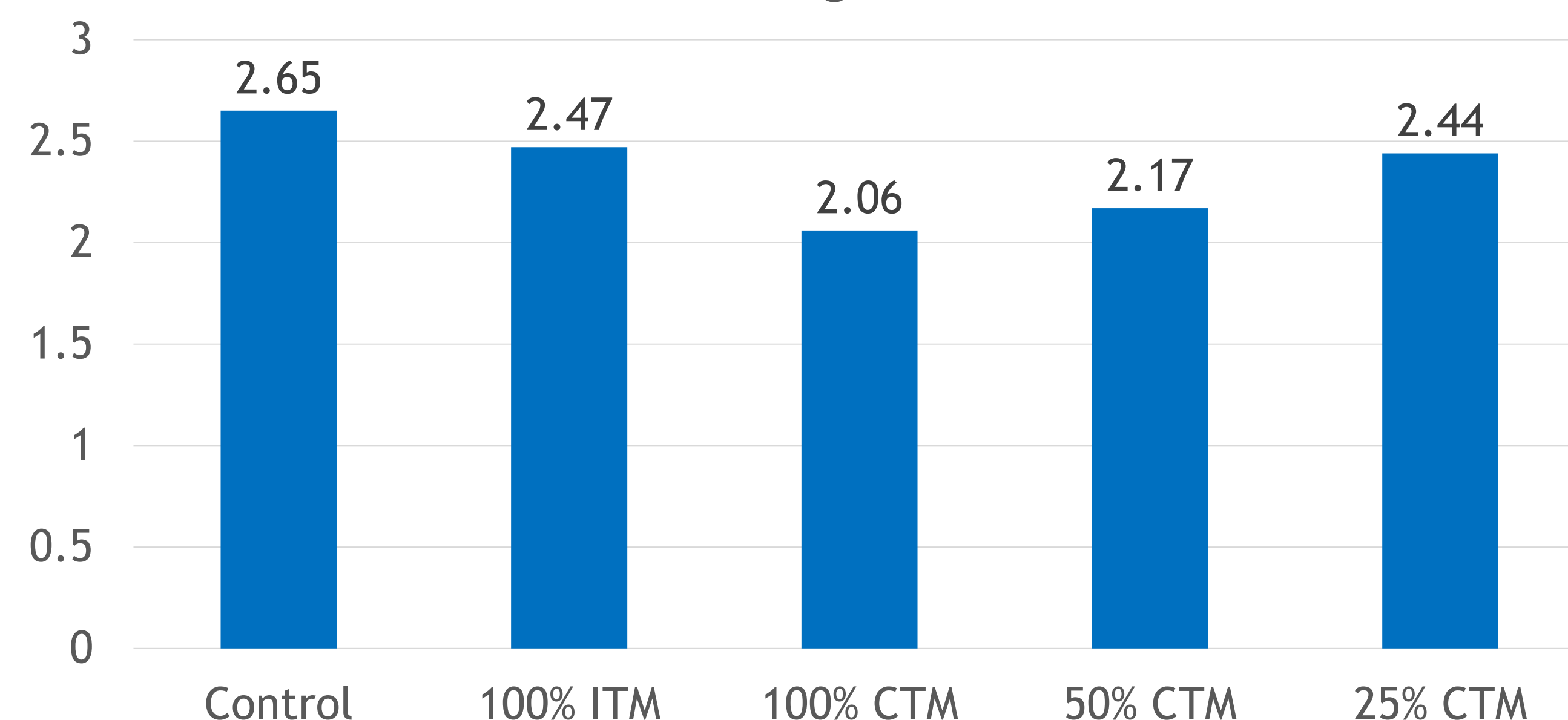
Results

- Feed intake was increased ($p < 0.05$) with ITM supplementation while 50 % CTM and 100 % CTM reduced feed intake.
- Kg feed/kg egg was better for diets supplemented with CTM.
- CTM supplementation at 50 and 100% increased ($p < 0.05$) packed cell volume (PCV) while white blood cell count was similar ($p > 0.05$) across all treatment groups.
- supplementation of CTM led to a higher ($p < 0.05$) total serum protein and albumin.
- Globulin, creatinine and ALT were not affected ($p > 0.05$) while 100% CTM increased AST (153.45 IU/L).
- ITM supplementation resulted in increased ($p < 0.05$) cholesterol (192.35 mg/dL) and LDL (140.47 mg/dL) levels in the sera while CTM supplementation increased ($p > 0.05$) HDL.

Feed intake and Hen-Day egg production of Layers (late-lay) fed chelated copper, zinc and manganese



Feed Conversion Ratio (kg feed/kg egg) of laying chickens fed diets supplemented with copper, zinc and manganese.



Serum protein, albumin and globulin of laying chickens fed diets supplemented with copper, zinc and manganese.

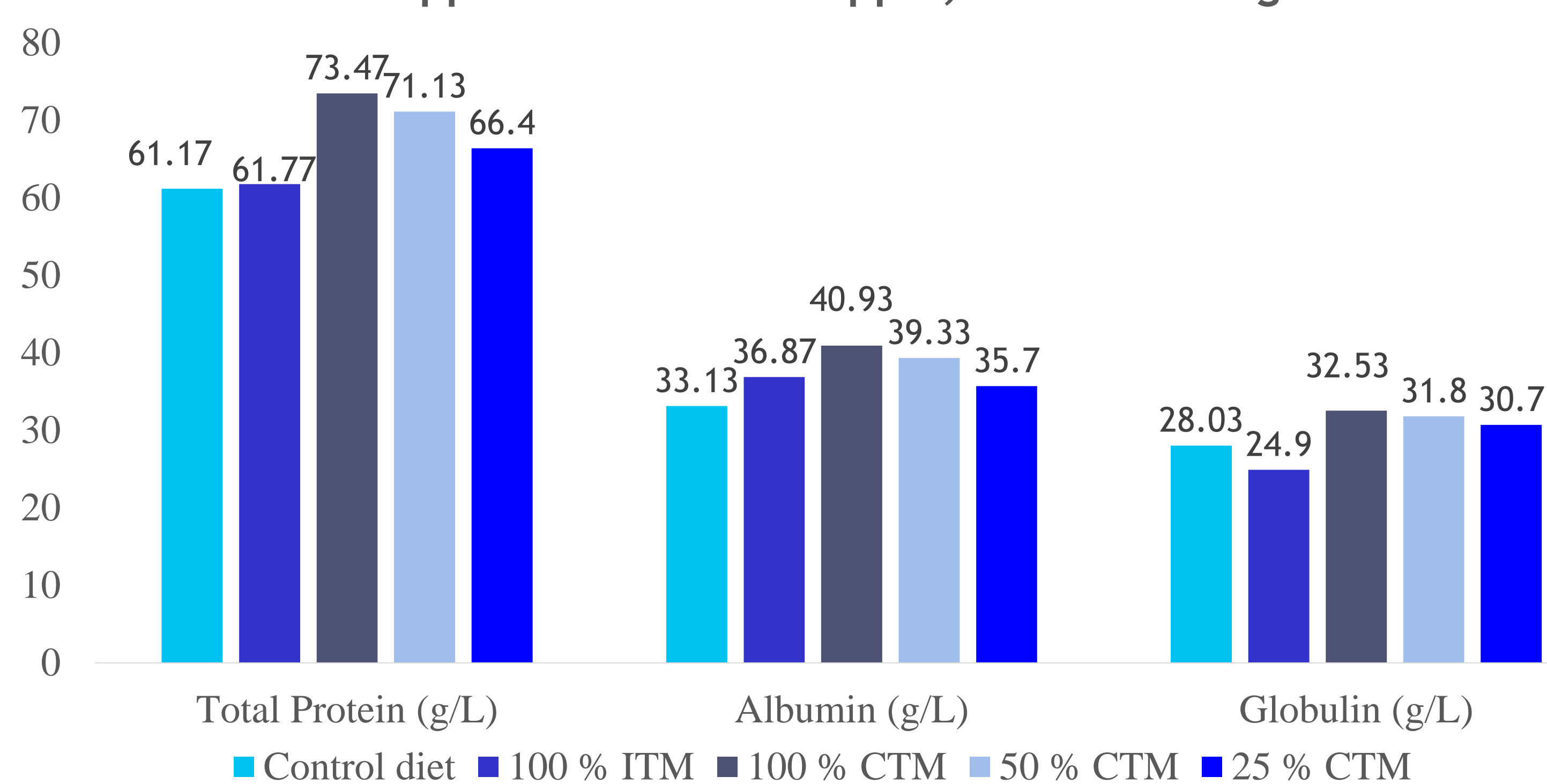


Table 1: Haematological and serum biochemical Indices of experimental laying chickens (late-lay) fed diet supplemented with inorganic and chelated Cu, Zn and Mn

| Parameters | Control diet | 100% ITM | 100% CTM | 50% CTM | 25% CTM | SEM | P value |
|----------------------------|---------------------|---------------------|---------------------|---------------------|----------------------|------|--------------|
| PCV (%) | 27.67 ^b | 29.33 ^{ab} | 32.00 ^a | 31.33 ^a | 29.33 ^{ab} | 0.50 | 0.023 |
| HB (g/dL) | 8.93 | 11.30 | 10.70 | 10.53 | 9.77 | 0.35 | 0.056 |
| RBC (10 ⁶ /μL) | 2.50 | 2.88 | 2.89 | 2.86 | 2.70 | 0.07 | 0.055 |
| WBC (x10 ⁶ /μL) | 13.27 | 12.80 | 10.43 | 10.77 | 10.97 | 0.42 | 0.071 |
| Creatinine (mg/dL) | 1.17 | 1.33 | 1.53 | 1.53 | 1.47 | 0.06 | 0.211 |
| AST (IU/L) | 134.17 ^b | 132.97 ^b | 153.45 ^a | 152.27 ^a | 149.97 ^{ab} | 2.80 | 0.001 |
| ALT (IU/L) | 14.33 | 15.67 | 15.47 | 15.53 | 15.47 | 0.64 | 0.172 |

^{ab}Means on the same row with different superscripts were significantly different ($P < 0.05$)

Conclusion

- Chelated Trace Mineral supplementation improved FCR (kg feed/kg egg) of layers in late lay.
- Chelated Trace Mineral supplementation at 100% and 50% increased PCV and total serum protein of layers in late lay while albumin was enhanced with 100% CTM supplementation.

Bibliography

- Liu B, Xiong P, Chen N, He J, Lin G, Xue Y, Li W, and Yu D. 2016. Effects of Replacing of Inorganic Trace Minerals by Organically Bound Trace Minerals on Growth Performance, Tissue Mineral Status, and Fecal Mineral Excretion in Commercial Grower-Finisher Pigs. *Biological Trace Element Research*;173(2):316-24

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