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Effect of Enzyme and Vitamin Supplementation on Physiohaematological Parameters of Turkey Broiler Birds

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Abstract: *This research was conducted to determine the effect of enzymes & vitamin on the physio- haematological parameters of broiler turkey birds (Melliagris gallpavo gallopavo) which were obtained from Big Brothers Farm (B &B) from Ilorin Kwara State. Sixty birds were used for the study. Same feed were given to the birds, the birds were grouped into four groups labeled as A, B, C and D, each group consists of fifteen (15) birds. Group A was maintained as control and placed on feed and drinking water throughout the experimental period. Group B was placed on enzymes at 1g/litter of water, group C was placed on vitamin at 0.5g/liter of drinking water and group D was placed on combination of enzymes and vitamin at the rate mentioned above. All the birds were fed the same commercial feed throughout the study. Initial body weight was recorded and subsequently, body weight was recorded at 7 days interval up to the end of experimental period and on the final day of the experiment blood sample were collected using 5ml syringe and 25 gauge needle via the wing vein for hematological haemoglobin (Hb), packed cell volume (PCV) red blood cell (RBC), white blood cell (WBC), study. The results revealed that mean value of WBC in all treated groups increased numerically with the highest value recorded in group D (242.96+15.35) However, statistically there was no significant increased (P>0.05) in all the treated groups. The mean value of RBC increased significantly (P<0.05) in all the treated groups and the highest value was recorded in group D (2.62+ 0.17) million/mm^3. Similarly, the mean hemoglobin values increased significantly (P<0.05) in all the treated groups and the highest was recorded in group D (14.26 + 3.56) g/dl. The mean value of PVC similarly showed a significant increased (P<0.05) in all the treated groups with the highest value recorded in group D (42.66 + 0.21%). On platelets, no significant difference (P<0.05) was recorded in all the treated groups. On body weight there was an increased body weight gain numerically in all the treated groups than control group. The data showed that numerically on the 7th day there was an increase in body weight, however, statistically no significant difference (P< 0.05) was recorded in all the treated groups. Similarly, on day 14th, 21st, and 28th there was a numerical increase in body weight in the treated groups and the highest value was always recorded in group D in all the weeks. It is concluded that enzyme and vitamin has no negative effect on the turkey broiler birds, it rather enhance digestion utilization, performance and hematological parameter of turkey birds was not altered. Enzyme and vitamin should be used to enhance performance of the bird and a similar study should be carried out using the same enzyme and vitamin in turkey birds to see their effect in terms of egg production.*

Keyword: Enzyme, Vitamin, Supplementation, Physiohaematological, Parameters, Turkey Broiler

Introduction: Turkey broilers are domestic birds raised for meat purpose. Turkey forms almost two percent of the total poultry production (Rajeshwara and Devishree, 2023). They are reared for meat only. Their meat is the leanest (having little fats) among other avian species. Turkey has nutritional and sensorial properties which makes it almost ideal raw material for rational and curative nutrition (Mahesh and Schulze, 2020). Turkey meat contains protein, fats, and the energy values of turkey meat are 240, 6.6%, I62 calories per 100gm of meat. Like potassium, calcium, magnesium, iron, selenium, zinc and sodium are present: it is also rich in essential amino-acids and vitamins like niacin, vitamin B6, B12. It is rich in unsaturated fatty acids and low in cholesterol (Rajeshwara and Devishree, 2023). Enzymes arc proteins and are organic catalyst which take part in the rate of chemical reaction and increased the speed of chemical reaction without themselves undergoing any permanent changes or they are biological catalyst that accelerate a chemical reaction without altering its equilibrium (e.g. hydrogenase and carbohydrase's enzymes) (Mahesh and Schulze, 2020). Vitamins are organic compound which are needed in small quantities to sustain life, we get vitamins from the food we eat because the body of animals' cither does not produce enough of them or none at all (Barton and Trabert, 2019). Both enzymes and vitamins has some effect but the adverse effect can be overcome by supplementation of exogenous carbohydrates (xyloses)enzymes which have been shown to lower viscosity of intestinal content and to improve digestibility of starch, proteins, fats and apparent metabolizable energy (AME) in broiler fed diet containing wheat (Annison and Choet, 2019; Bedford, 2019). The nutritive value of available feed stuffs such as wheat, maize, rice-polish, soya beans meal etc. contain more undigested part, so the feed utilization and

digestibility is also poor. Exogenous enzymes should have the ability to breakdown plant cell wall materials and nutrient such as protein and starch (Singen, 2019), thereby feed utilization and digestibility is expected to get enhanced. Adding non starch polysaccharides (NSP) degrading enzymes in turkey diet has increased in recent years (Bedford and Shulze, 2019) (Bedford 2020; Acamovic, 2021).Therefore optimum enzyme and vitamin supplementation are required for turkey, poultry, and formulating premixes are necessary, Vitamins play an important role in both nutrition and production (Dowel, 2019).

Materials and Methods: Experimental Site: This study was conducted in the Department of Animal Science, College of Agriculture, Federal University of Agriculture Zuru, Kebbi State, Nigeria. Zuru is located within latitude $11^0 45'$ and $5^0 25'$ East of the equator in the Northern Guinea savannah of the South Eastern part of Kebbi State (KBSG, 2003) it is also found in the extreme South Eastern part of Kebbi State on a hilly terrain and bounded to the North by Gummi Local Government Area North West by Yauri Local Government Area, North East by Bukkuyum Local Government Area of Zamfara State and South by Rijau Local Government Area of Niger State (Sakaba *et al.*, 2017).

Experimental Birds: A total number of sixty (60) broiler turkeys were used for the experiment the birds were sourced from B and B (Big Brother) poultry farm in Ilorin Kwara State.

Management of Experimental Birds: A week before the arrival of the birds the pen was thoroughly cleaned, washed and disinfected with detergent (Klin) and universal germicide (1ZAL) respectively, the pen stayed for three days to get rid of pathogens that may be harboring in the pen from previous stockings. Feeding and water trough were available, in addition to litter materials. The pen was partitioned into four (4) compartments which are treatment A, B, C and D respectively.

Experimental Diet: Commercial feed was given to turkey broiler from 0-4 weeks. Starter diets composition - 28% CP, lysine 1.70%, methionine 0.62, calcium 1.4%, phosphorus 0.7% sodium 0.18%, metabolizable energy (ME) 2900kcal/kg, Finisher Diet - 18% CP, lysine 1.15%, methionine 0.4%, calcium 0.90%, phosphorus 0.6%, sodium 0.17% metabolizable energy (ME) 3 100kacl/kg.

Experimental Design: The birds were randomly divided into four equal groups each group consisting of fifteen (15) birds and were numbered as group A, B, C and D) respectively. And each group was replicated three times with five birds per replicate. Group A was the control and was placed only on water without additives, then group B was placed on vitamin at 0.5g/litter of drinking water, group C was placed on enzyme at 1.0g/litter of drinking water and group D was placed on both enzymes and vitamins, at the above mentioned rate. The additives were measured using electronic weighing balance in the college laboratory. All the birds were fed with commercial feed throughout the experimental period.

Data Collection: Initial body weight of the birds was recorded and subsequently the weights were taken on weekly basis up to the end of experimental period. At the end of the experiment blood was collected for analysis at the end of the experiment or study for blood parameters (RBC, WBC, PCV, and HB).

Sample Collection: The blood was collected in the morning, by the use of 5ml syringe and 26 gauge needles, the area used for collection of blood was disinfected using spirit and cotton wool, the hand gloves used was properly disposed. 3ml was dispensed into the EDTA bottle for RBC, WBC, PCV and HB examination.

Data Analysis: Data generated from the study was expressed in mean and standard deviation and then subjected to analysis of variance (ANOVA).

Results and Discussion: All the hematological values analyzed in the study are presented in table 1. The mean value of WBC in all treated groups increased numerically with the highest value recorded in group D (242.96+15.35) however, statistically there was no significant increased ($P>0.05$) in the body weight recorded in all the treated group. The mean value of RBC increased significantly ($P<0.05$) in all he treated groups and the highest value was recorded in group D (2.62+ 0.17) million/mm, Similarly, the mean hemoglobin values increased significantly ($P<0.05$) in all the treated groups and the highest was recorded in group D (14.26 + 3.56) g/dl. The mean value of PVC similarly showed a significant increased ($P<0.01$) in all the treated groups with the highest value recorded in Group D (42.66 + 0.210). On platelets, no significant difference ($P<0.05$) was recorded in all the treated groups. The hematological parameter of present findings is in conformity with that of Dukes (1955) who reported that the number of erythrocytes and other component of blood may decrease or increased due to the influence of age, environment, exercise, nutritional status and climate.

Values with different superscripts in the same column differ significantly ($P<0.05$). Turkey treated with different treatments of enzymes and vitamin supplement showed an increased body weight gain numerically than control group. The data showed that numerically on the 7^{th} day there was an increase in body weight, however statistically no significant difference ($P<0.05$) was recorded in all the treated groups. Similarly, on day 14^{th}, 21^{st}, and 28^{th} there was a numerical increase in the treated groups and the highest value was always recorded in group D in all the weeks. These research is in line with the earlier report of Ahmed *et al*. (2017), Meng *et al.* (2019); Saleh and Ward (2019); Wang *et al.* (2019); Silva and Smithard (2022) that birds placed on supplements such as vitamin and enzymes performed better. The decreased in body weight gain in most of the treated groups statistically may be due to environmental factor, and species of animal but grossly there was increase in body weight and this might not be

unconnected with the feed intake, feed consumption, utilization, digestion, absorption and metabolism of supplied feed nutrients especially protein essential for their health and body weight gain. The increased body weight gain in group D is due to synergistic effect of combined treatment of enzyme and vitamin. This finding is not in agreement with the Carlier reports of Villar (2020) who reported that the weight gain and feed efficiency increased statistically with enzyme and vitamin supplementation.

Conclusion: The study was designed to establish the effect of enzymes and vitamin on the heamotological indices of turkey birds raised in Department of Animal, Following this experiment, it is therefore concluded that the agents has no effect. It rather enhance feed digestibility, weight gain, and growth rate, and the heamotological parameters of the turkey birds were not altered.

Recommendation: Based on the research findings, it is therefore recommended that; these agents (enzyme and vitamin) can be used to enhance feed intake, digestibility in poultry and turkey birds

1. Further study should be carried out using these agents on other species of birds to ascertain their performance.

2. Farmers should be encouraged to use the agents to enhance their production

3. A similar study should be carry out to assess whether these agents could influence egg production in turkeys

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Table 1: Effect of enzyme and vitamin supplementation on physiological parameters of turkey broiler birds

N = 5 groups	WBC	RBC	HGB	PCV	PLT
Control A	23.64±4.17[a]	2.47±0.08[b]	12.40±0.16[b]	37.20+0.16[b]	0.12±0.44
Enzyme B	235.12±0.59[a]	2.47±0.03[b]	12.36±0.11[b]	37.40±0.16[b]	0.22±0.44
Vitamin C	239.44±5.31[a]	2.62±0.08[b]	12.32±0.19[b]	36.80±1.40[b]	0.22+0.44
Combination D	242.96±15.35[a]	2.62±0.17[ab]	14.26±3.56[ab]	42.26±9.42[ab]	0.21±0.44

N=No of blood sample tested, values with different superscripts in the same column differ significantly (P<0.05).