

INFLUENCE OF MULTI-ENZYME SUPPLEMENTATION WITH GRADED LEVELS OF FLASHED-DRIED CASSAVA PULP AS REPLACEMENT FOR MAIZE ON HAEMATOLOGICAL INDICES OF BROILER STARTERS

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ABSTRACT

An experiment was carried out to investigate the influence of multi-enzyme supplementation with graded levels of flashed-dried cassava pulp (FDCP) on hematological indices of broiler starters. The FDCP was substituted for maize at 0, 5, 10 and 15% and supplemented with 100g/1000kg multi enzyme as described by the manufacturer and tagged as T₁, T₂, T₃ and T₄. T₁ (0% FDCP) served as control without maize and multi enzyme while T₂, T₃ and T₄ were contained maize (5, 10 and 15%) and supplemented with multi enzyme. Ninety-six (96) day old broiler chicks were used for the finding. Experimental diets and water were supplied to the birds ad libitum respectively. At three (3) weeks of the experiment, 3 mls blood was randomly collected through jugular vein of the birds and transferred to the laboratory for assay. Statistical results showed no significant ($p > 0.05$) effect on hematological parameters except lymphocytes and heterocytes that were significantly ($p < 0.05$) affected. Birds on 0% FDCP had the least (46.33 %) significant ($p < 0.05$) lymphocytes while 10% FDCP had the highest (58.00 %) significant ($p < 0.05$) effect. Birds fed on 10% FDCP showed the least (34.00 %) significant ($p < 0.05$) effect of heterocytes while birds fed on 0% FDCP gave the highest (47.3 %) significant ($p < 0.05$) effect. Varied FDCP with multi-enzyme supplementation had no negative effect on the hematological indices of broiler starters. Therefore, inclusion of FDCP up to 15% with multi-enzyme supplementation is recommended and further study should be carried out to investigate extent the use of FDCP with multi-enzyme in the broiler starter could be tolerated.

Keywords: Broiler starters, Hematological, Flashed-dried cassava pulp, Laboratory, Multi-enzyme

INTRODUCTION

Haematological studies are of biological and physiological concern in facilitating understanding the correlation of blood characteristics to the environment (Ovuru and Ekweozor, 2004) and therefore could be beneficial in the selection of animals that are genetically hardy to definite diseases and environmental circumstances (Isaac *et al.* 2013). Changes in haematological structures are often used to regulate various statuses of the body and to investigate stresses due to the environment, nutritional and/or pathological factors (Afolabi *et al.* 2010). Microbial enzymes have been employed in diets containing various cereal grains but few investigations have been carried out in diets containing cassava. The use of exogenous enzymes to degrade indigestible dietary components has yielded inconsistent results mainly because of use of enzymes often not suitable for effective hydrolysis of such components Akinfala *et al.* (2010) suggested that a combination of different enzymes of different activities is required for complete degradation of complex NSP and improved nutrient utilization.

MATERIALS AND METHODS

Experimental area:

The experiment was carried at the Poultry Unit of the Teaching and Research Farms, Oyo State College of Agriculture and Technology, Igbo-ora.

Sourcing of the flashed-dried cassava pulp (FDCP) and other feed materials

The FDCP (test ingredient) was obtained from Poultry industry, a starch processing industry along Maya Ado-Awaye Road, Iseyin Local government area, Oyo-State, Nigeria while maize, soybeans, wheat bran, multi-enzyme etc were procured at a feed mill in Igbo-ora town.

Experimental diets

Four iso-proteinous and iso-caloric starter diets were formulated, such that FDCP replaced maize at 0, 5, 10 and 15% levels in diets 1, 2, 3, and 4 respectively. The experiment was arranged in a Completely Randomized Design (CRD). Enzyme was used at the rate of 100/1000kg of the feed as recommended by the producer. The gross composition of the experimental diet is presented in Table 1.

Experimental design

A total number of ninety-six (96) unsexed day-old broiler chicks (Marshal ®) were used for the study. The chicks were randomly allotted into 4 treatment groups of 24 birds each in a completely randomized design

(CRD). Each group was subdivided into four (4) replicates of six (6) birds each placed on a deep litter pen of fresh wood shavings measuring 1.50m x 1.50m. The study lasted for a period of 28 days.

Table1: Gross experimental broiler starter diets (0-4 weeks)

Ingredient (kg)	T1 (0%)	T2 (5%)	T3 (10%)	T4 (15%)
Maize	51.00	48.45	45.90	48.35
FDCP	0.00	2.55	5.10	7.65
Soya beans	35.00	35.00	35.00	35.00
Maize bran	9.95	9.95	9.95	9.95
Limestone	1.00	1.00	1.00	1.00
Lysine	0.25	0.25	0.25	0.25
Methionine	0.30	0.30	0.30	0.30
Premix (B)	0.25	0.25	0.25	0.25
Salt	0.25	0.25	0.25	0.25
Bone meal	2.00	2.00	2.00	2.00
Enzyme (g)	50.00	50.00	50.00	50.00
Total	100.00	100.00	100.00	100.00
Calculated analysis				
EnergyME (kcal/kg)	2979.30	2933.09	2919.85	2906.60
Crude protein (%)	22.15	21.70	21.37	21.03
Ether extract (%)	3.43	3.23	3.03	2.83
Calcium (%)	1.12	1.12	1.10	1.08

FDCP= Flashed-dried Cassava pulp

Data collection

At three (3) weeks feeding trials, a sterile needle and syringe were used to draw blood from each of the four (4) broiler chickens in each treatment individually through the jugular vein. Three milliliters (3ml) blood sample was withdrawn from each bird in vials that containing ethylene diamine tetra-acetic acid (EDTA) as an anticoagulant for determination of haematological parameters (haemoglobin concentration), red blood cell (RBC) count, packed cell volume (PCV), as well as white blood cell (WBC) counts of the blood samples were analyzed in Wintrobe haematocrit tubes according to the method of AOAC(2021).

Statistical analysis

Data obtained were subjected to one-way analysis of variance by using SPSS (2021). Significant ($p < 0.05$) means among variables were separated by using Duncan's multiple range test of the same software package.

RESULTS

The result of the haematological parameters of broiler starter chickens fed graded levels of flashed-dried cassava pulp (FDCP) with enzyme supplementation is presented in Table 2. There were no significant ($p > 0.05$) differences on hemoglobin (Hb), red blood cells (RBC), white blood cells (WBC), platelets, mean corpuscular volume (MCV), Mean corpuscular haemoglobin concentration (MCHC), Mean corpuscular haemoglobin (MCH) while significant ($p < 0.05$) different were observed on packed cell volume (PCV), lymphocytes and heterocytes.

Table 2: Haematological parameters of broiler starters fed experimental diets (2-4 weeks)

Parameters	T1 (0%)	T2 (5%)	T3 (10%)	T4 (15%)	SEM	P-value
PCV (%)	21.33 ^b	23.00 ^{ab}	25.67 ^a	23.66 ^{ab}	0.7	
Hemoglobin(g/dl)	6.77	7.5	8.13	7.67	0.23	
RBC(x106 /mm3)	1.77	2.18	2.49	2.22	0.14	
WBC(x103 /mm3)	15.45	15.27	15.37	14.92	0.22	
Platelets (%)	118.67	118.67	119.67	122	1.92	
MCV	120.61	107.22	105.38	94.29	6.57	0.943
MCHC	31.59	32.62	31.43	32.36	0.27	0.246
MCH	38.1	34.99	32.7	35.44	1.18	0.482
Lymphocytes	46.33 ^c	54.67 ^{ab}	58.00 ^a	51.00 ^{bc}	1.85	0.013
Heterocytes	47.33	37.00 ^b	34.00 ^b	42.00 ^{ab}	0.38	0.017

Monocytes	3.67	3.67	2.67	2.33	1.2	0.875
Eosinophil	2.67	4	5	4	0.42	0.343
Basophil	0	0.67	0.33	0.67	0.15	0.41

^{a,b,c}: Means in the same row with different superscript differed significantly ($p < 0.05$), SEM= Standard error of mean, PCV= Packed cell volume, RBC= Red blood cells, WBC= White blood cells, MCV= Mean corpuscular volume, MCHC= Mean corpuscular haemoglobin concentration, MCH= Mean corpuscular haemoglobin

Packed cell volume (PCV) varied between 21.33 (%) and 25.67 (%), Broiler starter fed on 10 % FDCP, had the highest (25.67%) significant ($p < 0.05$) different and was statistically similar ($p < 0.05$) with T2 and 15% FDCP, while those on 0% FDCP had the least (21.33%) significant ($p < 0.05$) different. Lymphocytes significantly ($p < 0.05$) ranged from 46.33 to 58.00 (%), the least significant ($p < 0.05$) difference was observed from 0% (FDCP) while the highest (58.00%) was observed from birds fed on 10% FDCP. Heterocytes significantly ($p < 0.05$) ranged from 34.00 to 47.33 (%), birds fed on 10% FDCP had the least (34.00 %) significant ($p < 0.05$) different while those placed on 0% (FDCP) had highest (47.33 %).

DISCUSSION

The lymphocytes and heterocytes obtained in this study were within the referenced ranges of 45-70 (%) and 54-73 (%) reported by (Tvedten, 2010). The higher lymphocytes and heterocytes obtained from this study showed that the experimental broiler starters had capacity to generate antibodies and had higher degree of resistance to disease (Soetan, *et al.*, 2013). This study revealed that flashed-dried cassava pulp supplemented with multi-enzyme had no significant effect on the hematology indices of the experimental broiler starters. This is an indication that test diet in this finding had no negative impact on the health status of broilers at the starting phase of the experiment.

CONCLUSION AND RECOMMENDATION

Based on the outcome of this finding, it could be concluded that varied flashed dried cassava pulp with multi enzyme supplementation can be used to replace maize up to 15% inclusion levels without posing any negative influence on the blood index of the broiler starters, therefore, 15% inclusion level with multi enzyme supplementation is recommended to replace maize in the broiler's starters. Inclusion levels beyond 15% flashed-dried cassava pulp with multi-enzyme supplementation should be investigated in the broiler starters.

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