EFFECT OF RICE OFFAL SUPPLEMENTED WITH ENZYME ON HAEMATOLOGICAL PARAMETERS AND SERUM BIOCHEMICAL INDICES IN JAPANESE QUAILS

Obaweki, E.V.[1*], Edache, J.A.[2], Yisa, A.G.[3] and Gulloma, N.M.[4]

[1]Livestock Investigation Division, National Veterinary Research Institute, Vom.
[2]Federal College of Animal Health and Production Technology, Vom, Plateau State, Nigeria
[3]Federal College of Animal Health and Production Technology, Vom, Plateau State, Nigeria
[4]Molecular Parasitology Unit, Biotechnology Center, National Veterinary Research Institute, Vom.
[*]Corresponding author: valerieobaweki@gmail.com; 08134163267

ABSTRACT

A six-week feeding trial was carried out to determine the effect of feeding diets containing rice offal supplemented with natuzyme on the serum biochemical and haematological parameters of growing Japanese quails. Four diets containing rice offal at 0, 5, 10 and 15% were formulated and represented by A, B, C and D respectively. Diets B, C and D had natuzyme mixed with them at 100g/100kg as recommended by the manufacturer. One hundred and eighty (180) two-week old Japanese quails of mixed sexes were randomly allotted to the diets at 45 birds per diet in a completely randomized design. Feed and water were made available to the birds for six (6) weeks. Serum biochemical indices, Random Blood Sugar (RBS), Total Protein (TP), Albumin and Total Cholesterol (TC), did not vary significantly (P>0.05). For the control, haematological parameters, Red Blood cell (RBC), White Blood Cell (WBC), Haemoglobin (Hb), Mean Corpuscular Volume (MCV), Mean Cell Haemoglobin (MCH) and Mean Cell Haemoglobin Concentration (MCHC), did not vary significantly (P>0.05). Therefore, feed for growing Japanese Quails could contain as high as 15% rice offal supplemented with natuzyme for profitable performance.

Keywords: Japanese quail, rice offal, haematological parameters, enzymes, rice offal

INTRODUCTION

The Japanese quail (*Coturnix coturnix japonica),* also known as the coturnix quail, is a species of old-world quail found in East Asia. The Coturnix quail is a small hardy bird with males being smaller bodied than females. Chang *et al*. (2005). The Japanese quail has gained so much economic value as an agricultural specie for egg and meat production in many parts of the world. Chang *et al*. (2005) and Genchev (2012).

Rice offal (rice milling waste) consists of rice hulls and rice bran which is rich in nutrients and has potential as a feed ingredient. It contains 6% protein, 2860 kcal of metabolizable energy (ME), 0.04% calcium and 0.46% phosphorus. It is obtained during the milling of either untreated or steam treated paddy rice seeds referred to as raw and parboiled rice offal. Enzymes as additive is well established in poultry diet. Provided and supplied in powder form or added to diet before mixing, pelleting or in form of granules. Both procedures allow it to mix properly with dietary ingredients and react effectively with the substrates.

MATERIALS AND METHODS

Experimental Design, Housing and Procedure

One hundred and eighty (180) two-week old Japanese quails of mixed sexes obtained from the Poultry Department, National Veterinary Research Institute (NVRI) Vom, certified to be healthy and uniform in size were used for the experiment and were randomly allotted to the diets at 45 birds per diet in a completely randomized design. Each treatment was replicated thrice with at least 15 birds per replicate. Diets were given alongside clean drinking water for six weeks. In each week, birds were weighed before the experiment commenced. Birds were housed in a standard poultry house partitioned with wire mesh to allow good ventilation.

Diets

The diets were formulated and mixed, such that rice offal is included at 0 (Control), 5%, 10% and 15% rice offal and were tagged A, B, C and D respectively. The diets contained crude protein levels (25% CP) but varied slightly in energy levels. The enzyme was mixed with diets B, C and D at 100g/100kg as recommended by the manufacturer.

Data collection

Two birds per replicate were selected and used for the determination of blood parameters and serum biochemical indices. At the end of the experiment, the birds were slaughtered and blood samples were collected via the jugular vein (located in the neck of the bird) into sample bottles containing Ethylene diamine tetra acetic acid (EDTA) to prevent clotting of the blood and used to determine the haematological parameters, PCV, Hb, RBC, WBC by procedures described by Ridwell (2011). Other haematological parameters determined were MCV, MCH and MCHC. Other bottles without EDTA were used to collect blood for determination of serum biochemical indices (RBS, Total protein, Albumin and Cholesterol).

Table 1: Composition of Experimental Diets

Composition	A	B	C	D
Rice Offal	0.00	5.00	10.00	15.00
Maize	39.81	34.40	28.98	23.55
Groundnut cake	41.99	42.40	42.82	43.25
Palm Kernel cake	13.50	13.50	13.50	13.50
CP (%)	24.99	25.00	25.00	25.00
M. E. (Kcal/Kg)	2779.32	2747.73	2715.54	2683.50
Ca (%)	1.38	1.38	1.39	1.40
P (%)	0.44	0.45	0.49	0.50
CF (%)	4.58	5.12	5.65	6.19
COST(N)/Kg	90.74	86.60	82.44	78.29

*Others: palm kernel cake (13.50%), fish meal (0.50%), bone meal (2.00%), limestone (1.50%), *premix (0.25%), salt (0.25%), methionine (0.10%), lysine (0.10%).

Key: C.P, crude protein; M.E, metabolisable energy; Ca, calcium; P, phosphorus; C.F, crude fibre.

Data Analysis

The data obtained were subjected to analysis of variance (ANOVA), Steel and Torrie, (1981) and where significant differences existed, they were separated using Duncan's New Multiple Range Test (Obi, 1990). P-value ($P<0.05$) was considered significant.

RESULT

In the serum biochemical indices of quail chicks in our work, total protein (TP) did not differ significantly across the diet of quail chicks. This is contrary to what was reported by Olufeko *et al*. (2019). The serum biochemical indices of quail chicks did not vary significantly in this work and it fell within the ranges reported by Minka *et al*. (2012) and Jatoi *et al*. (2013) and is an indication that the birds were in good health throughout the experimental period. The cholesterol level in our work is similar across the diet which is contrary to the report by Ilo *et al*. (2019) that where the cholesterol value on 15% level of cassava peel was significantly higher than 5%. The reason may be that he was working on cassava peel and broilers and not rice offal and quail.

Table 2: Effect of rice offal supplemented with natuzyme on serum biochemical indices of growing Japanese quail

	Treatments					
Parameters	A (0%)	B (5%)	C (10%)	D (15%)	SEM	P-value
RBS(mmol/l)	2.45	2.32	1.88	2.83	1.02	0.728
TP (g/l)	37.50	61.83	35.67	51.00	19.90	0.919
Albumin (g/l)	22.17	21.00	16.67	23.83	8.40	0.757
Total CH (mg/dl)	2.76	2.52	2.20	2.98	1.45	0.388

RBS=Random blood sugar, TP=Total protein, Total CH=Total cholesterol, SEM=standard error of mean,

Haematological parameters in this study did not vary significantly across the diets. This result is similar to report by Salami and Odunsi (2017) which states that there was no significant effect of multi-fibre sources on the haematological parameters of broilers. Normal range of Haemoglobin (Hb) is 7-13g/dl and 41-52.17% PCV as reported by Banerjee (1998). The crude fibre level of one of their diets was 11.85% of the diet. This report is at

variance with the depressed values of haematological indices in cockerel starters due to varying crude fibre levels, Bamgbose *et al*. 2004) in the diets fed. Similarly, Alade *et al*. (1998) reported that haematological parameters in their study with rabbits decreased as the crude fibre levels increased which was contrary to what was observed with Japanese quails in this study. These values recorded for Japanese quails may be due to the adequacy of the diet to maintain healthy birds. The haematological parameters for the treatment groups were generally within the values reported by Mitruka and Rawusley (1977) and Ridwell (2011) for normal chicken as well as Japanese quail.

Table 3: Effect of rice offal supplemented with natuzyme on haematological parameters of growing Japanese quail.

Parameters	A (0%)	B (5%)	C (10%)	D (15%)	SEM	P-value
WBC (10^3/ul)	3167	4367	3467	5867	2131	0.733
NEUT (cells/mcl)	13.17	11.67	15.16	38.00	17.14	0.298
LYMP (%)	84.67	88.33	81.33	78.67	44.10	0.994
RBC (10^6/mm^3)	1.87	2.27	2.05	3.28	0.86	0.262
Hb (g/dl)	13.00	17.17	13.67	11.65	9.42	0.902
PCV (%)	41.33	47.33	46.17	61.50	28.03	0.846
MCV (fl)	185.70	209.30	207.70	248.80	131.90	0.946
MCH (pg)	58.50	76.33	73.00	53.50	48.92	0.925
MCHC (g/dl)	20.67	36.00	33.50	28.50	11.37	0.418

WBC=white blood cell, NEUT=neutrophil, LYMP=lymphocyte, RBC=Red blood cell, Hb=Haemoglobin, PCV=packed cell volume, MCV=mean cell volume, MCH=mean cell Haemoglobin, MCHC=mean cell Haemoglobin concentration.

Values for WBC obtained in this study compares favorably with reports (15.25-16.77) for broilers by Diarra *et al*. (2012). Similarly, figures by Diarra *et al*. (2012) for PCV (29.50-32.50%) and RBC of 2.77-3.47 (10^6/mm^3) compared closely to what was reported in this study for quail chicks.

CONCLUSION

There were no significant differences both in the haematological parameters and serum biochemical indices. Enzyme supplementation is therefore recommended because it improved digestion in quail birds by increasing digestibility of nutrients, breaking down anti-nutritional compounds and improving intestinal health. While existing research highlights the beneficial effects of rice offal on haematological parameters and serum biochemical indices in Japanese quail, further studies are needed to establish optimal inclusion levels and their long-term impacts on quail health and productivity.

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