HEMATOLOGICAL AND SERUM BIOCHEMICAL PARAMETERS OF JAPANESE QUAILS FED DIFFERENT ENERGY SOURCES IN SEMI ARID ENVIROMENT OF GASHUA, YOBE STATE

BY

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Abstract

An experiment was conducted to assess the effect of millet and sorghum as alternatives to maize on hematology and serum biochemical parameters of quails. Three hundred (300) day old quails were sourced form National Veterinary Institute Jos. The birds were brooded for two weeks and randomly allotted to three (3) different energy sources i.e. maize, millet and sorghum designated as treatment 1, 2 and 3 respectively. The birds were fed with experimental diets for eight weeks and blood were collected for hematology and serum biochemical parameters. Results showed that packed cell volume (50.20-56.00), red blood cells (4.72-5.21) and hemoglobin (16.98-18.38) were statistically similar (P>0.05). The serum biochemical parameters showed that total protein (36.20-39.80), globulins (11.60-14.44), total protein (36.20-39.80), glucose (12.68-14.82), cholesterol (5.36-6.78), urea (17.80-20.00) and ASAT (1.98-2.08) were not affected by the different energy sources (P>0.05). It can be concluded that the alternative energy sources can be used in quail's production without deleterious effects on hematology and serum biochemistry of quails in semiarid environment.

Keywords: Quail's, energy sources, hematology, serum biochemistry

Introduction

Nigerian livestock industry has been greatly affected by high cost of feed which is reported to account for 60-85% of the total cost monogastric production (Sanni and Ogundipe, 2005). This high cost of feeds has necessitated the search of alternative energy sources. Maize is the major source of energy in poultry feeds and energy constitute about 40% of the feed cost in livestock production in Nigeria (Ijaiya et al., 2012). Maize also serves as staple food for good proportion of Nigerians. The ever growing demand for maize for human consumption, livestock feeds and some industrial uses has pushed its market price to an alarming height (Odukwe, 1994). This is because maize is high in energy and forms the standard (100) against which other cereals grains is compared (Atteh, 2002). Therefore, any cereal can be alternative to maize in poultry feed industry and could be the only immediate solution to reduce cost of poultry production. Hematological and serum biochemical parameters could serve as a baseline line information for comparisons of nutrient deficiency, physiology and health status of farm animals (Daramola et al., 2006: Maidala *et al.*, 2014). The aim of this research work is to evaluate the use of millet and sorghum as alternative energy sources on hematology and serum biochemical parameters of Japanese quails in semi-arid environment of Gashua, yobe state.

Materials and methods

Study area

The study was conducted in teaching and research farm of Federal University Gashua, Yobe state. Bade local government lies between latitude 10^0 and 11^0 east of Greenwitch and longitude 13^0 and 12^0 north of equator (Geoname/yobe state 2016).

Sources and processing of Ingredients

The millet and sorghum were purchase in Bade Central Market. The supplements were purchase from animal care Kano state. The maize, millet and sorghum were used to formulate the experimental diets which are isonitrogenous and isocaloric, the composition of the experimental diets are shown in Table 1.

Experimental birds and management

Three-hundred-day old quail chicks were sourced from National Veterinary Research Institute Vom, Plateau State. The birds were brooded for two weeks. The birds were randomly allotted to three dietary treatments, there are one hundred birds per treatment replicated five times (twenty birds per replicate) in a completely randomized design (CRD). The experiment lasted for eight weeks.

Blood profile analysis

Ten (10) birds per treatment (i.e. two birds per replicate) were randomly selected, fastened overnight. Samples of blood were collected from the brachial vein using 1ml disposable syringe and needle, the blood were stored in a blood samples bottles with and without anticoagulant (EDTA). Blood samples were analyzed for hematological parameters according to routine available clinical methods described by Baker *et al*. (1998). The biochemical parameters were determined by biuret reaction expanded by Bush, (1975). Data sets generated were subjected to analysis of variance ANOVA SPSSS 2010. LSD was used to separate the means.

Results and Discussion

The percentage composition of the experimental diets is shown in Table 1, the hematological and serum biochemical parameters are shown in Table 2. Results showed that packed cell volume, hemoglobin and red blood cells were not affected by the different energy sources ($P<0.05$), this finding suggested that the alternate energy sources provide enough energy for quail's metabolism. The values are within the normal range of 42 – 45% and 7 – 13g/dl for PCV and Hb (Banerjee, 2009) and 31 – 50% for PCV (Schalm *et al*., 1975). Similarly, the MCH, MCV and MCHC were not affected by different types of energy. The uniform values of the RBC, Hb, MCH, MCV and MCHC obtained in this study indicated that there were normal bone marrow functions, no macrocytic, hypochromic and autoimmune hemolytic anemia. Neutrophils was affected by the different energy sources ($P<0.05$), the neutrophils were better in millet and sorghum diets and this implies higher resistance to infection and bacteria while lymphocytes were better in the control diets. The serum biochemical studies revealed that albumin, total protein, globulins, glucose, chlorine and calcium were statistically similar ($P>0.05$) and this suggest that millet and sorghum can be alternative energy sources. The potassium and bicarbonate were affected across the treatment ($P<0.05$), the control diet had higher values of this mineral compared to alternative energy sources. Similarly, the control diet had higher level of sodium compared to alternative energy sources. The cholesterol, urea, creatine, ASAT, ALP and TB were not affected by the different energy sources ($P<0.05$), and this indicate that the liver and the kidney were physiologically normal. Higher significant values of ALAT ($P<0.05$) were observed in the control diet while the lowest was observed in millet diet, this suggest that millet is safer compared to maize for normal liver functions. Similarly, the CB were statistically higher in the control diet ($P<0.05$) and lowest in millet based diet. Results of this study indicated that the alternative energy sources can replace maize as energy sources in the diets of Japanese quails without adverse effect on hematological and serum biochemical parameters.

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Table 1: Percentage composition of experimental diets fed to quails

Ingredients	Maize	Millet	Sorghum D
Maize	52.03	00.00	00.00
Millet	00.00	52.03	00.00
Sorghum	00.00	00.00	52.03
Full fat soyabean	29.07	29.07	29.07
Wheat offal	10.00	10.00	10.00
Fishmeal	5.00	5.00	5.00
Bone meal	3.00	3.00	3.00
Lysine	0.20	0.20	0.20
Methionine	0.20	0.20	0.20
Salt	0.25	0.25	0.25
DRPremix*	0.25	0.25	0.25
Total	100.00	100.00	100.00
Calculated analysis			
Crude protein (%)	21.00	21.00	21.00
Metabolizable energy (kcal/kg)	2879	2745	2725

*****Each kilogram contains Vit A 3600, 000 IU. Vit. D_3 600.000 IU. Vit E 4.000.000mg. Vit B_1-B_6 640, 1600, 600, 4.00mg. Panthothenic acid 2000mg, Biotin 300mg. Manganese 16000mg. Manganese 16000mg. Selenium80mg. Vit. K_3 600mg. Cobalt 80mg. Copper1200mg. Zinc 12,000mg. Folic acid 200mg. Choline chloride700000mg. Antioxidant 500mg.

Table 2: Hematological and serum biochemical parameters of quails fed different energy sources

Parameters	T_1 Maize	T2 Millet	T3 Sorghum	SEM	P-value
Packed cell volume (%)	53.80	56.00	50.20	1.40	0.246
Red blood cells (X 106/mm	5.21	4.91	4.72	0.49	0.321
Haemoglobin (g/dl)	17.49	18.38	16.98	0.45	0.482
MCH (fl)	103.26	114.05	106.36	1.56	0.214
MCH (pg)	0.33	0.32	0.33	1.22	0.078
MHCV (%)	32.51	32.82	33.82	0.56	0.065
Neutrophils	25.20^{b}	32.60^{a}	32.60^{a}	1.45	0.041
Lymphocyte	74.80	67.25	67.40	1.55	0.055
Albumin (g/100ml)	24.60	23.80	25.40	0.52	0.045
Total protein (g/100ml	36.20	37.80	39.80	0.82	0.480
Globulins	11.60	14.00	14.44	0.80	0.207
Glucose (mmol/l)	14.82	12.84	12.68	0.77	0.322
Chlorine	143.40	128.20	131.40	3.80	0.484
Potassium	8.38^{a}	4.83^{b}	4.18^{b}	0.65	0241
Cholesterol	5.36	6.34	6.78	0.29	0.006
Urea (µmol/l)	20.00	18.60	17.80	0.86	0.112
HCO_2	29.00^{a}	18.60^{b}	17.80^{ab}	0.86	0.112
Sodium	168.80^{a}	153.00^{b}	154.00^{b}	2.55	0.070
Calcium	3.20	3.36	3.00	0.07	0.006
AST (UI/L)	2.00	1.94	2.08	0.04	0.242
ALT (UI/L)	124.20^{a}	117.20^{ab}	108.80^{b}	2.64	0.266
ALP (IU/L)	38.80	36.00	32.00	1.06	0.044
TB	302.00	342.00	330.00	17.07	0.659
CB	15.48^{a}	8.38^{b}	10.82^{ab}	1.18	0.029

Means bearing different superscripts were statistically different