The effect of feeding graded levels of cowpea seed meal on heamatology and serum biochemical parameters of broiler chickens.

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Abstract
An experiment was conducted to asses the effect of replacing soyabean with cowpea seeds on blood parameters of broiler chickens Two hundred Anak 2000 one week old broiler chicks were randomly allocated to five dietary treatments in which cowpea seeds replace soyabean at 0%, 20%, 30%, 40% and 50%, each treatment was replicated four (4) times with ten birds per replicate in a Complete Randomized Design (CRD). Results showed that all the blood parameters were affected (P<0.05) by the replacement level. Based on the result of this study 30% replacement is recommended for enhanced heamatological, serum biochemical and reduce toxicity levels of blood of broiler chickens.

Key words: Cowpea, haematology, biochemical, broiler chickens

Introduction

Hunger and malnutrition, remain one of the major problems facing higher number of Nigerians resulting into lower protein in their diets. The contribution of animal protein in most of Nigerians diet is very low. The inability of Nigeria to feed their teeming population with qualitative and quantitative food is a problem associated with high cost of animal protein accompanied with biological factors such as disease and pest, social factors such as custom and tradition and ignorance Oyawoye (1999). However, poultry bird has been reported to bridge the gap within a shortest possible time due to their short generation interval, short gestation period, and fast growth rate (Maidala andIstifanus, 2012). Abeke *et al.* (2007) reported that among the various poultry species, broilers birds are important in meat production because they provide quicker returns in the investment within a short period of six to eight weeks (6-8 weeks). As a result of high cost of ingredient used in poultry production, conventional,poultry feeds continue to increase in price in Nigeria over several decades. The use of low price ingredient is encouraged to reduce the cost of production. The use of cheap alternative source of protein is to be encouraging hence soya bean and groundnut cake are the main source of protein which can be grown in all and semi arid areas. Different types of local varieties of cowpea exist in and around Katagum Local Government which include:- kananado (big seed and coiled one), (silver variety) Yabarem (small seed variety). The use of this local varieties will reduce the cost of poultry production and over dependence on soya beans as source as source of protein. Blood analysis is an established means of assessing clinical and health status of animal on feeding trials since ingestion of dietary components has measurable effect on blood composition (Church *et al.*, 1984; Maidala *et al.*, 2014) and may be considered as an appropriate measure of long term nutritional status. Oyawoye and Ogunkunle (1998) stated that haematological components of blood are valuable in monitoring feed toxicity especially with feed constituents that affect the formation of blood. The research reported here in the replacement of soyabean with cowpea on blood parameters of broilers.

Materials and Methods

The experiment was conducted at poultry house of collage of education Azare, Bauchi state, Katagum local government is situated on the northern part of Bauchi state, Nigeria. It is located between latitudes 11°42' and 11°40°and longitude 10° 31' and 10° 11' east (Anon, 2009). Two hundred birds Anak 2000 day old broiler chicks were used for this study. The birds were brooded for one week. The chicks were individually weighted and randomly assigned to five treatments diet in which cooked cowpea replace full fat soya bean at: control 0%, 20%, 30%, 40% and 50% inclusion. Each treatment was replicated four (4) times consisting of ten birds per replication in a completely randomized design CRD. The cowpea seed were cooked for about 30 minutes after the boiling point of water of 100%. After cooking the cowpea seed was sun dried for five days before milling. The seeds were used to formulate the experimental diets. The composition of the experiment is shown Table 1 and 2 for starter and finisher respectively. The birds were administered with vitamin and amprolium in their drinking water. The vaccination of Gumboro was been administered after one week and Lasorta was also administered

after two weeks (14 days). Water is giving to the bird adlibitum. At the end of feeding trial four birds were randomly selected per treatment and blood samples were collected early in the morning to avoid temporary elevation of blood metabolites by feeding as observed by Bush (1975). Samples of blood were collected from the brachial vein using 5ml disposable syringe and needle (21 gauge), the blood were stored in a blood samples bottles with and without anticoagulant (EDTA). Blood samples were analyzed for heamatological 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).

Results and Discussion

The heamoglobin values (7.65-9.80) values are statistically significant (P<0.05). The control diets and 40% cowpea inclusion level are similar while higher values in 20 and 30% cowpea level are reported. The heamoglobin values reported in this work are within the range of values reported by Lamidi *et al.* (2014) for broiler chickens. Broilers on 40 and 50% cowpea level have higher pack cell volume than 20-30% level which is significantly different (P<0.05) from the control diet, this may be an indication of utilization of different cowpea levels and the values reported in this study within the values of Mitruka and Rawnsley (1977) for broiler finisher chickens. The red blood cell value ranged between 1.88 in 40% cowpea level to 2.38in 20% cowpea levels and the difference between the values are statistically significant (P<0.05), broiler chickens on 40% cowpea level have the least red blood cell value while chickens on 20% cowpea level has the highest red blood cells. The values obtained in this researchwork are comparable to values of 3. 55-to 4.22 reported by Afolayan *et al.* (2014) and 1.65-2.55 reported by Lamidi (2014) on healthy broilers supplemented with ginger and garlic as additives. The white blood cells varied between 216.50 in 40% cowpea diet to 235.00 in 50% cowpea diet and the difference between the values are statistically significant (P<0.05). Broiler chickens on 50% cowpea inclusion level have the highest white blood cell level. Broiler chickens fed different cowpea levels are significantly different from the control diets. The values reported in this work were higher than 26.50-43.25 Oyeyemi *et al.* (2014). The eusonophiles varied between 20.50 in the 40% levels of cowpea to 28.00 in 20% level of cowpea and the difference between the values were statistically significant (P<0.05).The blood plathelets varied between 15.50 in 40% cowpea replacement level to 42.50 in 20% cowpea inclusion level and the difference between the values are statistically significant (P<0.05). Broiler chickens in 30% cowpea inclusion level have the highest value blood plathelets. The cholesterol level ranged between 2.70 in 40% cowpea inclusion level to 3.70 in the control diet and the difference between the values were statistically significant (P<0.05). The cholesterol reported in this work is within the range of values (4.13- 5.05) reported by Afolayan *et al.* (2014) on African locust bean seeds fed to broilers. The total protein in blood varied between 33.00 in 40% cowpea replacement level to 45.00 in 30% cowpea inclusion level and the difference between the values are statistically significant (P<0.05). The total protein in blood was highest at 30% cowpea inclusion level. Aspartate transaminase ((ASAT)) level varies between 72.00 in the control diet to 119.00 in 50% cowpea inclusion level and the difference between the values were statistically significant (P<0.05). Higher level of ASAT indicates presence of toxin or poisons in the heart and liver. ASAT is found in appreciable quantities and forms in the heart and liver. It is the serum enzyme that shows the functioning of the heart and liver, when hepatic cell are damaged, ASAT levels rises. This enzyme occurs in high proportions early in disease conditions, whether damage is due to infection or toxic hepatitis. The alanine transperase (ALAT) varied between 17.00 in the 20% level of inclusion to n19.50 in 50% level of inclusion and the difference between the values were statistically significant (P<0.05). ALAT is found principally in the liver with only small amounts being present in other organs. When there is liver cell damage, the serum or plasma level of both ASAT and ALAT raised tremendously. Keenly, ALAT is thus more specific for detecting liver cell damage.

Conclusion

Based on the result of this study 30% replacement is recommended for enhanced heamatological, serum biochemical and reduce toxicity levels of blood of broiler chickens.

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Table 1: Percentage composition of experimental diet fed to starter (1-4 weeks of age)

Ingredients	Control	20%	30%	40%	50%
Maize	44.35	42.98	41.64	41.16	30.57
Soya beans	36.75	29.40	25.73	22.05	18.37
Cowpea	00.00	7.35	11.03	14.70	18.37
Wheat offal	10.00	10.00	10.00	10.00	10.00
Fish meal	5.00	5.00	5.00	5.00	5.00
Bone meal	3.00	3.00	3.00	3.00	3.00
Salt	0.25	0.25	0.25	0.25	0.25
Lysine	0.20	0.20	0.20	0.20	0.20
Methionine	0.20	0.20	0.20	0.20	0.20
premix	0.25	0.25	0.25	0.25	0.25
Total	**100**	**100**	**100**	**100**	**100**
Calculated analysis					
Crude protein	23.00	23.00	23.00	23.00	23.00
Metabolizable energy (kcal/kg)	28207	28197	28105	2896	2875

Table 2: Percentage composition of experimental diets feed to finisher (5-8 weeks of age)

Ingredients	Control	20%	30%	40%	50%
Maize	43.64	43.64	43.64	43.64	43.64
Soya beans	27.46	21.97	19.22	16.42	13.73
Cowpea	00.00	5.49	8.24	10.98	13.73
Wheat offal	20.00	20.00	20.00	20.00	20.00
Fish meal	5.00	5.00	5.00	5.00	5.00
Bone meal	3.00	3.00	3.00	3.00	3.00
Salt	0.25	0.25	0.25	0.25	0.25
Lysine	0.20	0.20	0.20	0.20	0.20
Methionine	0.20	0.20	0.20	0.20	0.20
premix	0.25	0.25	0.25	0.25	0.25
Total	**100**	**100**	**100**	**100**	**100**
Calculated analysis					
Crude protein	20.01	20.01	20.00	20.00	20.00
Metabolizable energy (kcal/kg)	3330	3330	3320	3320	3320

Table 3: Heamatological and serum biochemical parameters of broiler chickens fed cowpea for soybean

	Level of cowpea					
Parameters	0%	20%	30%	40%	50%	SEM
Heamoglobin	7.65^{b}	9.80^{a}	8.40^{a}	7.80^{b}	8.90^{b}	2.15*
Pack cell volume	26.50^{c}	29.50^{b}	31.00^{b}	37.00^{a}	41.00^{a}	12.50*
Red blood cell	1.94	2.38	2.06	1.88	2.09	*
White blood cell	225.50	242.00	234.00	216.50	235.00	*
Neutrophiles	44.00^{b}	61.00^{a}	69.00^{a}	68.50^{a}	67.00^{a}	9.86*
Basophiles	9.00	11.00	11.00	9.50	11.50	*
Eusonophiles	24.00	28.00	21.50	20.50	21.50	*
Plathelets	19.50^{c}	28.00^{b}	42.50^{a}	15.50^{c}	26.00^{b}	9.09*
Cholesterol	3.70	3.65	3.25	2.70	3.80	*
Total protein	35.00^{b}	42.00^{a}	45.00^{a}	33.00^{b}	50.50^{a}	12.67*
ASAT	72.00^{b}	104.50^{b}	118.00^{b}	100.50^{b}	119.00^{b}	17.56*
ALAT	17.50	17.00	18.50	19.50	19.50	*

SEM: Standard error of means, Means bearing different superscripts are statistically significant *= ($P<0.05$)