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EFFECT OF BAOBAB SEED MEAL AS A REPLACEMENT FOR SYNTHETIC METHIONINE AND LYSINE ON HAEMATOLOGICAL PARAMETERS OF BROILER FINISHERCHICKENS

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ABSTRACT

The effects of feeding baobab seed meal (BSM) as a replacement for synthetic methionine and lysine (SML) on haematological parameters of broiler chickens was carryout in a 28-day feeding trial. A total of (180) day old chicks (Cobb 500) were randomly allotted into a complete randomized design (CRD) and replicated 3 times with 12 birds each. The diets were formulated to be isocaloric (3000kcal/kg) and isonitrogenous (19% crude protein) with BSM included at 0, 25, 50, 75 and 100% replacing SML. Birds were reared in a deep liter system and fed with known quantity of experimental diets and supplied water at all times. Standard routine management practices were strictly observed. The result showed that birds fed 100%BSM had higher HB g/dl (11.40g/dl) and PCV (34%) than birds fed control diet and other treatment diets. Birds fed 25%BSM had higher WBC (15.20x10^9) and RBC (5.50x10^6) compared to birds in control group and other treatment. Birds fed 75%BSM had increased MCV (94.00fl) and MCH (30.20fl) compared to those fed the control diet and others. However, mean cell haemoglobin concentration had no significant effect across the treatment when baobab seed meal was added to the diets. These values were within the normal reference range for birds. It is concluded that 100% of baobab seed meal should be included as source of methionine and lysine for optimum performance of broiler chickens.

Keywords: Baobab, Broiler Finisher, haematological parameters, Synthetic Additives.

INTRODUCTION

Protein from animal sources contain adequate amounts of methionine and lysine but are often too expensive for use in practical rations (Dafwang *et al*., 1980*;* Dafwang*,* 2006). It was concluded that methionine and lysine requirements for poultry can be met by supplementing diets with other sources of plant products as supplementation of methionine and lysine with herbs have been economically and scientifically proven to ensure efficient nutrient and energy utilization, reduction in mortality and better performance (Bishnol, 2008). The use of phytogenic replacements to synthetic feed additives also provides dual opportunity of cost reduction and the quest for inclusion of natural, biodegradable products into the feeds of monogastric animals. Phytogenic feed additives must however be rich in key nutrients such as essential amino acids, vitamins and other micro nutrients. Baobab tree (*Adansoniadigitata*) is a drought and fire resistant tree that is found in most parts of Africa including the desert (FAO, 1988). This tree produces all year round in the savanna and derived savanna area of Nigeria. The leaves are used for soup in the drier parts of Nigeria, and the seeds even though underutilized is rich in protein and contains substantial amount of energy (Mwale *et al*., 2008), while the fruit pulp is rich in vitamin C and contain appreciable amount of methionine and lysine (Sidibe *et al*., 1998).

MATERIALS AND METHODS

Experimental site

The experiment was conducted at the Teaching and Research Farm of the Department of Animal Science, Faculty of Agriculture, Nasarawa State University Keffi, Shabu -Lafia Campus.Shabu-Lafia is located in the Southern Guinea Savannah Zone of Nigeria on Latitude 8^035^1N and longitude 8^033^1E. The average minimum temperature is 23^0C and maximum temperature is 36.9^0C, mean monthly relative humidity is 74%. The mean annual rainfall is 823mm; the mean monthly temperature is 35.06^0C (NIMET, 2019).

Processing of Baobab seeds to seed meal

Baobabseeds were collected within Kokona Local Government Area of Nasarawa State, Nigeria. The seeds were removed from the pods, sorted, dried and then hammer-milled to obtain baobab seed meal (BSM). The processed sampleswere then analyzed for proximate and amino acid compositions.

Laboratory analyses

Proximate compositionand the amino acids profile of the test ingredient were determined using the procedure outlined by AOAC (2010) as described by Alu *et al.* (2018). See Table 1&2.

Table 1.Proximate composition of baobab seed

Parameters	**(%)**
Crude protein	20.23
Crude fibre	7.54
Ether extract	25.00
Ash	7.27
Moisture	5.41
Nitrogen free extract	34.55
Dry matter	94.59
**Metabolizable energy (kcal/kg)	4002.535

** Pauzenga (1985),

Table 2. Amino acid profile of baobab seed

Parameter	**Value (%)**
Essential amino acid	
Lysine	2.94
Leucine	14.39
Valine	2.24
Isoleucine	17.47
Threonine	7.91
Phenylalanine	6.83
Methionine	1.68
Tryptophan	3.41

Diets formulation

Five experimental broiler finisher diets were formulated to be isocaloric (3000kcal/kg) and isonitrogenous (19% crude protein).Baobab seed meal included at 0, 25, 50, 75 and 100% replacing synthetic methionine and lysine. See Table 3.

Experimental design

A total of 180 birdswere used for the research.They were given the same quantity of feed and water *ad – libitum*. They were assigned in a completely randomized design (CRD) to 5 experimental diets under the deep litter system for 4weeks. Each treatment was replicated 3 times comprising of 12 birds each.

Hematological analysis

At the end of the experiment, sample bottles were used to collect blood sample. The sample bottles were containing anticoagulant Ethylenediaminetetraacetic Acid (EDTA) as reported by Jain (1987) which was used for hematological indices: Packed Cell Volume (PCV) using hematocrit method described by Wintrobe (1933), Hemoglobin Concentration (HB) described by Brown (1976), Red Blood Cell (RBC), White Blood Cell (WBC) as described by Dacie and Lewis (1991).

Statistical analysis

Data collected were subjected to one analysis of variance (ANOVA) using (SPSS) Model. Significantly different means were separated using Duncan's Multiple Range Test (DMRT, 1955) at 5

Table 3. Percent ingredient composition of experimental diets for broiler finisher chickens

Ingredients	**T1 (0%BSM)**	**T2 (25%BSM)**	**T3 (50%BSM)**	**T4 (75%BSM)**	**T5 (100%BSM)**
Maize	61.00	61.00	60.94	60.83	60.00
Rice bran	10.00	10.00	9.97	9.85	9.65
GNC	19.00	19.00	18.98	18.00	17.89
Fish meal	1.00	1.00	1.00	1.00	1.00
Blood meal	4.10	4.10	4.12	4.12	4.13
Bone meal	3.00	3.00	3.00	3.10	3.1
Oil palm	1.00	1.00	1.00	1.00	1.0
Premix	0.25	0.25	0.25	0.25	0.25
Salt	0.25	0.25	0.25	0.25	0.25
BSM*	0.00	0.10	0.20	0.30	0.40
Lysine	0.20	0.15	0.10	0.05	0.00
Methionine	0.20	0.15	0.10	0.05	0.00
Calculated analysis					
Crude protein	19.25	19.19	19.16	19.00	19.02
ME/Kcal/Kg	3102.45	3101.98	3101.20	3100.02	3100.00
Dry matter	90.32	90.31	90.31	90.36	90.78
Crude fiber	5.58	5.59	5.59	5.55	5.57
Ether extract	6.00	6.01	5.98	5.99	6.10
Lysine	1.02	1.01	1.00	1.00	1.00
Methionine	0.93	0.93	0.92	0.91	0.91
M+C	0.76	0.77	0.77	0.76	0.76
Calcium	1.23	1.25	1.29	1.34	1.35
Avail. P.	0.91	0.91	0.90	0.89	0.98

BSM= baobab seed meal, The vitamin- mineral premix supplied the following per 100kg of diet: vitamin A15,000 I.U, vitamin D3 300,000 I.U.,vitamin
E 3,000 I.U., vitamin K 2.50mg, vitamin B_1 (thiamin) 200mg, Riboflavin (B_2) 600mg, pyridoxine (B_6), Niacin 40.0mg,vitamin B_{12} 2mg, Pantothenic acid
10.0mg, folic acid 100mg, Biotin 8mg, choline chloride 50mg, anti-oxidant 12.5mg, manganese 96mg, zinc 6mg, Iron 24mg, Copper 0.6mg, Iodine 0.14mg, Selenium 24mg, cobalt 214mg. Using Feedwin software version 1.01., Avail. P = Available phosphorus, M+C= moisture content

RESULTS AND DISCUSSION

Table 4 shows the haematological parameters of broiler finisher chickens fed diets in which baobab seed meal replaced synthetic methionine and lysine. The result indicated significant ($P<0.05$) increase in all of the haematological indices except on Mean cell haemoglobin concentration for birds fed BSM treatment diets compared to the control group. Birds fed 100% BSM had higher HB g/dl (11.40g/dl) and PCV (34%) compared to those fed the than control diet and others. Birds fed 25%BSM had higher WBC ($15.20x10^9$) and RBC ($5.50x10^6$) compared to birds in the control group and others. Birds fed 75%BSM had increased MCV (94.00fl) and MCH (30.20) compared to birds in the control group and others. However, mean cell haemoglobin concentration had no significant effect across the treatments when baobab methionine and lysine was added to the diets.

The higher value for WBC ($15.20x10^9$) and RBC ($5.50x10^6$) in birds fed 25%BSM compared toother treatments support the earlier work of Sola-Ojo *et al.* (2016) who studied the effects of feeding processed baobab (*Adansonia digitata*) seed on the haematology and serum biochemistry of Broiler Chicks. The authors reported that WBC values (7.33 - 9.13) and MCHC values (25.98 - 31.00) were significantly increased due to inclusion of baobab seed meal across the dietary treatments. The present values obtained from this research were slightly higher. Contrarily, birds fed 75%BSM had increased MCV (94.00fl) and MCH (30.20) compared to the birds in control group and others.

Table 4. Effect of replacing methionine and lysine with baobab seed meal on haematological parameters of broiler finisher chicken

Parameters	T1 (0%BSM)	T2 (25%BSM)	T3 (50%BSM)	T4 (75%BSM)	T5 (100%BSM)	SEM	LOS
HB g/dl	8.75^{b}	8.10^{b}	10.00^{ab}	9.65^{ab}	11.40^{a}	0.43	*
WBC $x10^9$	11.50^{b}	15.20^{a}	8.60^{b}	11.95^{ab}	11.00^{b}	0.76	*
RBC $x10^6$	5.35^{a}	5.50^{a}	4.00^{b}	3.20^{ab}	4.75^{ab}	0.31	*
PCV%	26.50^{ab}	24.50^{b}	30.50^{ab}	30.00^{ab}	34.50^{a}	1.36	*
MCV fl	50.35^{bc}	44.80^{c}	76.10^{ab}	94.00^{a}	73.75^{ab}	6.45	*
MCH pg	16.60^{b}	14.80^{b}	24.90^{a}	30.20^{a}	24.25^{a}	2.01	*
MCHC g/l	33.05	33.05	32.75	32.10	33.10	0.24	NS

BSM = baobab seed meal; abc means on the same row haven different superscript differ significantly

CONCLUSION AND RECOMMENDATION

Based on the results obtained, baobab seed meal had increase most of the haematological parameters measured which fall within the normal reference range values for birds. It is concluded that 100% of baobab seed meal should be included as source of methionine and lysine for normal physiological performance of broilers.

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