EFFECT OF DIFFERENT HEAT TREA TMENT OF BAOBAB (*Adansonia digitata*) SEED AS AN ALTERNATIVE PLANT PROTEIN SOURCE ON HAEMATOLOGICAL AND BLOOD CHEMISTRY OF LOCAL TURKEY

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ABSTRACT
An experiment was conducted to evaluate the effect of boiling time of baobab (Adansonia digitata) seed meal as a partial replacement of soya beans meal on anti-nutritional factors, haematological and blood chemistry of local turkey. Raw baobab seeds were boiled for 30, 60, 90 and 120 minutes. The boiled baobab seed meals (BBSM) were used to replace 10% of soya beans meal. Seventy five poults were randomly selected and allocated to treatment diets with 15 poults per treatment and 5 poults per replicate. Proximate analysis of the experimental diets and anti-nutritional factors of the raw and boiled (30, 60, 90 and 120mins) BBSM were carried out. On the 9th week of the feeding trial, blood was collected from the poults for haematological and blood chemistry assays. The results obtained showed there was general reduction in the content of anti-nutritional factors (tannin, phytate and trypsin inhibitors) as a result of different boiling time of raw baobab seed. Monocyte count was different (P<0.05) among the treatment means with 30 mins BBSM having the highest count. The 30 mins BBSM recorded higher (P<0.05) creatinine compared the other treatments. Alkaline phosphate content was higher (P<0.05) for the control and 30 mins BBSM compared to 120 mins BBSM. It can be concluded that boiling reduces the content of anti-nutritional factors of raw baobab seeds and assisted the growing turkey in handling the anti-nutritional factors.
Keywords: Baobab, Local Turkey, Haematological, Blood chemistry, turkey

INTRODUCTION
Protein is a global index for measuring well-being of a country (Abdu, 2012). The basic sources of protein in Nigeria are the ruminant and the non-ruminant. The ruminant animals' production is seriously in dangerous stage due to insurgency in the north-east, cattle rustling in the north-west, and seasonal fluctuation of feed which resulted in reducing the supply of protein sources, the next alternative are poultry sources, but poultry is seriously affected by high cost of feed due to high competition between man, industries and poultry. Protein source is the major scarce and expensive ingredient in poultry production there by taking 75-80% of the total cost of production. Hence the need to source for alternative but promising feedstuffs. One of such alternative is baobab (*Adansonia digitata)* seed. Baobab (*Adansonia digitata*), locally called kuka (Hausa) and luru (Yoruba), which is another non-conventional feed stuff that is readily available in Nigeria particularly in the North. The use of legumes as a component of poultry feed has been limited by the content of anti-nutritional factors (ANF). Abdu (2012) and Saulawa *et al* (2014) reported that the inclusion of above 10% raw Baobab seed meal as plant proteins in diets of broilers leads to a significant impairment of growth and other undesirable physiological and biochemical alterations.

The examination of blood gives the opportunity to investigate the presence of several metabolites and other constituents in the body of animals and it plays a vital role in the physiological, nutrition and pathological status of an organism *(*Aderemi, 2004*). According to* Afolabi, *et al*, (2010), changes in haematological parameters are often used to determine various status of the body and to determine stresses due to environmental, nutritional and/or pathological factors. Hence, this study was conducted determine the effect of different time of hot water treatment on proximate composition and anti-nutritional factors of baobab and also its effect as a partial replacement for Soybeans on haematological and blood chemistry parameters of local turkey.

MATERIALS AND METHOD
Experimental Site
The study was conducted at the Poultry Unit, Livestock Teaching and Research Farm, Department of Animal Science, Federal University Dutsin-Ma. Dutsin-Ma lies on latitude 12°26'N and longitude 07°29'E (Abaje *et al.*, 2014).

Processing of Baobab Seeds

The raw seeds of baobab were collected from Dutsin-ma market and were divided into five parts and boiled at different time interval. Boiling was carried-out according to the recommendation of Ukachukwu, *(*2000) for *Mucuna cochinchinensis*. The equal quantity seeds were boiled for 30mins, 60mins, 90mins and 120mins using equal vol. of water differently. Thereafter, they were brought down and a basket was used to drain the seeds and allowed them to sun dry.

Experimental Animal, their Management and Data Collection

One hundred (100) day old turkeys were housed and brooded in a deep litter. All routine management practices were strictly adhered to. At the end of the fifth (5) week (brooding period), 75 birds were allotted to five (5) experimental diets and replicated three times in a completely randomized experimental design. Diet was soybeans based (control), while 10% boiled baobab seeds boiled for 30, 60, 90 and 120 minutes were used to quantitatively replace equivalent weight of soya beans meal in diets 2, 3, 4 and 5 respectively. Feed and water were given *ad libitum* throughout the experimental period which lasted for nine (9) weeks.

Table 1 Composition of the Experimental Diets (%)

	Period of boiling (minutes)				
	0	**30**	**60**	**90**	**120**
Ingredient	**(T1)**	**(T2)**	**(T3)**	**(T4)**	**(T5)**
Maize	60.2	60.2	60.2	60.2	60.2
Soybean	26.00	16.00	16.00	16.00	16.00
BBSM meal	0.00	10.00	10.00	10.00	10.00
GNC	10.00	10.00	10.00	10.00	10.00
Bone meal	2.00	2.00	2.00	2.00	2.00
Lim	1.00	1.00	1.00	1.00	1.00
Salt	0.3	0.3	0.3	0.3	0.3
Premix	0.3	0.3	0.3	0.3	0.3
Methionine	0.1	0.1	0.1	0.1	0.1
Lysine	0.1	0.1	0.1	0.1	0.1
Total	100.00	100.00	100.00	100.00	100.00
Feed cost N/kg	148.96	139.76	139.86	139.91	139.96
Calculated Analysis					
Crude protein (%)	21.56	18.57	18.70	18.57	18.47
Energy (ME kcal/kg)	2915.5	2793.29	2792.39	2780.29	2779.49
Crude Fibre (%)	2.79	2.82	2.68	3.22	2.97
Calcium (%)	1.16	1.16	1.16	1.16	1.16
Phosphorus (%)	0.67	0.69	0.69	0.69	0.69
Fat	2.63	2.08	3.04	2.96	2.98
Methionine	0.46	0.43	0.43	0.43	0.43
Lysine	1.27	1.12	1.12	1.12	1.12
Determined Analysis					
Dry matter	94.28	94.60	93.88	94.26	94.31
Crude protein	17.82	18.04	17.96	17.99	18.00
Crude fibre	9.24	8.98	9.11	9.25	8.80
Oil	4.48	4.36	4.52	4.19	4.39
Ash	6.03	5.88	5.07	5.46	7.47
Nitrogen free extract	56.7	57.5	57.2	57.3	55.6

On the 9th week of the feeding trial, 3 poults were randomly selected from each dietary replicate for blood collection. Blood was collected from the sub-clavicular vein of each poult using a scalp vein needle set. About 5ml of blood was collected into two (2) sets of three sterilized glass tubes/bottles containing Ethylene Diaminetetra-acetic Acid (EDTA) for Haematological studies. Blood samples for serum biochemical studies were collected into plain containers for serum separation.

Haematological parameters measured were red blood cell (RBC), haemoglobin (Hb), white blood cell counts (WBC), packed cell volume (PCV), mean corpuscular haemoglobin concentration (MCHC), mean corpuscular Haemoglobin (MCH) and mean corpuscular Volume (MCV) were all determined.

Serum biochemical parameters considered were total serum protein, serum albumin, glucose, cholesterol, creatinine, urea, serum glutamate oxaloacetate transfarase (SGOT), alkaline phosphate (ALP) and serum glutamate phosphate transfarase (SGTP). Data from the experiment are subjected to one way analysis of variance (ANOVA) using SAS software (SAS 1999).

RESULTS AND DISCUSSION

Table 2 shows the result of different anti-nutritional factors obtained in both raw and boiled baobab seeds. There was general reduction in the content of anti-nutritional factors (tannin, phytate and trypsin inhibitors) as a result of different boiling time of raw baobab seed though reduction varies in degree with different boiling period. The highest percentage reductions in trypsin is T5 (1.98), tannin T4 (1.08) and in phytate T4 (2.79) were observed when the raw baobab seed were boiled with different boiling period.

The haematology parameters of turkey fed boiled baobab seed meal for different duration is shown in table 3. The result shows that RBC, Hb, PCV, WBC, Neutrophills, Lymphocyte and MCHC were not affected (P<0.05) by the feeding baobab seed meal boiled for various duration a replacement for soyabean meal.

Table 2 Effect of hot-water treatment on the anti-nutritional factors of baobab seeds (mg/kg)

Anti-nutritional factors	Boiling Time(mints)					
	0	**30**	**60**	**90**	**120**	**± SEM**
Tannin	2.88^{a}	2.96^{a}	2.38^{b}	2.30^{b}	1.98^{c}	0.03
Phytate	1.60^{a}	1.48^{b}	1.50^{ab}	1.08^{c}	1.11^{c}	0.04
Trypsin inhibitors	3.43^{a}	3.30^{b}	2.98^{c}	2.79^{d}	2.81^{d}	0.03

a, b, c, d, e, = Means within rows with different superscript are significantly different (p<0.05).

Table 3 Haematological values of Turkey Fed Experimental Diets

	TREATMENT					
PARAMETERS	**T1**	**T2**	**T3**	**T4**	**T5**	**SEM**
Red blood cell (RBC) x10^6/mm	5.40	5.20	5.73	5.27	5.27	0.23
Haemoglobin (HB) g/dl	10.63	10.45	10.97	10.53	10.30	0.46
Packed cell volume (PCV) %	32.00	31.50	33.00	31.67	31.00	1.38
White blood cell (WBC)x10^3/mm^3	10.73	9.90	9.63	6.30	10.23	2.34
Mean corpuscular volume (MCV) mm^3	59.21^{ab}	60.58^{a}	57.52^{b}	60.10^{a}	58.98^{ab}	0.66
Mean corpuscular haemoglobin %	19.67^{ab}	20.10^{a}	19.12^{b}	19.99^{a}	19.59^{ab}	0.21
Mean corpuscular haemoglobin concentration	33.22	33.18	33.24	33.26	33.22	0.05
Band	1.00	1.oo	1.33	0.00	1.00	0.87
Neutrophils %	15.00	7.50	7.00	12.33	10.33	3.47
Lymphocytes %	78.67	82.00	85.33	86.33	85.00	4.07
Monocytes %	5.33^{b}	9.00^{a}	4.00^{bc}	1.00^{c}	3.00^{bc}	1.01
Eosinophil %	0.00^{b}	0.50^{ab}	2.00^{a}	0.33^{ab}	0.67^{ab}	0.57
Basophils %	-0.00	0.00	0.00	0.00	0.33	0.15

a,b,c,d means in the same row with different super scripts are significantly (P<0.05) different
SEM – Standard error of means

Monocyte count was different (P<0.05) among the treatment means with 30 mins BBSM having the highest count. 90 mins BBSM recorded the lowest which is statistically lower P<0.05) than the control and the 30mins BBSm but similar (P<0.05) with both 60 and 120 mins BBSM. Eosinophil count of the 60 mins BBSm was significantly higher (P<0.05) than that of the control but similar with the other treatments. The 30, 90, and 120 mins BBSM had similar Eosinophil count with the control. MCV was affected by the feeding of BBSM to growing turkey with 30 and 90 mins BBSM having hiher MCV than 60 mins BBSM.The control and 120 mins BBSM have similar MCV with the 30, 60, and 90 mins BBSM. Similar to MCV, MCH was higher than the 30 and 90 mins compared to 60 mins BBSM. The control and the 120 mins BBSM have similar MCH with the 30, 60, and 90 mins BBSM.

The result of the serum biochemistry of growing turkey fed BBSM is shown in table 4 all the parameters considered as shown in the table were not affected except for creatinine and alkailine