EFFECT OF DIFFERENTLY PROCESSED DOUM PALM (*HYPHAENE THEBAICA*) PULP ON HEAMATO-BIOCHEMICAL INDICES OF BROILER CHICKENS

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ABSTRACT
A study on Effect of Differently Processed Doum palm (Hyphaene thebaica) pulp on haematology and serum biochemical indices of broiler chicken was conducted. In a completely randomized design one hundred and fifty (150) day- old broiler chicks (Agritec) were randomly allocated to five dietary treatment groups of thirty (30) chicks with three replicates of ten chicks each. The treatment groups were labeled as T1 (0%), T2, (raw) T3 (soaked), T4 (boiled) and T5 (roasted).Two birds from each treatment were selected at random for Heamatology and serum biochemical analysis. The results indicated that, red blood cells (RBC), mean corpuscular (MCHC) and neutrophils were significantly ($p<0.05$) affected while the remaining parameters were not significantly ($p>0.05$) affected. RBC in T1 was significantly higher (5.05x1012/l) and statistically ($p<0.05$) difference with T3. MCHC showed T3 was significantly ($p<0.05$) higher and similar with all the treatments except T1. The results on serum biochemical analysis revealed significance ($p<0.05$) difference in the values of potassium and total protein while the remaining parameters were not significantly ($p>0.05$) affected. Potassium content in T5 showed significantly ($p<0.05$) higher value (4.20Mmol/L) and similar with all the treatment except T4. However, total protein content was higher (4.1g/dl) in T2 and statistically ($p<0.05$) similar with the remaining treatments except T4. Therefore, raw and differently processed doum palm pulp meal can be used without any adverse effect on the haematology and serum biochemistry of the broiler chicken as observed in this study.
Key words: Doum palm, Broiler, haematology, serum

INTRODUCTION

The continued growth and increase of human population in the developing countries means a greater demand for animal protein which is currently short supply in this region. This is due to low level of animal productivity (Attah *et al.,* 2011). Therefore, searching for alternative feed resources that can substitute for or partially replace the conventional feedstuffs is always the focus of feed producers and animal scientists (Matthew *et al.,* 2010). One of such alternative feed ingredient is the Doum palm (*Hyphaene thebaica* L.) fruit. It belongs to palmae family, smell taste like ginger and with a shinny orange-brown to deep chestnut skin colour and in some places it is termed as ginger bread (Nwosu *et al.*, 2008). The study of blood profile is valuable indicator of the bird's health and physiological status, as it is generally determined by nutrition, pathology and the environmental influences the birds are exposed to (Petra *et al.,* 2014). This study was aimed to determine the effect of Doum palm (*Hyphaene thebaica*) pulp on haematology and serum biochemical indices of broiler chicken.

MATERIALS AND METHODS

The experiment was carried out at Federal University Dutse Teaching and Research farm, Jigawa State. Federal University, Dutse (FUD), located East of Dutse town lies between Latitudes 11^0 41'10" and $11^0$44'00" as well as between longitudes $9^0$21'00" and $9^0$24'00". The climate of the area is commonly described as sahelian; with annual rainfall of 300 to 400 mm per annum and average annual temperature of 21.2ºC in January to 30.9ºC in June (NAERLS and FMARD, 2020). In a completely randomized design one hundred and fifty (150) day- old broiler chicks (Agritec) were randomly allocated to five dietary treatment groups of thirty (30) chicks. Each treatment was further sub-divided in to three replicates of ten chicks each. The treatment groups were labeled as T1 (0%), T2, (raw) T3 (soaked), T4 (boiled) and T5 (roasted). The raw and processed Doum palm (*Hyphaene thebaica*) pulp was ground to powder and obtain pulp meal which was incorporation in to the remaining feed ingredients. T1 having (0% Doum palm pulp meal) was served as control while the

remaining treatments contained 25% inclusion levels of the differently processed Doum palm (*Hyphaene thebaica*) pulp meal (Tables 1 and 2).

Two birds from each treatment were selected at random where blood sample (5ml) was collected using needle and syringe via wing vein. 2.5ml was placed in to EDTA bottle for heamatology analysis while the remaining 2.5ml in to a non EDTA bottle for serum biochemistry analysis. The heamatological parameters analyzed were RBC, WBC, haemoglobin, MCV, MCH and MCHC while for the serum biochemistry total protein, urea, creatinine, albumin, glucose, AST and ALT.

Table 2: Ingredient and Calculated Nutrient Compositions of the Experimental Broiler finisher Diets (5-8 weeks)

	0%	Level of	inclusion	(25%)	
Ingredients	T1(control)	T2(Raw)	T3(Soaked)	T4 (Boiled)	T5(Roasted)
Maize	57.00	42.75	42.75	42.75	42.75
Doum palm	0.00	14.25	14.25	14.25	14.25
Wheat offal	8.00	8.00	8.00	8.00	8.00
Soybean meal	29.00	29.00	29.00	29.00	29.00
Fish meal	3.00	3.00	3.00	3.00	3.00
Bone meal	1.50	1.50	1.50	1.50	1.50
Limestone	0.50	0.50	0.50	0.50	0.50
Salt	0.25	0.25	0.25	0.25	0.25
Premix*	0.25	0.25	0.25	0.25	0.25
Lysine	0.25	0.25	0.25	0.25	0.25
Methionine	0.25	0.25	0.25	0.25	0.25
TOTAL	100	100	100	100	100
Calculated Nutrient Composition					
ME(kcal/kg)	3002.18	3033.80	3033.80	3033.80	3033.80
Crude protein(%)	20.46	20.08	20.05	20.05	20.05
Crude fiber (%)	4.02	4.96	4.96	4.96	4.96
Ether extract (%)	3.65	3.83	3.35	3.35	3.35
Calcium (%)	0.98	1.01	1.56	1.56	1.56
Phosphorus (%)	0.27	1.48	1.36	1.36	1.36

ME=Metabolizable energy

RESULTS AND DISCUSSION

The results indicated that, red blood cells (RBC) and mean corpuscular (MCHC) and neutrophils were significantly ($p<0.05$) affected. However, white blood cells (WBC), haemoglobin (Hb), MCV and MCH of the birds in all the treatments groups were not significantly ($p>0.05$) affected by the dietary inclusion levels of the experimental test ingredient. RBC in T1 was significantly higher ($5.05x10^9/l$) and statistically ($p<0.05$) difference with T3. MCHC showed T3 was significantly ($p<0.05$) higher and similar with all the treatments except T1. Neutrophils value in T4 was significantly ($p<0.05$) higher and similar only with T2. The significance ($p<0.05$) differences observed in the values of RBC and MCHC in this study was in agreement with the results obtained by Makinde et al (2008). RBC values obtained in this study were higher than $2.27\text{-}2.87x10^3/mm^3$ by Ibe *et al*. (2021). Bush, (1991) mentioned that, abnormal increase in red blood cells indicates high concentration of haemoglobin while decrease indicates low concentration of haemoglobin. Neutrophils obtained in this study was comparable to result reported by However, results of WBC, Hb and MCH reported by Egbeyale, *et al.* (2018) was in agreement with the said parameters reported in this study.

Table 2 Haematological Parameters of Broiler Chickens fed raw and differently proceesed Doum palm pulp meal

Parameters	T1 (0%)	T2 (raw)	T3(soaked)	T4 (boiled)	T5(roasted)	LSD
WBC ($x10^9/l$)	5.35	5.45	6.90	7.35	4.50	5.56
RBC ($x10^{12}/l$)	5.04^a	4.09^{ab}	3.76^b	4.29^{ab}	3.96^{ab}	1.19
Hb (g/dl)	9.35	8.55	9.15	9.75	8.50	2.19

MCV(fl)	67.25	71.80	77.90	74.55	74.90	17.40
MCH(pg)	18.85	20.50	24.35	22.75	22.30	6.31
MCHC(g/l)	27.95^{b}	28.40^{ab}	31.30^{a}	30.45^{ab}	29.80^{ab}	3.23
Neu (%)	32.50^{b}	49.50^{ab}	41.50^{b}	69.00^{a}	39.00^{b}	20.09

^{a,b,c}:mean in the same row with different super scriptsdiffer significantly($p<0.05$) ,PCV=Packed Cell Volume; Hb= Haemoglobin; RBC= Red Blood Cell; WBC= White Blood Cell; MCV= Mean corpuscular Volume; MCH= Mean corpuscular haemoglobin; MCHC= Mean corpuscular haemoglobin concentration, Neutrophils. NS= Not significance.

The results on serum biochemical analysis revealed significance ($p<0.05$) difference in the values of potassium and total protein while the remaining parameters were not significantly ($p>0.05$) affected. Potassium content in T5 showed significantly ($p<0.05$) higher value (4.20Mmol/L) and similar with all the treatment except T4. However, total protein content was higher (4.1g/dl) in T2 and statistically ($p<0.05$) similar with the remaining treatments except T4. Total protein contents recorded in this study (3.05-4.1g/dl) were in agreement with the range (3.05-4.53g/dl) reported by Akazue *et al.* (2022) and that of Olabode *et al.* (2021) who reported significant ($p< 0.05$) effect on total protein with a range value of 3.6- 3.89g/dl. AST and ALT 72.95-90.16 and 62.84-79.50iu/L values reported by Makinde *et al.* (2018) were contrary with the values of this study.

Table 3 Serum biochemical indices of Broiler Chickens fed raw and differently processed Doum palm pulp meal

Parameters	T1 (0%)	T2 (raw)	T3 (soaked)	T4 (boiled)	T5 (roasted)	LSD
Total protein(g/dl)	3.60^{ab}	4.10^{a}	3.50^{ab}	3.0^{b}	3.55^{ab}	7.54
Urea(mmol/l)	2.85	2.20	2.70	1.40	1.40	2.67ns
Cretinine(mmol/l)	54.50	71.00	46.00	44.50	28.00	83.10n
Albumin(g/dl)	33.50	35.00	33.50	33.50	33.50	13.87ns
Glucose(mmol/l)	7.70	9.70	8.20	9.00	7.95	3.75ns
Potassium(mmol/l)	4.05^{ab}	3.25^{ab}	4.05^{ab}	2.70^{b}	4.20^{a}	1.39
ALT u/L	16.50	18.50	16.00	19.00	19.00	8.05ns
AST u/L	19	27.00	21.50	29.00	21.50	20.14ns

$^{a\ b\ c,}$ Means within different superscripts are significantly different ($p<0.05$). NS= Not significance, AST= Aspartate Aminotransferase; ALT= Alanine Aminotransferase.

CONCLUSION

Inclusion levels of raw and differently processed doum pal pulp meal does not have any adverse effect on the haematology and serum biochemistry of the broiler chicken observed in this study.

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(FJS) ISSN online: 2616-1370 ISSN print: 2645 - 2944: 6(2): 227 - 235 DOI: https://doi.org/10.33003/fjs-2022-0602-978

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