



**EFFECTS OF FEEDING TOASTED SICKLE POD (*SENNA OBTUSIFOLIA*)
SEED MEAL ON HAEMATOLOGICAL AND SERUM BIOCHEMICAL
PARAMETERS OF BROILER CHICKENS**

¹Bababngida, B. ³Yusuf, H. B., ³Nyako, H. D. ²Bitrus, G., ²Abdulkarim, B., ¹Sheriff, F. and
⁴Abba, A. Y.

¹Department of Agricultural Education, School of Vocational Education,
College of Education Waka-Biu,

²Department Integrated Science, College of Education Waka-Biu,

³Department of Animal Science and Range Management Modibbo Adama University Yola,

⁴Department of Agricultural Education, School of Vocational Education,
Federal College of Education (Tech), Gombe,

Corresponding Author's Email: bellobabangida50@gmail.com, **GSM:** 08035195680

ABSTRACT

A feeding trial was conducted for eight (8) weeks to evaluate the haematological and biochemical indices of broiler chickens fed processed or toasted tropical sickle pod (*Senna obtusifolia*) seed meal-based diets. five (5) experimental diets were compounded to contain 0% 5%, 10%, 15% and 20% of toasted *Senna obtusifolia* seed meal designated as T1, T2, T3, T4 and T5, respectively. One hundred and fifty (150) broiler chicks were randomly allotted to the five (5) dietary treatment in a Complete Randomized Design (CRD). Each treatment was replicated three times with ten (10) chicks per replicate. At the end of the experiment, blood samples were collected using standard procedure. Each representative blood sample was analysed in triplicates for Packed Cell Volume (PCV), Haemoglobin (Hb), Red Blood Cell (RBC), and White Blood Cell Count (WBC). The serum biochemical indices (Mean Corpuscular Volume (MCV), Mean Corpuscular Haemoglobin (MCH) and Mean Corpuscular Haemoglobin Concentration (MCHC) were computed using standard formula. The blood samples were also analysed for serum total protein, albumin, uric acid, and cholesterol. The haematological parameters were not significantly ($P>0.05$) affected by the dietary treatments for the Hb, RBC, MCH, and MCHC. The result of the haematological indices indicates that there were not significant ($P>0.05$) difference in any of the haematological parameters measured. This implies that place of nutrition was adequate to meet the requirement of all the groups. The Packed Cell Volume (PCV) of 33.73 to 42.16% and haemoglobin concentration (10.56 to 13.53g/dl) values obtained in this study. Similarly, the RBC and WBC values were within the normal range for growing broiler chickens reported by Wikivet (2013). The values of Mean Corpuscular Volume (MCV), Mean Corpuscular Haemoglobin (MCH) and Mean Corpuscular Haemoglobin Concentration (MCHC) are 64.66 to 72.73fl, 20.83 to 23.03pg and 28.73 to 32.63% respectively, were not significant ($P>0.05$) all within the normal range for broilers.

Keywords: *Senna obtusifolia*, Toasted, Broiler, Chickens, Blood

INTRODUCTION

The high cost of feed is the major problem responsible for the slow growth rate of the Nigerian poultry industry. This is as a result of the scarcity and high cost of conventional protein sources such as soyabeans (Ukachukwu, 2015). Therefore, exploring for a less expensive protein feed source is extremely necessary and hence, *Senna obtusifolia* seed is one such alternative that has been neglected in feeding poultry. The proximate composition of the *Senna obtusifolia* seed as reported by Ingweye *et al.* (2010) has a crude protein content of 29.54%, which suggest that it may be a good feed source for poultry but the seed contains some anti-nutritional factors such as tannins, saponins, phytate and oxalate which can have effects on the digestibility and utilization of nutrients (Augustine *et al.*, 2018). Therefore, it's necessary to ascertain the most effective processing methods that will enhance the use of the *Senna obtusifolia* seed without harmful effects. Information on processing methods which will optimally improve the use of *Senna obtusifolia* seed is scanty. Therefore, this



study seeks to evaluate the effects of diets containing toasted *Senna obtusifolia* seed meal on the growth performance of broiler chickens.

MATERIAL AND METHODS

Description of Study Area

This research was conducted at the Livestock Teaching Research Farm (poultry units) of the Department of Agricultural Science Education, College of Education Waka-Biu, Borno State Biu is located at between Latitude 11.85N, Longitude 13.08E and Altitude 354m (1161ft) above sea level (DNMA, 2013). The mean humidity is 32% in the evening and 59% in the morning. The Minimum relative humidity is 11% in March and Maximum is 64% in August (Weather Base 2013). The mean temperature 34°C, the maximum is being 40.06°C and the lowest is 25°C which is in April and December respectively. The average Dew point is 52% and the maximum been 32% in February and the maximum is 72% in August, (Weather Base, 2013). The area falls within the semi-arid zone of West Africa characterized by long dry season of 8 to 9 months (Adaku 1983, and Alfolayan 2013) and duration of rainfall (3 to 4 months) which varies from a minimum of 478mm to a maximum 600mm to 621mm

Research Design

Experimental bird's management

A total one hundred and fifty (150) day-old broiler chicks were purchased from the Valentine farm hatchery unit. The chicks were brooded for two weeks, and fed with broilers starter mash under proper care and good hygienic management. Thereafter, the birds were randomly allotted to five dietary treatments, 30 chicks per treatments with three replicates of 10 birds each. The birds were reared for a period of 8week. The design used for this experiment is a Completely Randomized Design (CRD)

Collection and Processing of *Senna obtusifolia* Seeds

The *Senna obtusifolia* seeds were obtained from Jalingo Waka-Biu. The pods containing the seed were collected from the matured stand at the commencement of dry season. The *Senna obtusifolia* were harvested and threshed mechanically with a mortar and pestle and then winnowed thoroughly to remove seed pods and bad ones. The toasted seed were finely milled with an electric grinding machine as required, while some portions of the cleaned seeds were toasted using a frying pan then milled.

Experimental Diets

The experimental diets are broiler starter (23% CP) and finisher (19%CP phases), respectively were formulated to contain 0, 5, 10,15, and 20% of toasted *Senna obtusifolia* seed meal as replacement for soybean meal in T₁, T₂, T₃, T₄, T₅ respectively



Table 1: Ingredient Composition and Calculated Analysis of Experimental Broilers Starter Diets

Ingredients	Treatments				
	T1 (0%)	T2 (5%)	T3 (10%)	T4 (15%)	T5 (20%)
Maize	52.00	52.00	52.00	52.00	52.00
Soya-bean meal (full-fat)	29.00	24.00	19.00	14.00	9.00
Groundnut cake	10.00	10.00	10.00	10.00	10.00
TSOSM	0.00	5.00	10.00	15.00	20.00
Fish meal	5.00	5.00	5.00	5.00	5.00
Salt (NaCl)	0.30	0.30	0.30	0.30	0.30
Bone meal	3.00	3.00	3.00	3.00	3.00
Methionine	0.30	0.30	0.30	0.30	0.30
Lysine	0.15	0.15	0.15	0.15	0.15
Premix *	0.25	0.25	0.25	0.25	0.25
Total	100.00	100.00	100.00	100.00	100.00
Calculated Analysis					
Metabolizable energy (Kcal/kg)*	2892.14	2857.50	2822.14	2788.21	2753.57
Crude protein	23.47	23.07	22.67	22.55	22.47
Crude fibre (%)	3.09	3.87	3.92	3.99	4.11
Methionine (%)	0.72	0.72	0.77	0.79	0.82
Lysine (%)	1.24	1.25	1.26	1.27	1.28
Calcium (%)	1.69	1.70	1.72	1.73	1.74
Phosphorus (%)	0.75	0.72	0.70	0.68	0.65

TSOSM = Toasted *Senna Obtusifolia* seed meal

Vitamin – Mineral Premix (Animal Care) supplies the following per 2.5kg: vitamin 12,000,000 vit.D_{300,000}, vit. E 30,000 mg, vit. K₃ 2,500 mg, folic acid 1,000 mg, niacin 40,000, folic acid, 1,000 mg,

Calpan, 10,000 mg vit. B₂ 5000 mg, vit. B₁₂ 20 mg, vit. B₁ 2,000 mg, vit. B₆ 3,500 mg, biotin 80 mg and Antioxidant 125,000 mg, cobalt 250 mg, selenium 250 mg, iodine 1,200 mg, iron 40,000 mg, manganese 70,000mg, copper 8,000 mg, zinc 60,000 mg, chloride 200,000 mg

** Metabolizable energy (ME) calculated according to the formular Pautenga, (1985) $ME = 37 \times \%CP + 81 \times \%EE + 35.5 \times \%NFE$ (Pautenga, 1985)

Table 2: Ingredient Composition and Calculated Analysis of the Experimental Broiler Finisher Diets

Ingredients	Treatment				
	T1 (0%)	T2 (5%)	T3 (10%)	T4 (15%)	T5 (20%)
Maize	54.00	54.00	54.00	54.00	54.00
Soya-bean meal (full-fat)	27.00	22.00	27.00	12.00	7.00
Groundnut cake	7.00	7.00	7.00	7.00	7.00
RSOSM	0.00	5.00	10.00	15.00	20.00
Fish meal	3.00	3.00	3.00	3.00	3.00
Maize offal	5.00	5.00	5.00	5.00	5.00
Salt (NaCl)	0.30	0.30	0.30	0.30	0.30
Bone meal	3.00	3.00	3.00	3.00	3.00
Methionine	0.30	0.30	0.30	0.30	0.30
Lysine	0.15	0.15	0.15	0.15	0.15
Premix *	0.25	0.25	0.25	0.25	0.25
Total	100.00	100.00	100.00	100.00	100.00
Calculated Analysis					
Metabolizable energy (Kcal/kg)*	2948.38	2900.30	2879.09	2856.46	2778.37
Crude protein	21.01	20.61	20.21	19.85	19.76
Crude fibre(%)	3.69	4.11	4.23	4.38	4.49
Methionine (%)	0.70	0.72	0.72	0.73	0.75
Lysine(%)	1.04	1.13	1.38	1.41	1.44
Calcium (%)	1.14	1.14	1.16	1.18	1.21
Phosphorus (%)	0.68	0.61	0.59	0.51	0.49

RSOSM = Raw *Senna Obtusifolia* seed meal

Vitamin – Mineral Premix (Animal Care) supplies the following per 2.5kg: vitamin 12,000,000 vit.D₃ 300,000, vit. E 30,000 mg, vit. K₃ 2,500 mg, folic acid 1,000 mg, niacin 40,000, folic acid, 1,000 mg, Calpan, 10,000 mg vit. B₂ 5000 mg, vit. B₁₂ 20 mg, vit. B₁ 2,000 mg, vit. B₆ 3,500 mg, biotin 80 mg and

Antioxidant 125,000 mg, cobalt 250 mg, selenium 250 mg, iodine 1,200 mg, iron 40,000 mg, manganese 70,000mg, copper 8,000 mg, zinc 60,000 mg, chloride 200,000 mg

*** Metabolizable energy (ME) calculated according to the formular Ponzenga, (1985) $ME = 37 \times \%CP + 81 \times \%EE + 35.5 \times \%NFE$ (Ponzenga, 1985)*

Statistical Analysis

Data obtained were subjected to analysis of variance (ANOVA) of the completely randomized design (CRD) using statistix, 2003). Duncans Multiple Range Test (Duncan, 1955) was used to separate the treatment means where there were significant differences.

Significant difference was considered at 5% level of probability

RESULTS AND DISCUSSION

The result of the haematological indices indicates that there were no significant ($P>0.05$) difference in any of the haematological parameters measured. This implies that plane of nutrition was adequate to meet the requirement of all the groups. The Packed Cell Volume (PCV) (33.73 to 42.16% and haemoglobin concentration (10.56 to 13.53g/dl) values obtained in this study were similar to the values of 34.63 to 45.25% and 12.18 to 14.25g/dl for PCV and Hb respectively by Olumide et al. (2018) in growing broiler chickens fed diets supplemented *Occimum gratissimum* meal. Similarly, the RBC and WBC values were within the normal range for growing broiler chickens reported by Wikivet (2013). The values of Mean Corpuscular Volume (MCV), Mean Corpuscular Haemoglobin (MCH) and Mean Corpuscular Haemoglobin Concentration (MCHC) are 64.66 to 72.73fl, 20.83 to 23.03pg and 28.73 to 32.63% respectively were all within the normal range reported by Wikivet (2013)

Table 3: Haematological Indices of Broiler Chickens Feed Toasted *Senna obtusifolia* Seed Meal.

Treatment Parameters	T ₁ (0%)	T ₂ (5%)	T ₃ (10%)	T ₄ (15%)	T ₅ (20%)	SEM
PCV (%)	33.73		37.90	41.60	36.10	42.10 4.73 ^{NS}
Hb (g/100 ^b /mm ³)	10.56		12.06	13.20	11.76	13.53 1.50 ^{NS}
RBC (×10 ³ /mm ³)	5.27		5.30	6.39	5.58	6.19 0.69 ^{NS}
WBC (×10 ³ /mm ³)	5.80		8.16	8.83	10.30	10.46 2.92 ^{NS}
MCH (F1)	69.96		72.73	65.53	64.66	67.93 2.05 ^{NS}
MCHC (%)	31.27		31.43	28.73	32.65	32.03 59.25 ^{NS}

SEM = Standard Error of the Means

NS = Not Significant (P>0.05)

PCU = Packed Cell Volume

Hb = Haemoglobin Concentration

RBC = Red Blood Cell

WBC = White Blood Cell

MCH = Mean corpuscular Haemoglobin

MCH = Mean Corpuscular Haemoglobin

MCHC = Mean corpuscular Haemoglobin Concentration

Table 4: Serum Biochemical Indices of Broiler Chickens Feed Toasted *Senna obtusifolia* Seed Meal.

Treatment Parameters	T ₁ (0%)	T ₂ (5%)	T ₃ (10%)	T ₄ (15%)	T ₅ (20%)	SEM
Total protein (g/dl)	52.03	37.70	37.70	49.20	30.66	3.95 ^{NS}
Albumin (g/dl)	38.66	26.00	36.26	24.06	28.16	2.41 ^{NS}
Globulin (g/dl)	13.37	20.70	21.04	15.70	20.80	2.7 ^{NS}
Cholesterol (Mg/dl)	31.86	23.56	33.40	32.23	32.00	0.81 ^{NS}
Glucose (Mg/dl)	4.06	6.40	7.10	7.20	7.56	0.64 ^{NS}
Urea (Mg/dl)	9.26	6.70	6.90	6.90	8.36	1.92 ^{NS}

SEM = Standard error of the means

NS = Not Significant (P>0.05)

There was no significant (P>0.05) difference in any of the serum biochemical indices. The values recorded for these parameters are within the range of 49.76 to 60.66g/dl, 34.06 to 38.86g/dl, 13.33 to 21.66 g/dl for total protein albumin, and globulin respectively reported by Wikivet (2013). The total protein, albumin, and globulin are generally influenced by protein intake (Terzungwu *et al.* 2013) and their values depends on systematic protein utilization. The cholesterol and glucose levels recorded are within the normal ranges of 31.86 to 33.40 mg/dl and 75.90 to 77.06 mg/dl respectively reported by Wikivet (2013). There were not significant (P>0.05) difference among treatment groups in the urea levels in the serum, the urea ranges (6.70 to 8.36mg/dl) were within normal range reported by Wikivet (2013).

CONCLUSION AND RECOMMENDATION

The outcome of this study reveal that toasted *Senna obtusifolia* seed meal does not have effect on haematological and serum biochemical parameters of broiler chickens. Therefore, broiler chickens can be fed up to 20% of *Senna obtusifolia* seed meal is therefore recommended for feeding broiler chickens.

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