BIOCHEMICAL PARAMETERS OF SOKOTO RED BUCKS FED GRADED LEVELS OF UREA TREATED GROUNDNUT SHELL (*ARACHIS HYPOGEA*)

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ABSTRACT
The study was conducted to evaluate the biochemical parameters of Red Sokoto Bucks fed graded levels of urea treated groundnut (Arachis hypogaea) shell. The shell was treated by dissolving 2.5kg of urea in 50L of water and used to ferment the shell which weighed 50g/kg. In the study three treatment diets were formulated containing T1 untreated groundnut shell (UNTGNS), T2 (10%) urea treated groundnut shell (UTGNS), and 20% urea treated groundnut shell (UTGNS). Twelve (12) Sokoto Red goat (Bucks) were used and randomly assigned to three treatments diets with three animals per treatment in a Completely Randomized Design (CRD). All appropriate management practices were observed during the period of the feeding trial that lasted 84 days. Blood was collected through the jugular vein of three randomly selected ones from the experimental animals in the morning for serum biochemical analysis. The result indicated that there were no significant differences (p>0.05) in the total bilirubin, AST and albumin among the treatments. The key findings indicated that dietary inclusion of urea treated groundnut shell for up to 20% had no adverse effect on the kidney and liver functions of the animals. Goats can then be fed diets that contain up to 20% level of inclusion in view of the positive results from the growth trial using in this same study.
Keywords: Biochemical, urea, Sokoto red bucks, groundnut shell, ruminants

INTRODUCTION

Small ruminant production plays a significant role in animal production in Nigeria in view of its multipurpose roles. Small ruminant contributes immensely to animal protein supply in Nigeria (Aruwayo and Muhammad, 2018). Goat production plays dominant role in meat and skin production in Nigeria. Ruminant production has also been recognized for its contribution to livestock production in Nigeria. Ruminants form a significant proportion of the livestock production in Nigeria and possess obvious advantages over other livestock such as playing significant roles in the life of rural households (Aruwayo and Garba, 2015). Goats are small ruminants with excellent potentials at mitigating the shortage of human protein consumption in Nigeria. Goats provide about 30% of all meat consumed by Nigeria populace. They are found all over Nigeria in large population and very popular among the small holder farmers. They are found all over Nigeria in large population and very popular among the small holder farmers. National Bureau of Statistics (2011) indicated that Nigeria was endowed with an estimated 19.5 million cattle, 72.5 million goats, 41.3 million sheep, 7.1 million pigs and 28,000 camel (Premium Times, 2016). However, the potentials of goats in Nigeria have not been fully exploited. This has often been attributed to scarcity of feed especially during the dry season of the year. Lamidi and Olugbose (2014) reported that feed scarcity is one of the major challenges of livestock production in Nigeria due to variation in the pattern of rainfall thereby resulting in slow growth and reduction in productivity (milk and meat) output per animal. This results in seasonal migration of herdsmen from north to the southern part of Nigeria, leading to encroachment of farmlands, culminating in farmers/herders clash, a menace which has become the order of the day in Nigeria (Aruwayo *et al.*, 2021). The conventional feed sources have not been able to supply the feed requirements of ruminant animals especially in the Northern part of Nigeria. Farm residues and wastes form a quick source of rescue for the feed challenge but are fibrous and low in nutrients hence the need for treatment to improve digestibility and nutrients availability. Groundnut shell constitutes one these processing wastes that are fibrous with poor digestibility, hence the treatment with urea in this study.

MATERIALS AND METHODS

The experiment was conducted at Prof. Lawal Abdul Saulawa Livestock Teaching and Research Farm, Federal University Dutsin-Ma, Katsina State. The goats used for the experiment were

purchased from Dutsin-Ma market in Katsina State. The goats were quarantined for two weeks during which they were dewormed with Albendazole to get rid of endoparasites, and Ivermectin administration to the animals against ectoparasites. Antibiotics (Oxy-tetracycyline) was administered to the animals through injection. Urea treated groundnut shell was the test ingredient and was prepared by dissolving 2.5kg of urea in 50L of water, applied to 50 kg of GNS and then ensiled in a plastic container by pressing the treated groundnut shell to expel air contained in it. It was then covered with polythene sheet to make it air tight. The treated groundnut shell waste remained in such condition for two weeks to allow fermentation to take place and subsequent sun drying for ten days. It was pulverized and used as the test ingredient.

Three experimental diets were formulated for this study. Treatment A serve as the control without urea treated groundnut shell while, treatments B and C contain 10% and 20% inclusion level of urea treated groundnut shell, respectively. Other ingredients that were used in the formulation of diet are maize offal, cowpea hausk, cotton seed cake, ground nut hulm, bone meal and salt. The gross composition is contained in table 1. The animals were fed at 3% of their body weight and were provided with clean water everyday *ad libitum* throughout the 84 days experimental period. Blood samples were collected through the jugular vein according to Coles (1986) from three randomly selected experimental animals from each of the treatments after the feeding trial that last for twelve (12) weeks. Bleeding was done early in the morning before feeding and an average of 7 mL of blood was collected from each animal and placed in a universal bottle and allowed to stand for about 2 hours at room temperature. The universal bottle was thereafter centrifuged at 700 × g for 15 minutes. The serum was separated, decanted, and stored in a deep freezer for blood biochemical parameters test. Data collected were subjected to one way analysis of variance (ANOVA) SPSS (2.0). The Mean separations were compared using Duncan's Multiple Range Test.

Table 1: Gross Composition of Experimental Diet

Ingredients (%)	**treatments**		
	A	**B**	**C**
Maize offal	60	57	45
Cotton seed cake	15	15	10
Urea-treated groundnut shell	0.0	10	20
Cowpea husk	15	7	15
Groundnut hulm	8	9	8
Bone meal	1	1	1
Common salt	1	1	1
Total	**100**	**100**	**100**
Calculated nutrient levels			
Crude protein (%)	14.69	18.16	24.90
Energy(MEkcal/kg)	2896.67	3327.65	4107.50

RESULTS AND DISCUSSION

Chemical Composition and Crude fibre Fraction of the Experimental Diets

The results of the chemical composition and crude fibre fraction of the experimental diets are presented in Table 1. The proximate composition as shown in Table I is adequate for the nutrient requirements of a growing buck. The crude fibre fraction is also in line with growing ruminant requirement in the tropics as recommended for growing ruminants in the tropics (NRC 1996).

Result on Biochemical Parameters (Kidney Function) of Red Sokoto Bucks fed urea treated groundnut shell

The result of biochemical parameters for kidney function of Sokoto Red Buck fed the treatment diets are presented above in Table 3. The result revealed that there were significant differences ($P<0.05$) in the urea with the highest numerical value of 7.20 umol/L obtained in T3 and lowest value of 4.750 umol/L obtained in T1. The values for urea in this study that ranged from 4.75-7.200 umol/l falls within the same range reported by (Aruwayo *et al*., 2016). The result further revealed that there were no significant differences ($P>0.05$) in the creatinine, sodium and potassium although their numerical differences among the treatments. The potassium value obtained in this study agreed with the

established value of 3.6-4.8mmoq/L while the sodium value obtained were slightly higher than the established average value of 157 mmoq/L (Aruwayo *et al*., 2016).

Table 2: Chemical Composition and Crude fibre Fraction of the Experimental Diets

Parameters (%)	Treatments		
	T1	T2	T3
Dry Matter	90.61	90.94	90.96
Crude protein	17.06	17.50	17.95
Crude Fibre	18.69	18.03	18.18
Ether Extract	4.08	4.92	4.84
Ash	7.50	7.32	7.63
ADF	30.47	30.38	31.14
NDF	58.63	58.70	56.96
NFE	44.28	43.17	42.36
Lignin	10.90	10.92	11.90

ADF=Acid Detergent fibre; NDF=Neutral Detergent Fibre; NFE=Nitrogen Free Extract

Table 3. Biochemical parameters of Red Sokoto Bucks fed urea-treated groundnut shell

Parameters	**Treatments**				
	T1	**T2**	**T3**	**SED**	**LOS**
Urea Nitrogen Conc (umol/L).	4.750[a]	6.750[b]	7.200[b]	0.428f	*
Creatinine (umol/L)	74.75	78.85	81.70	3.65	NS
Sodium (mmol/L)	112.5	141.5	162.0	32.0	NS
Potassium (mmol/L)	4.155	4.200	4.115	0.0904	NS

Means within the same row with different superscripts are significantly different (P<0.05
AST=Aspartate Aminotransferase; ALT= Alanine Aminotransferase

Biochemical Parameters (liver function test) of Sokoto Red Buck Fed urea Treated Groundnut Shell

The result on biochemical parameters of sokoto red buck fed urea treated groundnut shell for liver function test are presented in table 4. The result indicated that there were no significant differences (P>0.05) in the total bilirubin, ALT, AST and albumin. Total bilirubin and albumin obtained the highest numerical value of 3.250mg/dL and 4.300g/dL in T3 respectively while ALT and AST recorded highest numerical value of 58.50 and 8.100 at T1, respectively. This result further revealed that there were significant differencs (p<0.05) in the total protein and glubolin with the highest numerical value of 84.25g/L and 50.50g/L obtained at T1, respectively. These values were similar to those obtained by Aruwayo *et al*. (2016) when Sokoto red bucks were fed Urea treated rice milling waste.

Table 4: Biochemical Parameter (liver function test) of Sokoto Red Buck Fed urea Treated Groundnut Shell

Parameters	**Treatments**				
	T1	**T2**	**T3**	**SED**	**LOS**
ALT ((IU/L)	58.50	46.00	51.50	1.008	NS
AST (IU/L)	81.00	70.00	73.50	0.456	NS
Total Protein (g/L)	84.25[b]	72.75[a]	78.50[b]	0.2217	*
Albumin (g/L)	43.75	42.50	43.00	0.335	NS
Globulin(g/L)	50.50[b]	30.25[a]	35.50[a]	0.370	*
Total Bilirubin (umol/L)	1.85	2.60	3.25	0.47	NS

Means withn the same row with different superscripts are significantly different (P<0.05).

CONCLUSION AND RECOMMENDATION

The key findings indicated that dietary inclusion of urea treated groundnut shell for up to 20% had no adverse effect on the kidney and liver functions of the animals. Goats can then fed diets that contain

up to 20% level of inclusion in view of the positive results from the growth trial using in this same study.

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