



## UTILIZATION OF VARIOUS PROPORTIONS OF UREA-TREATED SUGAR CANE SCRAPINGS AND GROUNDNUT HAULMS IN THE DIETS OF GROWING YANKASA RAMS

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### ABSTRACT

The study evaluated the utilization of varying Proportion of urea-Treated sugarcane scrapings (SS) and Groundnut haulms in the diets of Growing *Yankasa* rams. Sixteen (16) *Yankasa* Rams were randomly assigned to four treatment groups, each with four rams in a completely randomized design. Four experimental diets were formulated with SS, and GH, T1 (7.5), T2 (15%), T3 (22.5%), and T (30%). GH T1 (30%), T2 (22.5%), T3 (15%), and T4 (7.50%). Labeled as T1, T2, T3, and T4 respectively. The results revealed significant differences ( $p < 0.05$ ) in the final weight gain. Rams on T1 had the highest final weight gain (23.30 kg), while those on T4 had the lowest (20.32 kg). The total weight gain and daily weight gain were similar across treatments, with T2 showing a slightly higher daily gain (0.10 kg/day). Feed intake was highest in T1 (50.77 kg) and decreased with increasing levels of groundnut haulm. Feed conversion ratios were lowest in T2 (6.74) and highest in T1 (7.55). Haematological parameters varied significantly among treatments. Rams on T3 had the highest packed cell volume (46.8%), while T4 showed the highest hemoglobin concentration (18.4 g/dL) and mean corpuscular hemoglobin concentration (41.5 g/dL). Serum biochemistry revealed that total protein was highest in T4 (32.20 g/L), while glucose levels were within the reference range for all treatments. Urea and cholesterol levels were also within the normal ranges, with T3 showing the highest urea (9.7 mmol/L) and T1 the highest cholesterol (2.0 mmol/L). Rumen pH at 0 hours before feeding (BF) ranged from 6.60 in T4 to 6.90 in T3. Five hours after feeding (AF), the pH varied, with T3 showing the lowest pH (5.97) and T4 the highest (6.94). Rumen ammonia nitrogen (RAN) was highest in T1 at both 0 hours BF (51.49 mg/dL) and 5 hours AF (68.41 mg/dL). Total volatile fatty acids (VFA) were highest in T2 at 0 hours BF (84.89 mmol/100) and in T3 at 5 hours AF (127.61 mmol/100). In conclusion, the inclusion of sugar cane scrapping up to 30% in the diet did show adverse effect on *Yankasa* Rams. It is recommended to include sugar cane scrapping and groundnut haulm at levels of 15% to 22.5% in the diets of *Yankasa* Rams to achieve optimal growth and health benefits.

**Keywords:** *Yankasa* Rams, Sugarcane Scrapping, Urea, Groundnut Haulms, Rumen Metabolite.

### INTRODUCTION

Livestock is an important component in the agricultural production system, and plays a crucial role in the economy (Hasan *et al.*, 2019). Small ruminants play a key role in bridging the wide gap in the supply of animal protein for human consumption (Ahmed *et al.*, 2019). *Yankasa* is one of the important sheep breeds in Nigeria, it is the most widely distributed and most numerous sheep breed in Nigeria (Umar, 2020). The Major Constraint of livestock production is feed, which account for more than 60% of total cost of production (Akinola *et al.*, 2015). Therefore, Farmers in the rural areas depend on crop residues to feed their livestock during the period of feeds scarcity, (Muhammad *et al.*, 2018). Crop residues such as groundnut



and cowpea haulms offer cheap alternative sources feeds. (Anderson, 2016; Yashim *et al.*, 2016). The broad objective of this study, therefore, was to examine the utilization of varying proportions of urea-treated sugarcane scrappings and groundnut haulms in the diets of growing *Yankasa* rams.

**MATERIALS AND METHODS**

**Experiential Site:**

The experiment was conducted at the Bauchi State College of Agriculture Teaching and Research Farm, Bauchi. Bauchi is located on Latitude 100<sup>0</sup> 17<sup>1</sup> N and longitude 90<sup>0</sup> 49<sup>1</sup> E, with an altitude of about 690.2 meters above sea level.

**Experimental Animals and their Management**

A total of sixteen (16) *Yankasa* Rams were procured from different markets in Bauchi and environments and used for the experiment. The animals were quarantined for two weeks during which their body was spread with acaricide, using Amitraz® at the rate of 1ml/litre for external parasites. They dewormed with Albendazole at 12.5mmg/kg1 body weight for internal parasites respectively, also antibiotic, Oxytetracycline L.A (Kepro ®) 20%, at 1ml per 10kg body weight was injected intramuscularly.

**Experimental Diets and Animal Feeding**

Four (4) isonitrogenous diets (16% crude protein) were formulated in which Sugar Cane scrapping and groundnut haulms were included at various levels such that the two ingredients collectively contributed 37.5% of the diets. The diets was compounded using the groundnut haulm and the diet contained 7.50%, 15%, 22.50%, and 30% of the groundnut haulm and these diet was tagged treatment 1, 2, 3 and 4 respectively. Ingredients composition of the experimental diets was presented in Table 1.

**Table 1** : Gross Composition (%) of Experimental Diets

Ingredients	Treatments			
	1	2	3	4
Sugarcane Scrappings	7.50	15.00	22.50	30.00
Groundnut Haulms	30.00	22.50	15.00	7.50
Maize Offal	42.69	50.01	57.48	55.70
Cotton Seed Cake	17.30	9.98	2.52	4.29
Bone Meal	2.00	2.00	2.00	2.00
Salt	0.50	0.50	0.50	0.50
Total	100.00	100.00	100.00	100.00

**Experimental Design**

The experiments were conducted in a completely randomized design with four (4) treatments of four (4) animals each (Steel and Torrie, 1980).

**Procedure of Ensiling Sugarcane Scrappings**

Add 100l of water into the flask rubber. Mixed 5kg solution of urea dissolved in water. Place in the bottle with a hole or hand, Start to Sprayed at the rate of 100l of water on 100kg of Granded sugarcane Scrapping mixed, put the sugarcane scrapping mixed with 100l of water with urea into hole or container. Covered the hole with leather to kept in Air fight condition to prevent the escape of Ammonia, on the covered leather we put stone to avoid access of air. It was covered for 3week or long After 21 days the fermentation was terminated and the silages were opened for silage quality assessment. The colour, aroma and pH were assessed according



to Babayemi and Igbekoyi (2008). The pH was determined by adding 100 ml of distilled water to 100kg of each treatment in a plastic Rubber and a pH meter glass electrode was inserted to determine the pH. The conditions were scored for aroma and color by three independent scorers on a subjective scale of 1- 4 according to Muhammed *et al.*, (2009).

#### **Chemical Composition of Ensiled Urea**

The chemical composition of the experimental ensiled urea treated Sugarcane Scrappings and diets were determined in the laboratory according to procedure described by AOAC (1980) and Van Soest *et al.* (1991).

#### **Statistical Analysis**

The collected data were subjected to analysis of variance (ANOVA) using SPSS software (2007). Significant differences among treatment groups were determined using least significant difference (LSD) post-hoc tests (1955).

### **RESULTS AND DISCUSSION**

#### **Chemical Composition of Experimental Diets**

The chemical composition of sugarcane scrappings obtained in the study was presented in Table 2. The results showed values as follows: moisture content (4.15%), crude protein (9.64%), crude fibre (43.60%). The value for CF was higher than the 12.7% CF reported by Ayoade *et al.* (2007). The calculated ME of 205.35 kcal/kg was lower than 2970 kcal/kg reported by Alu *et al.* (2012).

**Table 2:** Chemical Composition of Sugar Cane Scrappings

Parameters (%)	Sugarcane Scrappings
Moisture	4.15
Crude Protein	9.64
Crude Fibre	43.60
Ash	2.53
Nitrogen Free Extract	39.11
Calcium	0.62
Phosphorus	0.01
Lipid	1.15
Metabolizable Energy (ME/kcal)	205.35

#### **Feed Intake and Growth Performance of Yankasa Rams Fed the Experimental Diets**

The result of growth performance obtained in the current study was presented in Table 3. The higher total feed intake observed in the study with animals on treatments 2 and 1 (50.87kg and 50.77kg) are in line with those reported for *Yankasa* rams fed unensiled sugarcane scrappings (Amanullah *et al.*, 2006). All animals increased in weight which indicated that the intake of protein and energy were above maintenance requirement. The highest daily weight gains of (95.53g) observed in this Study was higher than that reported by Ali - Balogun *et al* (2018) who fed urea treated sugarcane scrappings to *Yankasa* rams.

**Table 3:** Growth Performance of *Yankasa* Rams Fed Varying Proportion of Urea-Treated Sugar Cane Scrappings and Groundnut Haulms

Parameters	Treatments				SEM
	1	2	3	4	
Initial weight (kg)	15.90	13.20	14.37	13.82	2.17ns
Final weight (kg)	23.30 <sup>a</sup>	21.22 <sup>b</sup>	21.22 <sup>b</sup>	20.32 <sup>b</sup>	1.31*
Total weight gain (kg)	7.40	8.02	6.85	6.50	1.15ns
Daily weight (kg)	88.09	95.53	81.57	77.38	1.51ns
Total Feed Intake (g)	50.77	50.87	48.12	44.76	13.69ns
Daily Feed Intake (g)	604.45	605.67	572.91	532.85	38.05
Daily water Intake (liter)	2.10	2.30	2.23	2.27	0.12 ns
Feed Conversion ratio	7.55	6.74	7.47	6.99	1.85ns

a.b.c: means with different superscript on the same row differ significantly at \* $p < 0.05$   
SEM: Standard error of Mean

### Haematological Parameters of *Yankasa* Rams Fed the Experimental Diets

The results of haematological parameters of *Yankasa* rams obtained in the current study were presented in Table 4. The range of values for packed cell volume (29.00 – 46.80 %), Haemoglobin (9.80 – 18.40  $\times 10^{12}$ L), Red blood cells (10.40 – 17.50 $\times 10^{12}$ L), White blood cells (7.60 – 16.30  $\times 10^9$ /L), MCV (21.80 – 42.50 fl), MCH (9.80 – 13.10 pg) and MCHC (25.99 – 41.50%) fell within the normal values suggesting that the animals were healthy animals.

**Table 4:** Haematological Parameters of *Yankasa* Rams Fed Varying Proportion of Urea-treated Sugarcane Scrappings and Groundnut Haulms

Parameter	Treatments				R/Values
	1	2	3	4	
Packed Cell Volume (%)	33.00	35.50	46.80	29.00	27-45
Haemoglobin (g/dL)	9.80	12.45	16.30	18.40	9-15
Red Blood Cell ( $\times 10^{12}$ L)	17.50	10.40	16.90	13.40	9-15
White Blood cell ( $\times 10^9$ /L)	7.60	12.80	16.30	8.46	4-8
MCV (FL)	37.90	29.10	42.50	21.80	28-40
MCH (pg)	9.80	13.10	12.71	10.93	8-12
MCHC (%)	29.60	38.10	25.99	41.50	31-34

R/Values: Reference values (Radostis *et al.*, 2000)

Mean corpuscular volume (MCV), mean corpuscular hemoglobin (MCH), mean corpuscular and hemoglobin concentration (MCHC)

### Serum Biochemical Parameters of *Yankasa* Rams Fed the Experimental Diets

The results of serum biochemical parameters of *Yankasa* rams obtained in the current study were presented in Table 5. The range of values for Total protein (21.10 – 32.20g/l), Glucose (2.80 – 3.90 mmol/L), Urea ( 3.10 – 9.70 mmol/L), Cholesterol ( 1.50 – 2.00 mmol/L), Albumin ( 21.60 – 32.70 g/l) and Creatinine ( 85.50 – 107.50 mmol/L) were within the normal values suggesting that the animals were healthy animals. However, the creatinine value of 107.50 mmol/L observed for animals on treatment 4 was found to be outside of the comfort zone of 28 – 100 mmol/L.

**Table 5:** Serum- biochemical of *Yankasa* Rams Varying Proportion of Urea-treated Sugar cane scrappings and groundnut Haulms.

Parameters	Treatments				R/values
	1	2	3	4	
Total protein (g/l)	30.29	21.10	30.20	32.20	2.35
Glucose (mmol/L)	3.00	1.70	3.90	2.80	2.6-4.4
Urea (mmol/L)	4.60	8.40	9.70	3.10	3.4-12.0
Cholesterol (mmol/L)	2.00	1.50	1.90	1.60	1.13-2.57
Albumin (g/l)	28.00	32.70	33.10	21.60	29-47
Creatinine (mmol/L)	94.10	90.90	85.50	107.50	28-100

R/Values: reference Values (Radostis *et al.*, 2000)

### Rumen Metabolites of *Yankasa* Rams Fed the Experimental Diets

The results for rumen metabolites obtained by *Yankasa* rams in the current study were presented in Table 6. The range of values for pH (before feeding) ranged from 6.60 to 6.90 while those for after feeding were 5.97 to 6.94. These pH values were similar to those recommended for optimum rumen function. The results for rumen ammonia nitrogen (RAN) obtained in the current study ranged from 39.93 -51.49 mmol/L (before feeding). The RAN values observed after feeding (57.61 – 68.41 mmol/L) were much higher than those recorded before feeding. This is possible because the animals were expected to digest more feed (after feeding) thereby producing more RAN. The results for total volatile fatty acids (TVFA) observed in the current study ranged from 69.49 to 84.89 mmol/L (before feeding) and 117.60 to 127.61 mmol/L after feeding. The range of values of TVFA after feeding was much higher than those recorded before feeding. Animals fed the experimental diets recorded higher amounts of TVFA immediately after feeding to few hours after feeding.

**Table 6:** Rumen Metabolites of *Yankasa* Rams Fed Varying Proportion of Urea-Treated Sugarcane Scrappings and Groundnut Haulms

Parameters		Treatments				SEM
		1	2	3	4	
pH	BF	6.81 <sup>b</sup>	6.80 <sup>b</sup>	6.90 <sup>a</sup>	6.60 <sup>c</sup>	0.04*
	5HRS AF	6.70 <sup>c</sup>	6.90 <sup>b</sup>	5.97 <sup>d</sup>	6.94 <sup>a</sup>	0.15*
RAN	BF	51.49 <sup>a</sup>	48.88 <sup>b</sup>	39.93 <sup>d</sup>	42.52 <sup>c</sup>	1.76*
	5HRS AF	68.41 <sup>a</sup>	60.21 <sup>c</sup>	57.61 <sup>d</sup>	61.60 <sup>b</sup>	1.51*
TVFA	BF	69.49 <sup>d</sup>	84.89 <sup>a</sup>	79.93 <sup>c</sup>	82.52 <sup>b</sup>	2.22*
	5HRS AF	122.41 <sup>c</sup>	126.21 <sup>b</sup>	127.61 <sup>a</sup>	117.60 <sup>d</sup>	1.47*

a,b,c,d: means with different superscripts on the same row differ significantly at  $p < 0.05^*$

SEM standard error of means, RAN Rumen Ammonia Nitrogen, and T.V.F.A: Total Volatile Fatty Acid.

### CONCLUSION AND RECOMMENDATIONS

In conclusion, the inclusion of varying Proportions urea-treated sugar cane scrappings and groundnut haulms at 37.5% in the diets did not show adverse effect on the productive performance of growing *Yankasa* rams, The inclusion of sugar scrapping in the diets of *Yankasa* ram did not negatively affect the blood profile of the rams.



From the results of the current experiment, diet 2 (15.00% sugarcane scrappings (22.50%) which gave the highest daily weight gains of 95.53g/day and the best feed conversion ratio of 6.74 is recommended for growing *Yankasa* Rams.

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