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EFFECTS OF ENSILED SORGHUM HUSK AND MAIZE COBS WITH POULTRY LITTER ON HAEMATOLOGY AND SERUM BIOCHEMISTRY OF UDA RAMS

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ABSTARCT

The study was conducted to evaluate the effect of ensiling maize cobs and sorghum husk with poultry litter waste at ratio of 70:30. The experimental diets consist of four treatments viz-a-viz 70% maize cobs plus 30% poultry litter as treatment 1 while treatment 2 consist of 70% sorghum husk plus 30% poultry litter waste then third treatment had 35% maize cob plus 35% sorghum husk plus 30% poultry litter waste. The last treatment T4 is a control diet. Twelve (12) uda ram lambs were used in the experiment and fed with experimental diets at ratio of 60:40 ensiled diets to concentrate for period of 63 days. At the end of the feeding trial, blood samples were collected and analysed for haematological and biochemical characteristics. The result of the study indicated significant variation in Hb, MCH, MCHC, WBC, ALT, TB and chlorine. It was concluded that the test ingredients were safe and will not interfere with renal and liver functions of the animals.

Key words: haematology, serum biochemistry, Uda rams, corn cobs, sorghum husk

INTRODUCTION

Sheep and goats constitute a very important part of the livestock sub sector in the Nigerian agricultural economy (Lakpiniet *al.*, 2002). Nigeria hosts 21,230 million sheep and over 70% of the sheep population in Nigeria is found in the sahel savanna regions where three of the four breeds of sheep (Balami, Yankasa and Uda) predominate (Adu and Ngere, 1979). Uda sheep is a breed of domestic sheep from Africa. It is common in chad, northern Cameroon, northern Nigeria and Niger. Blood is known to be vital to the life of an organism. This is a medium through which nutrients are conveyed to various parts of the body system of an organism. A readily available and fast means of assessing clinical and nutritional status of an animal on feeding trial is the use of blood analysis. Hematological parameter is an important and reliable medium used to monitor and evaluate health and nutritional status of animals (Gupta *et al.*, 2007). It therefore becomes imperative to evaluate blood parameters of an animal fed unconventional feeds such as poultry waste.

MATERIALS AND METHODS

Description of Experimental site

The experiment was conducted at the Usmanu Danfodiyo University Livestock Teaching and Research Farm. The farm is situated within the main campus of the university at about 10km north of Sokoto metropolis in Wamakko Local Government Area. Sokoto state has a semi- arid climate, which is characterized by low rainfall, in which the mean annual rainfall is about 700mm although, rainfall vary in amount from year to year.

Ensiling of Experimental Feeds (basal diets)

The silage was prepared using maize cobs fortified with soybean meal and poultry litter as shown in the table 1. Forty percent water by weight of the feed was sprinkled on the diet ingredients before ensiling. The ingredients were thoroughly mixed and poured into 120 liter containers, compressed using stones until filled to the brim without air space. The top of the containers have been covered tightly with nylons to provide anaerobic environment suitable for fermentation, then covered with the lid and stones placed



NSAP

47th Annual Conference
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CONFERENCE PROCEEDINGS

THEME
SECURING ANIMAL
AGRICULTURE AMIDST
GLOBAL CHALLENGES

on the top. The treatments and proportions of the ingredients are shown in Table 1. The experimental treatments we're designated as treatment A, B, C, and D which represent the control diet.

Table 1: Gross Composition of Ensiled Experimental Diets

Ingredients	Treatments		
	A	B	C
MaizeCobs	70	-	35
Guinea Corn Husk	-	70	35
Poultry Litter Waste	30	30	30
Total	100	100	100

Table 2: Gross Composition of Control Diets

Ingredients	% inclusion level
Groundnut haulms	20
Cowpea husk	20
Wheat offal	24
Cotton Seed Cake	25
Rice milling waste	10
Salt	1
Total	100
Calculated crude protein (%)	16
Calculated crude fibre	24
Calculated energy (kcal)	2023

Experimental Design and Feeding Procedures

Completely randomized design (CRD) was used in this experiment. Three (3) animals were used for each treatment, having a total of 12 rams. The pens were disinfected and three animals were assigned to each of the four experimental diets and fed *ad libitum* for 63 days at the rate of 60:40 ratio basal to concentrate diet. Water was given *ad lib*.

Data Collection

Blood Sample Collection and Analytical Techniques

Blood samples were collected from all the animals at the end of the feeding trial. The blood samples were aseptically collected via jugular vein using separate sterilized disposable 5ml syringe and 23 gauge needle. The sample from each replicate was collected in plain tubes, and tubes containing EDTA. The samples in plain bottles were used for serum biochemical analysis, while the samples in tubes containing EDTA were used for haematological analysis.

Data Analysis

All data obtained were subjected to the analysis of Variance (ANOVA) using SPSS. The means were separated using least significance difference (LSD).

RESULTS AND DISCUSSIONS

Haematology

The result of haematology of Uda ramb lamb fed sorghum husk and maize cobs ensiled with poultry litter waste is presented in table 3. The result shows significant variation ($P < .05$) in HB, MCH, MCHC and WBC but indicated no significant difference ($P > .05$) in RBC, PCV and MCV across the treatments. The result shows that rams in treatment 1 had significantly higher haemoglobin compared to T3 and T4, treatments 1 and 2 in MCHC compared to treatment 3 and 4, treatments 2, 3 and 4 in WBC and T1 and T4 for MCH. There were no significant differences ($P > .05$) between treatment 1 and 2, 2 and 3 and also 3 and 4 in terms of hemoglobin. There was no significant difference ($P > .05$) between treatment 1 and 2, 2 and 3, and also treatment 3 and 4 in regards to MCH and also there were no significant difference ($P > .05$)



between treatments 1 and 2, and also 2 and 3 likewise treatment 3 and 4 in terms of WBC. Haematological parameters are good indicators of the physiological status of animals (Khan and Zafar, 2005). The result of the present study indicated haemoglobin value (7.57-8.70) to be outside the reference values of 9-15. The variation could be attributed to the study area and sources of the experimental animals. The value of PCV (25-25) observed in this study is below the reference value of 27-45 (Elmhurst *et al.*, 2002) which could be as a result of differences in the diets and the period of the study. RBC values for the treatments were in agreement with value for lambs (4.44-8.69g/dl) as reported by Njiddaet *al.*, (2014); Campbell *et al.*, (2013). The results were lower than the reference values of 9-15 (Elmhurst). The WBC counts in this study were within the normal range (4-12) reported by Elmhurst *et al.*, (2002). The MCV, MCH and treatment 1 and 2 of MCHC values reported for sheep in this study were within normal range 28-40, 8-12 and 31-34 respectively as reported by Elmhurst *et al.*, (2002). Therefore the differential count value obtained in this study show that the lambs were healthy. This indicates that using poultry litter as ensiling material is not harmful to lambs.

Table 3. Haematological Profile of Uda Ram Fed Graded Levels of Sorghum Husk and Maize Cobs Ensiled with Poultry Litter.

Parameters	Treatments				SEM	RV**
	1	2	3	4		
H.b (g/dl)	8.70 ^{ab}	8.27 ^{ab}	7.70 ^{bc}	7.57 ^c	0.18	9-15
RBC (g/dl)	7.70	7.83	7.53	6.97	0.23	9-15
PCV (%)	26.00	26.00	25.67	25.00	0.75	27-45
MCV (fl)	33.78	33.25	34.46	35.89	1.61	28-40
MCH (pg)	11.29 ^a	10.57 ^a	10.29 ^a	10.86 ^a	0.30	8-12
MCHC (%)	33.47 ^{ab}	31.80 ^{ab}	30.10 ^{ab}	30.30 ^{ab}	0.86	31-34
WBC (%)	4.37 ^b	4.73 ^{ab}	4.70 ^{ab}	5.15 ^{ab}	0.15	4-12

a, b, c, d means values with different superscripts in a row denotes significant ($p < 0.05$) difference between means within the same rows. H.B-Haemoglobin; PCV-Pack cell volume; RBC-Red blood cell; MCH-Mean corpuscular Haemoglobin; MCV-Mean corpuscular volume; MCHC-Mean corpuscular Haemoglobin concentration; WBC-White blood cell; RV-Reference value; **= Elmhurst *et al.*, 2002.

Serum Biochemistry

The results in table 4 shows that treatments 1, 2, 3 and 4 have significantly ($P < 0.05$) higher globulin content, treatments 1, 2 and 3 for total bilirubin and also treatment 2, 3 and 4 in terms of chlorine content and treatment 4 compared to treatment 1, 2 and 3 in ALT content. There were no significant ($P > 0.05$) difference between treatment 1 and 2, 2 and 3 and also 3 and 4 in terms of globulin, between 1, 2 and 3 in terms of ALT and also between 1 and 2, 2 and 3, and also 3 and 4, in regards to total bilirubin. Likewise treatment 2 and 3, 3 and 4 in terms of chlorine. The result of serum biochemistry of Uda ram lambs fed graded level of sorghum husk and maize cobs ensiled with poultry litter waste as shown in table 4 indicated no significant variations in total protein, ALP, AST, DB, Urea, sodium and potassium across the treatments.

Total protein values obtained in this study were compared well with the report of total protein of coles (1986), and Maigandi (2001). The result were within physiological range of total protein (6-9.3g/dl) values for sheep (Borjesson *et al.*, 2000) and in line with range of values (6.0-8.3g/dl) reported by Njiddaet *al.*, (2014) for growing lambs and also reference values of (6.0-7.9) of Elmhurst *et al.*, (2002). Koloet *al.*, (2017) reported that serum total protein of animals are indirect indices for measuring nutritional protein adequacy in animals. The Albumin values were slightly higher than the average values as reported by Coles (1986) and Maigandi (2001) for sheep. Globulin values obtained in this study were lower than the reference value (36-49) as reported by Elmhurst *et al.*, (2002).

The values on serum aspartate amino transferase (AST), serum Alanine amino transferase (ALT) and serum alkaline phosphate (ALP) activity observed in this study were within the reference value (60-280), (22-38) and (70-390) respectively as reported by Elmhurst *et al.*, (2002). The serum AST, ALT and ALP



did not show significant differences among treatments and values were within the normal range. The values of direct Bilirubin were within reference values (0-4.6) of Elmhurst *et al.*, (2002).while that of total Bilirubin were lower than the reference values (1.71-8.55).The result of the present study indicated that urea is within the reference value (3-10) of Elmhurst *et al.*, (2002). Urea levels of the serum being within the normal reference range infers that work rate of the liver and kidney is normal and the likelihood of the anti-nutritive or feed being toxic can be discarded thus the test material could be termed safe in Uda ram lambs diet (Duncan *et al.*, 1994).

Table 4. Serum Biochemistry of Uda Ram Fed Graded Levels of Sorghum Husk, Maize Cobs Ensiled with Poultry Litter.

Parameters	Treatment				SEM	RV**
	1	2	3	4		
T.protein (g/dl)	6.60	6.23	6.17	6.20	0.16	6-7.9
Albumin (g/dl)	3.30	3.47	3.57	3.33	0.15	2.4-3
Globulin	3.30 ^a	2.77 ^a	2.80 ^a	2.87 ^a	0.17	3.6-4.9
AST (iu/l)	167.67	157.67	162.33	174.23	12.01	60-280
ALP (iu/l)	133.67	118.00	90.33	88.13	21.44	70-390
ALT (iu/l)	22.33 ^b	24.00 ^b	22.67 ^b	43.20 ^a	1.84	22-38
DB (mg/100ml)	0.43	0.37	0.47	0.27	0.11	0-4.6
TB (mg/100ml)	1.17 ^{ac}	0.77 ^{abc}	0.77 ^{abc}	0.53 ^{bcd}	0.16	1.71-8.55
Urea (mmol/l)	4.07	3.63	3.97	6.20	0.54	3-10
Sodium	139.33	139.33	140.33	139.90	0.83	142-152
Potassium	5.67	4.93	5.67	4.63	0.36	3.9-5.4
Chlorine	95.33 ^b	98.67 ^{ab}	100.00 ^{ab}	103.50 ^{ab}	1.68	95-103

a,b,c,d means in the same row with different superscripts are significantly different ($P < 0.05$), ALP- Alkaline phosphate, ALT- Alanine amino transferase, AST- Aspartate amino transferase, DB – Direct Bilirubin, TB – Total Bilirubin; RV-Reference value; **= Elmhurst *et al.*, 2002

CONCLUSION

It was concluded that the results of renal and liver function test as well as heamatological parameters that maize cobs and sorghum husk ensiled with 30% poultry litter waste fed to Uda ram lambs was safe..

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