

BLOOD PARAMETERS OF YANKASA RAMS FED UREA ENSILED CRUSHED CORN COBS SUPPLEMENTED WITH CONCENTRATES

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ABSTRACT

The study was conducted to determine the blood parameters of Yankasa rams fed urea ensiled crushed corn cobs (UECCC) with supplementation. The treatment groups were 1 crushed corn cobs (CCC), 2 urea ensiled corn cobs for seven days (UECCC7), 3 urea ensiled corn cobs for fourteen days (UECCC14) and 4 urea ensiled corn cobs for twenty one days (UECCC21). 20 animals were supplemented with 300g per head per day of concentrate made of maize bran and cotton seed cake. The experiment was conducted in a completely randomized design (CRD). Haematological parameters and Rumen pH were not affected by the dietary treatments, but all values were within the normal range for healthy animals. Rumen metabolites (total volatile fatty acids and rumen ammonia nitrogen) were significant. It was concluded that corn cobs ensiled with urea at 7, 14 and 21 days and supplemented with 300g/day of maize bran and cotton seed cake (1:1) had no adverse effect on the blood composition pH, total volatile fatty acids and rumen ammonia nitrogen of growing Yankasa sheep. Urea ensiled crushed corn cobs is therefore recommended as diet for sheep.

Keyword: Blood, Rumen pH, Rumen metabolites, Corn cobs, urea, Yankasa rams

INTRODUCTION

Nigeria is one of the four leading livestock producers in Sub-Sahara (FAO, 2006). The livestock sector plays a significant economic role in most developing countries, and is essential for food security of the rural population. Small ruminant production rarely exist as a sole enterprise but is often a part of an enterprise mix, involving Cattle rearing, Sheep and Goat husbandry, rural poultry, arable farming and vegetable gardening Baah, *et al.*, (2012). Pastoralists engage in some farming while crop farmers engage in some livestock production (Osinowo, 1999). Among the major constraints limiting the development of livestock production in many developing countries, inadequacy of animal feed resources is most often the crucial factor. This study was therefore designed to determine the effect of feeding urea ensiled crushed corn cobs with supplementation on blood parameters, rumen ammonia nitrogen, total volatile fatty acids and pH of rumen liquor of growing Yankasa rams.

MATERIALS AND METHODS

EXPERIMENTAL SITE:

The experiment which lasted for ten weeks (70 days), was carried out at the Abubakar Tafawa Balewa University (ATBU) Teaching and Research Farm Bauchi. Bauchi metropolis has an average annual rainfall of 700mm-1300mm lying between lat. 9°3 and 12° North, long. 8°49 and 11°East and an altitude of 690.2 meters above sea level in the Northern Guinea Savanna ecological zone of Nigeria (Kowal and Knabe, 1972).

Experimental Animals and their Management

Twenty (20) growing Yankasa male Sheep aged 11-15 months with mean live weight of 15.7 kg were purchased from a market in Bauchi suburb and used for the trial. The experimental animals on arrival were examined and quarantined for a period of 14 days, during which they were ear-tagged using numbered plastic tags. The animals were also vaccinated against *PPR* using a tissue cultured rinderpest vaccine. Each animal was housed individually in cross-ventilated pens and allotted to its respected experimental diet. Good clean drinking water and salt lick were provided to the animals *ad libitum*. Initial weights of the animals were recorded before the commencement of the experiment. Weekly weight was taken for the period of the experiment to determine weight changes. Feeds and water were offered and remnant weighed daily to determine voluntary intake.

Experimental Diets Preparation

The experimental feed ingredients were; Crushed Corn Cobs, Cotton Seed Cake, Urea graded fertilizer and Maize Bran. The Corn Cobs of PZE-W composite 5 variety of maize was obtained from a farm in Gubi on the University land. The Corn Cobs were crushed using crushing machine. The Crushed Corn Cobs were ensiled for 7, 14, and 21 days. Four kilograms was dissolved in 100 liters of water to treat 100kg of crushed corn cobs. (Abubakar *et al.*, 2006; Ngele., 2007 and Ngele *et al.*, 2010). The treated Crushed Corn Cobs was ensiled in airtight plastic tanks (200 litres) lined with polyethene. After ensiling, the treated Crushed Corn Cobs were dried under shade for 5 days to allow for the escape of ammonia (Abubakar *et al.*, 2006; Ngele., 2007).

Animal Feeding

Supplement of 50 % maize bran + 50 % cotton seed cake mixed, untreated and urea treated corn cobs were fed to the experimental animals.

The experimental animals were fed thus;

Treatment one: 300g of supplement + Untreated Corn Cobs.

Treatment two: 300g of supplement + Urea Treated Corn Cobs at 7 days.

Treatment three: 300g of supplement + Urea Treated Corn Cobs at 14 days.

Treatment four: 300g of supplement D + Urea Treated Corn Cobs at 21 days.

The experimental diet was fed to the animals every morning.

Data Collection

At the 4th week of experiment, 5mls of blood was collected from each animal. The blood samples for hematology were collected in to a well labeled, sterilized vacutainer tube containing ethylene diamine tetra-acetic acid (EDTA).

Rumen liquor/fluids was collected during the 7th week before feeding and 4hrs after feeding using stomach tube and immediately after collection, the pH of the rumen liquor was taken and recorded using AGB-75 laboratory pH meter for total volatile fatty acids determination and rumen ammonia nitrogen (RAN).

RESULTS AND DISCUSSIONS

The effect of dietary treatment on Blood counts of *Yankasa* rams fed Experimental diets.

Table 1 shows the effect (pre and post feeding) of the diets on the blood counts; white blood cells (WBC), red blood cells (RBC), haemoglobin (HGB), packed cell volume (PCV). The WBC, RBC, HGB, PCV, were not significantly different, however, there was decrease in the mean values especially on white blood cells pre and post feeding. The values for the blood counts ranged thus: white blood cells (WBC) 102.52 to 118.24 $\times 10^3/\text{ul}$ and 33.04 to 97.06 $10^3/\text{ul}$, red blood cells (RBC) 7.89 to 8.77 $10^3/\text{ul}$ and 7.28 to 7.97 $10^3/\text{ul}$, haemoglobin (HGB) 9.32 to 11.78 g/dl and 10.22 to 10.70 g/dl, packed cell volume (PCV) 36.32 to 43.18 % and 32.72 to 42.0 g/dl g/dl 4 %. Therefore, the values recorded in this study for blood metabolites (white blood cells, red blood cells, haemoglobin, packed cell volume) were not affected by the dietary treatment. The PCV for sheep falls within the range of 24 to 45 % (Sirois, 1995). This indicates the high nutritive value of the experimental diets. The none significant difference ($P>0.05$) obtained across the treatments in this study could mean that the untreated crushed corn cobs and urea ensiled crushed corn cobs had no negative effects on the performance of the experimental animals and can be said to be safe for feeding *Yankasa* sheep.

Effect of dietary treatments on ruminal pH, total volatile fatty acids (TVFA) and rumen ammonia (RNA).

Table 2 shows the effect (pre and post feeding) of the diets on rumen liquor pH (RLpH), total volatile fatty acids (TVFA) and rumen ammonia - nitrogen ($\text{RNH}_3\text{-N}$).

Rumen pH

Rumen pH Pre- feeding was significantly ($P<0.05$) affected by the dietary treatments. The values for pre-feeding ranged between 6.14 and 6.40. However, there was general decrease in pH post- feeding across the treatments and the values were similar across the treatment (5.36, 5.34, 5.78 and 5.30 for diet 1, 2, 3 and 4 respectively).

This suggests that there was proper digestion of the treatment diets when fed to the animals across the treatments. The pH values recorded before feeding was similar to the findings of Khan *et al.* (2006) who reported 6.5 Mmol/100ml but much lower to the study conducted by Hamad *et al.*, (2011) who reported 7.43 Mmol/100ml before feeding, 7.70 Mmol/100ml; 3hours after feeding and 5.30 to 5.78 Mmol/100ml; 4 hours after feeding. Proper digestion usually triggers rumination which results in the production of saliva. The rumen pH recorded falls within range. This an indication of high fermentable diets fed to the animals. This observation agrees with the earlier findings of Adegbola, (2002) and Oddoye *et al.*, (2005).

RUMEN METABOLITES

The total volatile fatty acids (TVFA) post feeding was significant ($P < 0.05$) across the dietary treatments whereas pre feeding was not affected by the dietary treatments; the values were 78.00, 46.00, 81.40 and 53.20, and 42.40, 49.40, 71.40 and 62.40 Mmol/100ml for post and pre feeding respectively. The TVFA in the post feeding increased in treatments 1 and 3 and reduced in treatments 2 and 4. The rumen ammonia nitrogen pre-feeding was not significant across the treatments. However, the post feeding values was statistically significant ($P < 0.05$) across the treatments. The ruminal ammonia nitrogen values recorded after feeding was much lower than the earlier report by Hamad *et al.* (2011) and Khan *et al.* (2006) who reported 13.58 to 16.36 mg/100ml before feeding, 22.87 to 23.64 mg/100ml 3hours after feeding and 29.4 mg/100ml after feeding. The high level of RAN in this current study may be indicating rapid fermentation and degradation of the experimental diets especially for the urea ensiled crushed corn cobs. The levels of volatile fatty acids recorded before feeding and after feeding (78.00, 46.00, 81.40 and 53.20, and 42.40, 49.40, 71.40 and 62.40 Mmol/100ml) were quite high than the earlier report by Hamad *et al.*, (2011) and much lower than the study conducted by Khan *et al.* (2006). Earlier report by Oddoye *et al.*, (2005) suggested that for rumen microbes to operate at a maximum level, the release of nitrogen and fermentable carbohydrate must be synchronized. Khan *et al.* (2006) also noted that, slow release of NH_3 and sufficient production of VFA leads to better utilization of the nutrients for rumen microbial growth that resulted in improved digestibility.

CONCLUSION AND RECOMMENDATION

Corn cobs ensiled with urea at 7, 14 and 21 days and supplemented with 300g/day of maize bran and cotton seed cake (1:1) had no adverse effect on the blood composition, pH, total volatile fatty acids and rumen ammonia nitrogen of growing Yankasa sheep. Base on the performance of the animals placed on diet four (4) fed corn cobs ensiled at 21 days and supplemented with 300g/head/day is recommended for growing Yankasa Sheep.

Table 1: Blood Metabolites of Yankasa Rams Fed Experimental Diets

Parameters	Diets						
	Periods	UCC	UECC7	UECC14	ECC21	SEM	LS
WBC	BF	108.82	118.24	110.16	102.52	12.08	NS
	4hrs AF	97.06	84.44	33.04	69.00	15.02	NS
RBC	BF	8.63	7.89	8.55	8.77	0.25	NS
	4hrs AF	7.97	7.28	7.75	7.71	0.22	NS
HGB	BF	9.32	10.96	11.78	11.52	0.58	NS
	4hrs AF	10.54	10.22	10.70	10.44	0.24	NS
PCV	BF	36.32	40.78	39.06	43.18	2.33	NS
	4hrs AF	32.72	41.52	38.30	42.04	3.12	NS

= $P < 0.05$, UCC = Untreated corn cobs, UECC7 = Urea ensiled corn cobs for 7 days, UECC14 = Urea ensiled corn cobs for 14 days, UECC21 = Urea ensiled corn cobs for 21 days, BF = Before feeding, AF = After feeding, SEM = Standard error mean, LS = Level of significance, NS = Non significant, WBC = White blood cell, RBC = Red blood cell, HGB = Haemoglobin, PCV = Packed cell volume.

Table 2: Rumen pH and metabolites of Yankasa rams fed Experimental diets

Parameters	Period	Diets				SEM	LS
		1	2	3	4		
Rumen Liquor pH	BF	6.40 ^a	6.30 ^{ab}	6.14 ^b	6.32 ^{ab}	0.04	*
	AF	5.36	5.34	5.78	5.30	0.09	NS
TVFA(Mmol/100ml)	BF	42.40	49.40	71.40	62.40	5.44	NS
	AF	78.00 ^{ab}	46.00 ^b	81.40 ^a	53.20 ^{ab}	5.86	*
Rumen ammonia RNH ₃ -N(mg/100ml)	BF	64.15	58.50	52.88	47.37	3.80	NS
	AF	43.41 ^c	71.01 ^a	53.29 ^b	65.32 ^{ab}	4.13	*

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