Biochemical and Heamatological Characteristics of Growing Sokoto Red Kids fed Untreated and Urea Treated Rice Milling Waste in Katsina State

A. Aruwayo[1*], M. A. Yahaya and M. G. Garuba

Abstract---The study was conducted to determine the haematological characteristics and biochemical parameters of growing Sokoto red goat fed untreated and urea treated rice milling waste. The experiment was carried out at the Teaching and Research Farm of the Federal University Dutsinma using twenty five entire male growing Sokoto red kids. The experimental animals were allotted (n=5) to diets A, B, C, D and E consisting of the control (A) without rice milling waste and urea treated rice milling waste, B and C contained 15 and 30% untreated rice milling waste while D and E consist of 15 % and 30% urea treated rice milling waste respectively for 84 days in a completely randomized design (CRD). Blood samples were collected from three randomly selected animals in the experimental groups and analysed for haematological and biochemical parameters and were normal. It was concluded that feeding urea treated rice milling waste did not portend any danger to a growing buck kid.

Keywords: Biochemical, haematological, rice milling waste, Sokoto red goat and urea

I. INTRODUCTION

Ruminant animals especially goats possess the capacity to thrive on poor quality roughages and agro-by products that cannot sustain other groups of livestock. Goats are excellent browsers, hardy and possess the capacity for high turnover. However, despite all these, the productivity of the ruminants in the North Western Nigeria has been adjudged to be low. One of the reasons for this phenomenon is the supply of feed which fluctuates as a result of vagaries of weather condition. [1]) reported that feed scarcity as a result of variation in climatic conditions causes the quality and quantity of natural vegetation and other su\pplementary feeds to be affected.

This scarcity of feeds and feeding stuffs can be remedied through the use non-conventional feed and agro allied waste. However, there have been concerted efforts at improving the nutritive content and palatability of these agro allied waste. Rice milling waste has proven to be promising when fed to ruminants along with other feed ingredients. [2]) reported that rice milling waste could be incorporated into the diet of growing sheep up to 45% level without significantly affecting performance. The study was therefore conducted to determine the haematological characteristics and biochemical parameters of growing Sokoto red goat fed untreated and urea treated rice milling waste.

A. Aruwayo1*, M. A. Yahaya and M. G. Garuba are with Department of Animal Production and Health, Faculty of Agriculture and Agricultural Technology, Federal University Dutsinma, P.M.B. 5001, Dutsinma, Katsina State.

II. MATERIALS AND METHODS

The study was conducted at the Teaching and Research Farm of Federal University Dutsinma. Twenty five entire male growing Sokoto red kids were used for the experiment. The experimental animals were quarantined for two weeks during which Bannath IIR dewormer (12.5g/kg body weight) were administered, sprayed against ectoparasite and treated with oxytetracyline (a broad spectrum antibiotics) by injection.

The experimental animals were allotted to five groups of A, B, C, D and E of five goats per group of one goat per replicate in a completely randomized design (CRD) [3]. The treatment diets consisted of the control (A) without rice milling waste, test diets B and C contained 15 and 30% untreated rice milling waste while D and E consisted of 15 % and 30% urea treated rice milling waste respectively. The experimental animals shall be fed ad libitum in the morning and evening for 90 days in each phase of the experiment. Other husbandry management were strictly adhered to.

10ml blood samples were collected from three randomly selected animals from each of the experimental groups early in the morning before feeding from the jugular vein [4]. About 3ml of the sample were placed in EDTA (anti-coagulant) bottle for hematological studies and the remaining 7ml placed in a universal bottle and allowed to stand for about 2 hours at room temperature, centrifuged at 700xg for 15 minutes and the serum separated, decanted and stored in a deep freezer for blood biochemical parameters test. The data was analysed using StatView Statistical package.

The composition of the experimental diet is shown in TableI.

TABLE I: GROSS COMPOSITION OF EXPERIMENTAL DIETS

Ingredients	Control	RMW (%)	RMW (30%)	UTRMW (15%)	UTRMW (30%)
Maize	10	10	10	10	10
Cotton Seed Cake	10	12	15	11	14
Groundnut Hay	17	17	17	17	17
Cowpea Husk	24	24	17	19	12
Wheat offal	35	20	9	26	12
RMW		15	30		
UTRMW				15	30
Bone Meal	1	1	1	1	1
Salt	1	1	1	1	1
Total	100	100	100	100	100

III. RESULT AND DISCUSSIONS

The proximate composition of the experimental diets is shown in tables II.

TABLE II PROXIMATE ANALYSIS AND CRUDE FIBRE FRACTION

Parameters	Treatments				
	A	B	C	D	E
Dry matter	92.01	93.0	94.5	93.5	94.0
Crude protein	15.69	15.43	15.47	15.42	15.48
Ether estract	5.2	5.5	5.6	5.7	5.5
Crude fibre	20.11	25.45	24.11	21.13	20.61
NFE	51.53	38.62	48.09	49.99	49.24
Ash	7.47	9.52	6.73	7.76	9.17

Heamatological Parameter of Growing Kid Untreated and Urea Treated Rice Milling waste

The results of the heamatological parameter from the study is shown in table III. The packed cell volume (PCV) in study did not differ (P>0.05) significantly between treatments. These values are similar to the report of [5] with average value of 25.6% in West Africa Dwarf goat and 38%, 36% and 28% in kano brown kid, Borno white kid and Sokoto red respectively [6]. The result of heamoglobin, red blood count (RBC) and mean corpuscular hemoglobin analysis showed no significant (P>0.05) difference between treatments. The values of these parameters compares with the report of [6], [7] and [5]. [7] also reported similar values. Mean corpuscular haemoglobin (MCH) reported in this study was higher (P<0.05) in treatments A, D and E though treatments D and E were statistically similar to treatments C. However, these values were similar to the of [6] of 38.7 l/g, 35.94 l/g for Sokoto red and Kano buck kid respectively. The mean corpuscular haemoglobin concentration (MCHC) in this study did not differ significantly between the control and test diets; and compares with the report of [6] with 31.8%, 28.05% and 35.2% in Kano brown, Borno white and Sokoto red buck kids respectively. The white blood cell in the study was significantly (P<0.05) higher in treatments B and E. However, treatments A and D are similar (P>0.05) while A, C and E were similar. These values were comparable with 19.4 $x10^9$L reported by [5] in West African Dwarf (WAD) buck kid and that of [6] with 16.2 x 10^9L and 19.8 $x10^9$L in Kano brown and Sokoto buck kid respectively. The results of haematological parameters showed that the control and test diets were able to supply the nutrients requirements of the experimental animlas and did have diseases that could have alter the white blood cells and the differentials from the normal range for a growing male goat.

The values of the biochemical parameters of the experimental animals are shown in Table IV. Urea nitrogen concentrations in all the treatments were not significantly different (P> 0.05) from each other. This same trend was observed in sodium, potassium and chloride. These values were similar to the values reported by [6] for kano brown buck kid with 6.1 mmol/L of urea, 150mmol/L of sodium, 6.4mmol/L of potassium, and 110mmol/L of chloride; Borno white buck kid with 7.7 mmol/L of urea, 7.2 156 mmol/L of sodium, 4.8mmol/L of potassium and 106mmol/L of chloride. For Sokoto red goat, these values were similar.

TABLE III: HAEMOTOLOGICAL PARAMETERS OF SOKOTO RED KIDS FED RICE MILLING WASTE AND UREA TREATED RICE MILLING WASTE

Parameters	Treatments					
	A	B	C	D	E	SEM
PCV (%)	31.96	27.81	32.22	34.75	35.64	3.58
Heamoglobin(g/dl)	11.00	10.70	10.75	11.65	12.50	1.38
Red Blood Cell (g/dl)	3.44	3.75	4.166	4.16	4.21	0.50
MCH (l/g)	31.95^{a}	23.15^{bc}	26.40^{b}	28.15^{ab}	27.70^{ab}	1.17
MCHC (%)	34.25	31.05	34.15	33.65	32.75	1.15
WBC ($x10^9$L).	15.18^{bc}	19.07^{a}	15.83^{c}	18.32^{ab}	14.88^{c}	0.82
Lymphocytes	71.50	71.5	71.50	72.0	71	2.1
Neutrophil	21.50	21.50	18.0	20.0	22.50	1.9
Eosinophils	4.5	4.5	4.0	5.0	4.0	0.6
Monocytes	2.5	2.5	2.5	3.0	2.5	0.6
Basophil	0.00	0.00	0.00	0.00	0.00	

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

Biochemical parameters of Growing Kid Untreated and Urea Treated Rice Milling waste

TABLE IV: BIOCHEMICAL PARAMETERS OF SOKOTO RED KIDS FED RICE MILLING WASTE AND UREA TREATED RICE MILLING WASTE.

	Treatments					
Parameters	A	B	C	D	E	SEM
Urea Nitrogen Conc. (umol/l)	4.5	5.5	4.0	5.25	4.0	0.25
Sodium (iumol/l)	130	135	136.5	131.5	137.5	2.4
Potassium (mmol/l)	5.6	5.8	5.7	5.9	6.1	0.28
Chloride (mmol/l)	109.5	113.5	114.5	106.0	114.5	5.0
Bilirubin*(	23.0	18.5	22.0	18.0	24.0	2.1
Creatine(umol/l)	71.0^{b}	82.0^{ab}	71.0^{b}	88.0^{a}	70.0^{c}	2.2
Total Protein(g/l)	69.5^{b}	78.5^{ab}	85.0^{a}	85.0^{a}	75.0^{ab}	4.0
Albumin	29.5^{b}	33.50^{a}	34.5^{a}	35.5^{a}	31.0^{ab}	2.4
Globulin	40.0^{b}	45.0^{a}	50.0^{a}	49.5^{a}	44.0^{ab}	1.3
ALT (IU/L)	29.5	33.5	34.5	35.3	31.0	31.0
AST	53^{b}	67.5^{ab}	78.0^{ab}	82.5^{a}	76.0^{ab}	5.0
ALP	44.0	49.0	54.0	38.5	40.5	4.8
Total *Bilirubin	0.0	4.0	4.0	0.0	0.0	1.6
Conjugated *Bilirubin (umol/L)	0.0	16.0^{a}	16.0^{a}	0.0	8.0^{b}	1.6

The biochemical parameters of the experimental animals are shown in table IV.

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

The values for creatinine in the study were significantly higher (P>0.05) in treatments D (88mmol/l) and B (82mmol/l) although treatment B is similar (P>0.05) to other treatments. These values were lower than the value obtained in Kano red brown kid and Borno white kid but higher than the average values reported by [6] in Sokoto red goat kid. Total protein values obtained in the study were not significantly different between the control diet and test diets B and D but significantly different form C and D. The albumin values in the study were not significantly different (P>0.05) in treatments B, C, D and E; and were all higher than treatment A except E. while the values for globulin were not significantly different from each other. The values of albumin obtained in this study were lower than the report of [6] for kano brown kid, Borno white kid, and Sokoto red goat kid while the globulin is higher. This was however similar to the report of [7]. The results of values of alanine amino transferase (ALT) were not significantly different (P>0.05) among the treatments. These

values are similar to the report of [6] for kano brown kid, Borno white kid, and Sokoto red goat kid but higher than that of [7] for West Africa dwarf goat. For aspartate amino transaminase (AST) values in the study, treatment D was similar (P>0.05) to that of treatments B, C and E but different (P>0.05) from A while alkaline phosphate were not significantly different between treatments (P>0.05). AST and ALP reported in this study are lower than that of [6]with 109.0 IU/L, 108.0 IU/L and 107.0 IU/L of AST in Kano brown kid, Borno white kid, and Sokoto red kid; and 77.0 IU/L, 82.0 IU/L and 83.0UL/L in Kano brown kid, Borno white kid, and Sokoto red kid. The total bilirubin from the study in the study ranged from 0-16umol/L in all the treatmenmts and is within the range reported by [8]. The results of biochemical parameters from this study revealed that feeding urea treated rice milling waste does not portend any danger to the kids since the control and test diets were comparable; and compares with other authors like [6] and [7].

IV. Conclusion

The haematological and biochemical levels in the study were within ranges reported by other authors. This implies that feeding urea treated rice milling waste to growing goat were not harmful and supplied nutrients needed by the animals.

References

[1] J. U. Abil, P. A. Iji, N. N. Ummunna, and Dim,. N. I. The replacement value of wheat bran, cotton seed cake and maize in the diets of sheep. Bull. Anim. Hlth. Prod. Afr. 4, pp65-69., 1992

[2] N. Muhammad, S.A. Maigandi1, W.A. Hassan1 and A.I. Daneji, "Growth performance and economics of sheep production with varying levels of rice milling waste," Sokoto Journal of Veterinary Sciences ,vol. 7(1), pp 59-64, May 2008

[3] R. G. D. Steel and J.A. Torrie. Principles and Procedures of Statistics, New York, McGraw-Hill Book Co. pp234-236

[4] E.H. Cole, Veterinary Clinical Pathology, 4th ed.harcourt Brace Jovanodi,W.B. Sanders Company Inc. PP 230-238

[5] M.N. Opara, N. Udevi, and I.C. Okoli, Haematological Parameters and Blood Chemistry of Apparently Healthy West Africa Dwarf (WAD) Goats in Owerri, South East ern Nigeria, New York Journal, Vol.3(8), pp 68-72. 2010.

[6] A. A. Njidda1, I. T. Hassan1 and E. A. Olatunji," Haematological and Biochemical Parameters of Goats of Semi Arid Environment Fed On Natural Grazing Rangeland of Northern Nigeria", IOSR Journal of Agriculture and Veterinary Science (IOSR-JAVS), Vol 3(2), pp 01-08, May. - Jun. 2013.

[7] I. Ikhimioya and J.A. Imasuen, "Blood Profile of West African Dwarf Goats Fed Panicum maximum Supplemented with Afzelia africana and Newbouldia laevis" , Pakistan Journal of Nutrition, vol. 6 (1), pp 79-84, 2007
http://dx.doi.org/10.3923/pjn.2007.79.84

[8] Merck Veterinary Manual, Serum Biochemical Reference Ranges. www.merckvetmanual.com/mvm/appendixes/reference_guides/serum-biochemistry_reference_range.html