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Haematological Indices and Blood Urea Nitrogen of Yankasa Ram Lambs Fed Urea, Poultry Droppings and or Urea Treated *Pennisetum pedicellatum* (Kyasuwa Grass)

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ABSTRACT: A study was conducted to evaluate the haematological indices and blood urea nitrogen (BUN) of Yankasa ram lambs fed urea and/or poultry droppings treated Kyasuwa (*Pennisetum pedicellatum*). There were no significant differences (P>0.05) between control treatment (K) and other treatment means observed in the values of packed cell volume (PCV), neutrophils, lymphocytes, eosinophils and basophils. Treatments KU and KPD are significantly different (P < 0.05) from the rest of the treatments in which treatment KPD had the highest value WBC. Blood urea nitrogen from all the treatments were not significantly different (P>0.05) from each other. No ill-health was encountered as a result of feeding treated Kyasuwa with urea and or poultry droppings.

Key words: Haematological Indices, BUN, Yankasa ram lambs, treated Kyasuwa

INTRODUCTION

As the dry season progresses, pastures become rarely available, and where they exist, they are often of very low quality (Oyenuga, 1968; Steinbach, 1997). Ibeawuchi and Adamu (1990) estimated that as much as 15% of the animal's body weight attained at the end of the previous rainy season could be lost during the following dry season. The problem is more acute in north - western Nigeria, especially in the Sudan Savanna and semi-arid zones where the bulk of the ruminant livestock are found in the country (Aregheore, 2001).These problems tend to reduce the rate of expansion of small ruminant production in Nigeria which has consequently contributed to the low level of animal protein intake of Nigerians. Efforts to reduce the high cost of feeds and by extension the cost of small ruminant production in Nigeria have been concentrated on using feed formulated from available and cheap alternative unconventional feedstuffs of no nutritional value in human diets.

Some of the unconventional feed ingredients that could easily be obtained in this area are urea and poultry droppings. They are often used conventionally as fertilizer to supply nutrients to the soil. Their utilization as feed ingredients could therefore provide alternative usage and in addition lower cost of feeding.

However, the use of certain animal wastes and some chemicals are sometimes said to be associated with potential risks, which could be due to the presence of harmful micro-organisms, anti-metabolites, drugs and other anti- nutritional excretory products (FAO, 1980). All these could cause metabolic disorders or diseases in animals. One way of monitoring the health status of animals is through the evaluation of haematological indices. This study was therefore aimed at evaluating the haematological parameters and blood urea nitrogen (BUN) of Yankasa ram lambs fed Kyasuwa treated with urea and poultry droppings.

MATERIALS AND METHODS

Experimental Location

The study was conducted at the Livestock Teaching and Research Farm located at the new site of Bayero University, Kano. Twenty entire male Yankasa ram lambs (weighing 15-18kg) were used for the experiment. The animals were balanced for weight with variation of ± 0.58kg before being allotted to the treatment groups. They were observed/quarantined for two weeks.

Feeding

The animals were managed intensively and group fed with cowpea hay and wheat offal before the commencement of the experiment. Kyasuwa (*Pennisetum pedicellatum*) was obtained from within and around the new site of Bayero University, Kano. Urea was purchased from the Kano market while Poultry droppings were obtained from the poultry production unit of the Department of Animal Science, Faculty of Agriculture, Bayero University, Kano. It was sun dried by spreading on clean floor.

Kyasuwa was treated with urea alone in the first Silo after chopping it to an average of 5cm length. 500g urea was dissolved in 7.5 litres of water and sprinkled on 12.5kg Kyasuwa,

pressed/ compacted manually and covered (air tight) with polythene. The mixture was left for 21 days in top open drums. The same procedure was repeated for the second and third Silo but (1kg) poultry droppings was used in the second silo while 500g combined with 250g poultry droppings with same quantity of Kyasuwa and water was used respectively. These same procedures were followed to obtained adequate quantities of Kyasuwa used in the feeding trial according to Roy and Rangnekar (2006) procedure.

Table 2: Gross Composition of Experimental Diet (%)

Ingredients	treatments				
	K	KU	KPD	KUPD	**Concentrate**
Urea + Poultry Droppings	-	-	-	+	-
Urea	-	+	-	-	-
Poultry Droppings	-	-	+	-	-
Maize	-	-	-	-	9
Wheat Offal	-	-	-	-	30
CSC	-	-	-	-	22
Cowpea Husk	-	-	-	-	15
Groundnut Haulms	-	-	-	-	22
Bone Meal	-	-	-	-	1
Salt	-	-	-	-	1
Total	-	-	-	-	100

K = Untreated Kyasuwa, KU = Kyasuwa + Urea
KPD = Kyasuwa + Poultry Droppings, KUPD = Kyasuwa + Urea + Poultry Droppings

Daily records of feed intake were taken throughout the 12weeks (84 days) of feeding trial by weighing feed offered and left over the following day in the morning. The animals were weighed at weekly intervals between 8:00am and 9:00am after overnight fasting.

Blood Sample Collection

Ten milliliters (10ml) of blood sample from individual animal was collected at the end of the feeding trial. Samples were drawn via the jugular vein as described by Coles (1986) with sterilized 19-gauge needle and syringe. 3ml of each sample collected was put in EDTA (anticoagulant) bottle for haematological studies. The remaining 7ml was placed in a universal bottle and allowed to stand for about 2 hours at room temperature. The universal bottles were thereafter centrifuged at 700 x for 15 minutes to separate and decant the serum, which was stored in a freezer at 2^0C to -20^0C for analysis.

Analytical Techniques

Thoroughly mixed representative samples of experimental diets and faeces were analyzed for proximate composition according to the procedures of A.O.A.C. (1990).

Whole blood samples in EDTA bottles was analyzed for Packed cell volume (PCV), lymphocytes, eosinophils, basophils, monocytes and neutrophils counts according to the methods described by Coles (1986).

Blood urea concentration was estimated by Nessler's reaction (Tanis and Naylor, 1968), while total proteins were estimated by Biuret method as described by Henry and Stobel (1957). Albumin was determined by Bromo Cresol Green method (Grant, 1987), while globulin was determined by the difference between total protein and albumin.

Statistical Analysis

Data generated were subjected to analysis of variance (ANOVA) using SAS (1999-2000). Least significant difference (LSD) was used to separate the means where differences existed.

RESULTS

Proximate Composition of the Experimental Diets

Results of the experimental diet proximate composition were presented on Table 1. Dry matter varied from 90.44% for treatment KU to 93.00% for treatment K. Crude protein values varied from 5.50% in treatment K to 12.50% in treatment KU. Crude fibre in the diet has the following values: 32.00, 27.00, 29.00 and 28.00 for treatments K, KU, KPD and KUPD respectively. Ether extract content for the diet contained 1.92, 5.30, 6.80 and 6.05% for treatments K, KU, KPD and KUPD respectively. Ash content values ranges from 8.0% in treatment KU to 9.30% in treatment KPD. The lowest value of NFE was obtained for treatment KPD (45.4%) while treatment K

(51.78%) gave the highest value. Concentrate diet contained 90.46, 16.50, 3.3, 26.00, 8.90 and 45.3% dry matter, crude protein, ether extract, crude fibre, ash and nitrogen free extract contents respectively for all the treatments.

Haematological Indices of Ram lambs Fed Urea and or Poultry Droppings Treated Kyasuwa

Haematological indices examined are shown in Table 2. There were no significant differences (P>0.05) between the control treatment (K) and other treatment means observed in the values of packed cell volume (PCV), neutrophils, lymphocytes, eosinophils and basophils. Results on WBC indicated similar values for treatment K (4.84) which served as control, KU (4.32) and KUPD (4.72). Treatments KU (4.32) urea treated Kyasuwa and KPD (5.38) poultry droppings treated Kyasuwa were significantly different (P < 0.05) from each other. Monocytes for KU (2.0) and KUPD (0.40) were significantly different (P < 0.05) from each other.

Blood Urea Nitrogen of Ram lambs fed Urea and or Poultry Droppings Treated Kyasuwa

Results on blood urea nitrogen (BUN) of ram lambs are shown in Table 3. Blood urea, albumin, globulin and total protein values from all the treatments were not significantly different (P < 0.05).

Table 1: Proximate composition of experimental diets

Parameter (%)	Treatments				Concentrate
	K	KU	KPD	KUPD	
Dry Matter	93.00	90.44	92.55	92.51	90.46
Crude Protein	5.50	12.50	9.50	11.00	16.50
Ether Extract	1.92	5.30	6.80	6.05	3.30
Crude Fibre	32.00	27.00	29.00	28.00	26.00
Ash	8.80	8.00	9.30	9.05	8.90
Nitrogen Free Extract	51.78	47.2	47.4	45.9	45.30

Table 2: Haematological indices of ram lambs fed urea and poultry droppings treated Kyasuwa

Parameter (%)	Treatments				LSD
	K	KU	KPD	KUPD	
PCV%	31.42	32.60	33.60	33.60	4.87
WBC(x10^9/µl)	4.84^{ab}	4.32^{b}	5.38^{a}	4.72^{ab}	0.82
Neutophils(%)	58.60	60.80	58.00	58.20	5.41
Lymphocytes(%)	37.20	35.00	37.80	38.80	5.22
Eosinophils(%)	1.00	1.40	1.80	1.80	1.92
Monocytes(%)	1.40^{ab}	2.00^{a}	1.20^{ab}	0.40^{b}	1.22
Basophils(%)	1.80	0.80	1.20	0.80	1.39

Means in the same row with different superscript are significantly different (P<0.05)

Table 3: Blood urea Nitrogen of ram lambs fed urea and or poultry droppings treated Kyasuwa

Parameter	Treatments				LSD
	K	KU	KPD	KUPD	
BUN (mg/dl)	14.00	17.40	22.40	21.40	9.20
Albumin (g/dl)	3.00	5.76	3.28	2.98	0.65
Total Protein (g/dl)	5.90	5.76	5.28	6.02	1.3
Globulin (g/dl)	2.90	2.40	2.00	3.04	1.26

DISCUSSION

Proximate Composition of Experimental Diets

The crude protein obtained from concentrate in the present study is within the range of 15 – 18% recommended by ARC (1990) for growing sheep weighing 10-30kg. These values were also reported by FAO (1986) and Aduku (2004) for ram lambs. However, the values obtained from roughage were below the values reported by the authors. Treatment of Kyasuwa with urea alone contributed to 7% increased in crude protein compared to non-treated Kyasuwa. Likewise, the combination of poultry droppings and urea led to 5.5% increased in crude protein compared to the control. This result indicates that urea treated Kyasuwa is better in terms of protein content compared to others. Crude protein content could be a single nutrient that could determine the quality of a feed as reported by McDonald *et al.*

(1995). The higher levels of crude fibre (32%) obtained in the control diet of this study could be due to the crude fibre contents of the roughage used, while lower values in the rest of the treatments be as a result of neutralisation of the fibre by the agents used to treat the roughage. This is in agreement with Jackson (1977) who reported that alkali treatment of straw dissolved lignin, silica and hemicelluloses. The crude fibre contents of the experimental diets in this experiment are lower than the values reported by Maigandi *et al.* (2002) when he used fore-stomach digesta in the diet of growing lambs. This shows that treatment with urea and poultry droppings or their combination helps in further reduction of fibre. This is better for growing lambs as reported by Wallace (1994) that young animals lack sufficient micro flora for efficient degradation of fibre.

Ether extract contents obtained from feeds in the present study were higher than 4.5 - 3.40% used by Maigandi and Tukur (2002) in the diet of growing lambs. It is expected that growth performance of the ram lambs will be supported by presence of higher values of crude protein or ether extract in treatment KU since it could result in enough ammonia rumen liquor which will facilitate microbial growth, thus increasing fibre digestibility (McDonald *et al.,* 1995).

Haematological Indices of Ram lambs: Packed cell volume (PCV) concentration obtained in this study was within the range of values reported by Coles (1986) for sheep. This indicated that the PCV has not been affected in all the treatments. It further showed that in all the treatments, animals did not suffer from anaemia or dehydration. This confirms the report of The Merck Veterinary Manual (1998) that a low PCV value was an indication of anaemia while sharp increased in PCV is most often caused by dehydration. Neutrophils, basophils, WBC, lymphocytes, eosinophils and monocytes from all the treatments are within the range obtained by Maigandi *et al.* (2003) and Taiwo and Ogunsanmi (2003) which were normal for healthy lambs. It could therefore be concluded that all the treatments have non toxic effect on the animals.

Blood Urea Nitrogen of Ram lambs: Although Blood urea level was slightly higher for treatments KU, KPD and KUPD compared to the control (treatment K), they were within the normal ranges. This could be due to the higher CP contents of treatments KU, KPD and KUPD in which there was improvement in the CP content by the treatment materials confirming the observation by Coles (1986) that high dietary protein is associated with increase in urea level. However, the mean total protein values obtained in this study were within the range of 5.5-10.0g/dl reported for various ruminant species (Taiwo and Ogunsanmi, 2003). Albumin and globulin values obtained were also similar to those reported in Coles (1986).

CONCLUSION

It was observed that the haematological indices of Yankasa ram lambs fed urea and or poultry droppings treated Kyasuwa remained within the normal values. It can be concluded therefore that feeding urea and or poultry droppings treated Kyasuwa does not affect blood parameters, an indication of its safety.

REFERENCES

Aduku, A. O. (2004). *Animal Nutrition in the Tropics. Feeds and Feeding, Pasture Management, Monogastric and Ruminant Nutrition*. 1st printing. Davcon Comp & Bus. Bureau, Zaria, Nigeria. 143pp

AOAC (1990). *Association of Official Analytical Chemists. Official Methods of Analysis* 15th Edition, Vol. 1 Arlington Virginia USA. 1094pp

ARC (1990). *The Nutrient Requirements for Ruminant Livestock*. Technical Review by Agricultural Research council working parties CAB International Wallingford, U.K.

Aregheore, E.M. (2001). The Effects of crop residues based diets on the performance of steers grazed on natural pasture during dry season *African Journal of Range Forage Science,* **18:** 25 – 29.

Coles, E.H. (1986). *Veterinary clinical pathology* 4th edition NB Sanders company. Harcourt Brace Jovanarich Inc.

FAO (1980). Food and Agricultural Organisation of the United Nations. *Feed from animal wastes. State of Knowledge.* Vol. 18, F.A.O. Rome. Italy

FAO (1986). Food and Agriculture Organisation/World Health Organisation/ United Nations University. Energy and protein requirement. Reports of a joint expert consultation Technical Report series, No. 724 Geneva, Switzerland

Grant, G.H. (1987). *Essential Amino acids and protein* In: Fundamentals of chemical chemistry. Tietz N.W. (ed.) Third edition, WB Sanders company Philadelphia USA, 328 – 329

Henry, R.J. and Stobel, C. (1957). Determination of serum proteins by Biuret reaction. *Analytical Chemistry*, **92:** 1491

Ibeawuchi, J.I. and Adamu, Y.A. (1990). Effects of various levels of *Acacia albida* pods in concentrate supplement for goats: Growth response and feed intake*. Bulletin of Animal Heaith Production in Africa,* **38:**219-222

Jackson, M.G. (1977). The Alkali Treatment of straws (review article). *Animal Feed Science Technol.* 2:105 In: Methods of treating cereal straws. Retrieved on 20/5/2009 from *http://www.unu.ed/unupress/unupbooks/80362e/80362E00.htm*

Maigandi, S. A. and Tukur, H. M. (2002). Potential of Fore-stomach Digesta as an unconventional feed ingredient. *Journal of Agriculture and Environment,* **3(1):** 55-64.

Maigandi, S. A., Tukur, H. M. and Daneji, A. I. (2003). Fore-Stomach Digesta in the Diets of Growing Sheep; I: Performance and economics of Production. *Sokoto Journal of Veterinary Sciences*, **4(2):** 16-21

McDonald, P.., Edwards, R. A. and Greenhalgh, J. F. D. (1995). *Animal Nutrition* (5th ed.) Longman Group Ltd London, U.K. 606pp

Oyenuga, V.A. (1968). Nigeria's food and feeding stuffs' their chemistry and Nutritive value. Ibadan University Press, Ibadan, Nigeria. 99pp

Roy, S. and Rangnekar, D.V. (2006). Farmer adoption of urea treatment of cereal straws for feeding animals in Mithila milk shed, India. *Livestock Research and Development,* **18(8):**

SAS. Institute Inc.(1999-2000). Statistical Analysis System (SAS/STAT) Guide for personal Computers, Version 6th edition, Carry N.C., U.S.A Pp.967-978.

Steel, R.G.D. and Torrie, J. H. (1980). *Principles and procedures of Statistics. A Biometrical Application.* 2nd ed. MC Graw Hill Books Co. Inc. N.Y.

Steinbach, J. (1997). Alternative to crop residues as feed resource in mixed farming system. In: *Crop residues in sustainable mixed crop/ livestock farming systems.* (Reynard, C. ed.) (AB International), Netherlands.

Taiwo, V.O. and Ogunsanmi, A.O. (2003). Haematology, plasma, whole blood and erythrocyte. Biochemical values of clinically healthy captive-reared grey duiker (*Sylvicapra grimmia*) and west African Dwarf sheep and Goats in Ibadan, Nigeria. *Israel Journal of Veterinary Medicine,* **58(1):**

Tanis, R.J. and Naylor, A.W. (1968). Physical and chemical studies of a low molecular weight orm of cheese. *Biochemistry Journal,* **108:***771*

The Merck Veterinary Manual (1998). Clinical Pathology and Procedures. (8thed.) Susan, E. A.(ed.) Merc and Co., Inc., N. J., U.S.A. Pp 202-120

Wallace, R.J. (1994). Ruminal microbiology, biotechnology and ruminant nutrition progress and problem. *Journal of Animal Science,* **72:** 293-303